# Trading Tensions: Navigating Policy Tools for a Diverse Critical Minerals Supply Chain

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SAFE

The Ambassador Alfred Hoffman, Jr.
Center for Critical Minerals Strategy

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Sincerely,

Abigail Hunter
Executive Director
SAFE Center for Critical Minerals Strategy

## GLOSSARY OF ABBREVIATIONS

**3TG** - Tin, Tungsten, Tantalum, and Gold

**AAM** - Anode Active Material

**AD** - Antidumping Duty

**AGOA** - African Growth and Opportunity Act

**BIL** - Bipartisan Infrastructure Law

**BRI** - Belt and Road Initiative

**CAM** - Cathode Active Material

**CBAM** - Carbon Border Adjustment Mechanism

**CBP** - Customs and Border Protection

**CAA** - Clean Air Act

**CITES** - Convention on International Trade in Endangered Species of Wild Fauna and Flora

**CMA** - Critical Minerals Agreement

**CCP** - Chinese Communist Party

**DOC** - U.S. Department of Commerce

**DOD** - U.S. Department of Defense

**DOE** - U.S. Department of Energy

**DOL** - U.S. Department of Labor

**DOS** - U.S. Department of State

**DPA** - Defense Production Act

**DRC** - Democratic Republic of Congo

**EPA** - U.S. Environmental Protection Agency

**ERGI** - Energy Resource Governance Initiative

**EU** - European Union

**EV** - Electric Vehicle

**FLETF** - Forced Labor Enforcement Taskforce

**FEOC** - Foreign Entity of Concern

**FTA** - Free Trade Agreement

**G7** - Group of Seven

**GAO** - Government Accountability Office

**GSP** - Generalized System of Preferences

**HTS** - Harmonized Tariff Schedule

**ICE** - Internal Combustion Engine

**IRA** - Inflation Reduction Act

**MHP** - Mixed-Hydroxide Precipitate

**MSP** - Minerals Security Partnership

**NDAA** - National Defense Authorization Act

**OEM** - Original Equipment Manufacturers

**PGI** - Partnership for Global Infrastructure and Investment

**PVC** - Polyvinyl Chloride

**R&D** - Research and Development

**REEs** - Rare Earth Elements

**SOE** - State-Owned Enterprise

**SEC** - Securities and Exchange Commission

**USGS** - United States Geological Survey

**USITC** - U.S. International Trade Commission

**USJTA** - U.S.-Japan Trade Agreement

**USMCA** - U.S.-Mexico-Canada Agreement

**UFLPA** - Uyghur Forced Labor Prevention Act

**USTR** - U.S. Trade Representative

**WTO** - World Trade Organization

# Executive Summary

The United States faces a strategic challenge in securing reliable access to critical minerals that are the backbone of its economic prosperity and national defense. From the smartphones in our pockets to the advanced weapon systems protecting our nation, critical minerals like lithium, nickel, cobalt, rare earths, and aluminum are integral to the technologies powering modern society. These minerals are also crucial components in clean energy technologies, such as wind turbines and solar panels, and are essential for the batteries that drive the growing fleet of electric vehicles transforming the transportation sector. This report addresses the question: "How can the United States advance policies to influence the flow of critical minerals, with the goals of maintaining and building U.S. market presence, diversifying supply chains, and promoting high environmental and labor standards globally?"

Using electric vehicles (EVs) and their critical minerals components—a sector that is the focal point of recent trade policies—as a case study, the analysis in this report examines the opportunities and limitations of trade measures in addressing critical mineral supply chain challenges. Trade policy, though not a comprehensive solution to the challenges in critical mineral supply chains, offers some of the tools capable of garnering bipartisan support in an increasingly polarized political climate. However, effective resource-focused trade policy hinges on robust diplomacy with allies and strategic partners and alignment with broader economic strategies designed to enhance U.S. economic competitiveness globally.

## Geopolitical Landscape and Supply Chain Vulnerabilities

The global landscape for critical minerals is dominated by intense geopolitical competition, particularly between the United States and China. China has emerged as a dominant player, controlling a significant share of both the upstream (mining and extraction) and midstream (refining and processing) stages of critical mineral supply chains. This dominance is the result of decades of strategic investments, government subsidies, and industrial policies, which give Chinese companies a competitive edge, as well as broader market failures that advantage bad actors with lower costs from poor environmental and labor practices.

EVs are a key driver of demand for these minerals. While the U.S. is expanding its downstream capacity in vehicle and battery manufacturing, it lacks sufficient midstream (refining and processing) and upstream (mining and extraction) capabilities. Ensuring reliable access to mineral feedstock is essential for growing the U.S. EV and battery manufacturing, both of which depend on a steady, secure, and environmentally and socially responsible supply for production.

China currently processes between 70 to 90 percent of the world's lithium, nickel, cobalt, rare earths, and other key minerals essential for battery and electric motor production. This control extends to the upstream sector for some minerals, with China dominating the mining of graphite and rare earth elements (REE). For other minerals, the absence of apparent geographic concentration in mining does not preclude Chinese influence. State-owned enterprises and other Chinese companies strategically acquire stakes in mining operations worldwide to divert material back to China for processing, further consolidating Beijing's influence over the supply chain. The concentration of these critical supply chains—especially processing—in one country, particularly one with adversarial geopolitical interests, poses a significant risk to U.S. national security, economic stability, and technological leadership.

While the United States does not directly import large quantities of raw critical minerals from China, it heavily relies on imports of products like battery components and other intermediate goods that contain critical minerals sourced from China. This indirect dependence on China's critical mineral supply is often obscured by the multi-step, cross-border nature of the supply chains.

Despite ongoing efforts to diversify, critical mineral supply chains remain stubbornly concentrated. Two powerful forces drive this trend: First, the Chinese Communist Party's (CCP) well-funded strategy to dominate advanced technology sectors


United States, Michigan, Dearborn: Ford Rouge Electric Vehicle Center. The facility is part of the historic Rouge Complex and houses production of the all-electric Ford F-150 Lightning pickup truck, the best-selling vehicle line in the USA. (Photo by: DR/SP/Andia/Universal Images Group via Getty Images)

and their mineral inputs. Second, a pervasive market failure, exacerbated by opaque supply chains, which fails to account for the true cost of mineral extraction. This market failure creates an uneven playing field, disadvantaging responsible producers who bear higher costs for fair labor practices and environmental compliance. The result is a race to the bottom that further entrenches existing supply chain monopolies and undermines global efforts toward sustainable and equitable resource management.

## The Role of Trade Policy: Tools for Securing Supply Chains

The United States has several trade policy tools at its disposal to address the vulnerabilities in critical mineral supply chains. Trade tools can be categorized into unilateral actions (e.g., tariffs and export controls), trade preference programs, and joint actions (e.g., Free Trade Agreements and Critical Mineral Agreements). Each of these tools has unique advantages and limitations, and their effectiveness often depends on how well they are integrated with broader economic and diplomatic strategies.

### Unilateral Trade Tools

**Tariffs**: The United States has historically used tariffs to protect domestic industries and counter unfair trade practices, such as those seen in China's state-subsidized critical mineral sector. For instance, Section 301 tariffs have been imposed on a range of Chinese imports, including several critical minerals, to counteract market-distorting practices. Similarly, Section 232 of the Trade Expansion Act allows the United States to impose tariffs on imports that threaten national security, as has been done for steel and aluminum. Tariffs alone do not improve the global competitiveness of U.S. industries. Furthermore, they can lead to unintended consequences, such as increasing costs for U.S. manufacturers and consumers, and require careful calibration to account for the often lengthy process of qualifying new suppliers or developing alternative sources, especially when options are limited or non-existent. The limitation of tariff policies in the absence of well-developed domestic and allied supply chains is exemplified by the Department of Commerce's final decision to not recommend a Section 232 tariff on neodymium-iron-boron permanent magnets, despite acknowledging a national security threat.

**Disclosure Requirements**: Transparency in supply chains is crucial to ensure that imported goods comply with U.S. labor, environmental, and national security standards. The Dodd-Frank Act's Section 1502, which mandates the disclosure of conflict minerals from the Democratic Republic of Congo (DRC), exemplifies efforts to promote ethical sourcing, while the National Defense Authorization Act (NDAA provisions for rare earth permanent magnets focus on supply chain transparency for national security reasons. These initiatives have yielded important lessons. First, such measures can place significant compliance burdens on companies and are only effective if rigorously enforced. Second, even with improved transparency, companies often struggle to shift supply chains if viable alternatives don't exist.

**Import Prohibitions**: The Uyghur Forced Labor Prevention Act (UFLPA) is an example of an import prohibition designed to prevent goods made with forced labor from entering the U.S. market. This tool can be powerful but requires robust enforcement and additional resources for implementing agencies to ensure compliance. Without adequate support and careful implementation, import bans can also have unintended consequences, potentially restricting U.S. industry's access to crucial material inputs if supply chains are not given time to adapt.

While trade policies are powerful tools, they come with trade-offs.

**Export Controls**: Export controls in the semiconductor industry are implemented to restrict access to advanced technologies and equipment, the United States faces a different set of considerations and potential pitfalls when exploring restrictions on exports of end-of-life products, scrap, and recycling intermediates in the critical minerals sector. Policymakers must navigate potential pitfalls such as implementing export controls without sufficient midstream capacity to transform recycling feedstock, which could lead to market imbalances and potentially hurt the entire recycling industry. Another pitfall is the message such policies may send to other nations considering export controls on raw materials.

### Trade Preference Programs

**Generalized System of Preferences (GSP) and the African Growth and Opportunity Act (AGOA)**: Trade preference programs offer privileged trade access to developing countries, fostering economic development while diversifying U.S. supply chains. While programs could potentially support responsible critical mineral industries in these regions low economic benefits and utilization rates suggest programs like AGOA alone may provide insufficient incentives to significantly increase capacity for responsible critical minerals production and trade. The costs associated with complying with AGOA's eligibility requirements, coupled with low Most Favored Nation (MFN) tariffs on critical mineral imports, create a challenging cost-benefit calculation for countries considering participation in the program for critical minerals trade.

### Joint Trade Tools

**Free Trade Agreements (FTAs)**: FTAs are a cornerstone of U.S. trade policy, reducing trade barriers while promoting shared values like labor rights and environmental protection. Their success depends on robust enforcement mechanisms. Although current U.S. FTAs do not contain provisions specifically targeting critical minerals, they do feature actionable clauses on environmental and labor issues. For example, the U.S.-Peru Trade Promotion Agreement includes a Forest Governance Annex to address specific environmental concerns, while the U.S.-Mexico-Canada Agreement (USMCA) establishes a Rapid Response Mechanism for swift action against labor rights violations. These provisions can serve as a model for future agreements. However, negotiating FTAs can be politically challenging and time-consuming given their economy-wide scope. Disputes in unrelated sectors can potentially delay or impede progress on critical minerals provisions.

**Critical Mineral Agreements (CMAs)**: The United States has begun negotiating CMAs with key partners, such as the U.S.-Japan CMA signed in 2023. These agreements aim to secure critical mineral supplies through alignment on trade policies and shared standards, laying the framework for reducing U.S. dependence on adversarial nations like China. CMAs must uphold a consistent standards framework to prevent a patchwork of varying requirements across different agreements. Crucially, their effectiveness hinges on enforceability, with tailored mechanisms to ensure compliance and capacity-building measures to support implementation across partners with varying capabilities.

## Navigating Trade-Offs and Challenges

While trade policies are powerful tools, they come with trade-offs. Policymakers must balance competing priorities, such as:

1. **Harmonizing U.S. and Allied Trade Policies:** Opaque supply chains enable circumvention of unilateral trade measures and undermine policies targeting the full value chain. While improving supply chain transparency is essential in the long-term, the United States can start harmonizing policies with partners to minimize loopholes and sends stronger market signals.
2. **Balancing De-Risking, Domestic Manufacturing, and Responsible Production Priorities**: Trade policies often involve trade-offs between these competing priorities of de-risking supply chains, supporting domestic industry, and promoting sustainable practices. No single policy can effectively address all three objectives.
3. **Embedded Minerals and Trade Policies**: Targeted trade remedies may not effectively reduce U.S. reliance on China due to the complex, global nature of supply chains. These policies can create loopholes where Chinese materials are incorporated into products in other countries and then imported to the U.S. without tariffs, potentially shifting supply chains without addressing upstream dependence on Chinese sources.
4. **Long Project Timelines vs. Urgent Need for Materials in the Downstream**: The development of critical mineral supply chains faces significant time challenges, with U.S. mine projects taking an average of 29 years from discovery to production, nearly double the global average. This extended timeline, alongside the rapid growth of downstream capacity, highlights the necessity of supporting both domestic U.S. projects and international efforts. These two approaches are not mutually exclusive; rather, they must be aligned to ensure a secure and sustainable supply of critical minerals to meet future demand.

# Recommendations:
# A Strategic Approach to Critical Mineral Supply Chains

To address the challenges outlined in this report, the United States must adopt a multifaceted and strategic approach to securing its critical mineral supply chains. Key recommendations include:

1. **Enhancing Unilateral Actions**: The United States should strengthen its existing trade measures, including tariffs, export controls, and disclosure requirements, to protect its interests and promote ethical supply chains. Enhanced supply chain transparency is crucial for improving the implementation of existing policies. An analysis of the collective effectiveness of individual trade tools addressing labor, environmental, and human rights concerns is needed to better integrate currently siloed efforts and policies. Additionally, creating a pathway for AGOA countries to negotiate sectoral critical mineral agreements will align domestic sourcing policies with international efforts.
2. **Creating and Expanding Multilateral Agreements**: The United States should continue negotiating and expanding CMAs with key allies and partners, creating a global network of secure, responsible critical mineral supply chains. These agreements should be integrated into broader trade policies and coordinated with diplomatic and economic initiatives to maximize their impact.
3. **Bolstering Domestic and Allied Production Capacity**: Trade policies alone cannot ensure a resilient critical mineral supply chain, as they do not address core U.S. competitiveness issues. To reduce foreign dependence, the U.S. should invest in domestic production and processing, maintaining existing incentives while expanding them to overlooked areas, and supporting R&D for alternative materials, recycling, and efficient techniques. Additionally, workforce development and streamlined permitting processes are crucial for enhancing U.S. competitiveness in critical minerals.

   Internationally, the U.S. should pursue trade policies in tandem with related diplomatic efforts to better support capacity building and joint investment in strategic resource-rich countries. This involves institutionalizing key partnerships, increasing funding for international collaboration, and fostering business relationships to develop allied supply chains. Efforts should focus on sustainable mining practices, environmental regulations, safety standards, and community engagement in partner countries. Cooperation should extend to both traditional allies and emerging economies that are key sources of critical minerals.

Securing a diverse, resilient critical mineral supply chain is essential for the U.S. to maintain its economic and military leadership in the 21st Century. By leveraging trade policy tools, fostering international cooperation, and investing in domestic capabilities, the United States can mitigate the risks posed by over-reliance on foreign sources, particularly those controlled by geopolitical adversaries. This report provides a roadmap for how the United States can navigate the complex and evolving global trade landscape to achieve these goals, ensuring that supply chains are not only secure but also sustainable and ethically responsible.

# Introduction: Ties between National Security and Diverse Supply Chains

In an era of global interdependence, vulnerable supply chains, and geopolitical competition, U.S. policymakers are increasingly leveraging trade policy to influence and secure the critical mineral supply chains that underpin national security, economic prosperity, and energy resiliency. As nations vie for control over these essential resources, the United States will need to effectively balance crafting politically feasible legislative solutions, strengthening and building relationships, and supporting accompanying economic and industrial sectors to build a secure critical mineral supply chain.

The United States defines a critical mineral as "a nonfuel mineral or mineral material essential to the economic or national security of the United States and which has a supply chain vulnerable to disruption."[1] Many of these critical minerals are extracted and processed far from U.S. shores, often in regions with varying geopolitical interests and standards for environmental protection and labor practices. In these contexts, a secure critical mineral supply chain consists primarily of domestic up, mid, and downstream sources substituted by allied and like-minded nations when U.S. sources are unavailable. Most importantly, a secure supply chain is insulated from influence by foreign entities of concern (FEOC).[2]

U.S. national security policy increasingly recognizes the importance of leveraging economic statecraft and leadership in technological innovation—including clean energy, advanced computing, and biotechnologies—to promote and strengthen the existing rules-based international system, maintain economic strength, and coalesce allies to address collective threats.[3] Critical minerals are essential for sustaining daily life, powering commercial innovation and defense capabilities, and supporting economic competitiveness. While the United States was once home to a robust manufacturing base, benefitting U.S. commercial and military supply chains, this base is shrinking, with productivity across manufacturing sectors stalling or declining over the last 20 years.[4] The United States now faces the need to quickly secure and build stable commercial and defense supply chains while supporting sustainable and ethical mining practices across diverse international contexts.

A global transition to minerals-based energy sources is happening at a time when many nations are grasping at diplomatic, economic, and trade tools to counterbalance the actions of a common, non-market geopolitical competitor dominating the critical mineral supply chain—the People's Republic of China (China). Increasingly powerful non-market actors, primarily China, are taking advantage of the post-Cold War rules-based free-trade system to distort the critical minerals market, among other markets across economic sectors. China built a significant competitive edge in the critical minerals industry over the past two decades, outpacing U.S. and partner countries' R&D capabilities by at least a decade.[5] This advantage is attributed to a combination of government subsidies, industrial policies leading to production overcapacity, and intellectual property infringement.[6] The CCP leverages state-owned enterprises (SOEs) and the Chinese private sector to build overcapacity in critical minerals mining and processing enabling producers to flood global markets with cheap products, at times artificially depressing prices to eliminate free market competitors.[7]

Additionally, Chinese firms benefit from operating under less stringent environmental and labor regulations, providing them with a significant cost advantage gained through practices

1 U.S. Institute of Peace, *Critical Minerals in Africa: Strengthening Security, Supporting Development, and Reducing Conflict amid Geopolitical Competition*, April 9, 2024, at page 13.

2 Foreign entities of concern are entities owned by, controlled by, or influenced by the governments of China, Russia, Iran, and North Korea, or any entity legally incorporated within these nations. Source: 42 USC § 18741(a)(5) and 10 USC §2533c.

3 The White House, *National Security Strategy*, October 2022, at page 11.

4 Joseph Politano, "America's Manufacturing Productivity Problem," Apricitas Economics, May 14, 2024.

5 Thomas Sheehy, "Thomas Sheehy on U.S.-China Competition and Africa's Critical Minerals," U.S. Institute of Peace, June 26, 2023; and Foreign Policy, *Mining the Future: How China is Set to Dominate the Next Industrial Revolution*, May 2019, at page 3.

6 The White House, "FACT SHEET: President Biden Takes Action to Protect American Workers and Businesses from China's Unfair Trade Practices," May 14, 2024.

7 See e.g., U.S. Department of the Treasury, "Remarks by Under Secretary for International Affairs Jay Shambaugh on Chinese Overcapacity and the Global Economy," Press Release, July 10, 2024.

Charleston, SC, USA - May 03, 2024: Container ship Maersk Willemstadt passes marina and aircraft carrier USS Yorktown. (Daniel Wright / iStock)

that can rely on child labor, environmental degradation, or corruption.[8] This advantage is facilitated by reduced government scrutiny and limited reporting requirements for companies listed on Chinese exchanges, allowing firms to operate with less transparency and oversight compared to their Western counterparts.[9] The complexity and obscurity of critical mineral supply chain, particularly in the up and midstream, make it challenging for end-users and regulators to trace the origin of minerals or verify the conditions under which they were extracted and shields bad actors in the upstream from scrutiny and accountability. The combination of these factors creates an unfair and challenging environment for competitors adhering to free market principles and stricter standards to successfully challenge China. Continuing to rely on opaque supply chains not only perpetuates harmful practices in less regulated regions but also solidifies an uneven global market, driving more responsible competitors out of business and consolidating control over critical mineral supply chains.[10] The dominance of Chinese firms in these non-transparent supply chains poses a threat to U.S. economic competitiveness and national security. This threat is heightened by China's demonstrated willingness to weaponize its supply chain dominance for geopolitical gains.[11]

This report seeks to answer, how can the United States advance policies to influence the flow of critical minerals with the goals of increasing U.S. competitiveness, supply chain diversification, and high standards globally? The analysis focuses on examining the efficacy of existing and potential trade policies, using electric vehicles (EVs) and their critical mineral components as a case study, to assess how policymakers can optimize trade tools. Creating a secure critical minerals supply chain requires a multifaceted approach that simultaneously addresses immediate and future national security threats. Although trade policies alone will not substantively improve U.S. critical mineral supply chain security, they gain domestic and international traction and are some of the only policies to garner bipartisan support in an increasingly polarized world. Trade policies are most effective when they are coordinated with or supported by U.S. allies and partners and paired with supporting diplomatic and economic policies. By providing a nuanced analysis of U.S. trade policies to secure and responsibly develop a secure critical mineral supply chain, this study aims to contribute to a more comprehensive understanding of the potential use and the limitations of trade measures at a pivotal moment in critical mineral supply chain security.

Continuing to rely on opaque supply chains not only perpetuates harmful practices in less regulated regions but also solidifies an uneven global market.

8 See e.g., SAFE, *A Global Race to the Top*, March 2023, at page 5; and John VerWey, *U.S.-China Competition in Global Supply Chains*, Testimony before the U.S.-China Economic and Security Review Commission, June 2022, at pages 2 and 3.

9 See e.g., Aaron Costello and Vivian Gan, "ESG Challenges and Opportunities in Chinese Equities," Cambridge Associates, September 2021.

10 The latest iteration of the same story is now playing out in the nickel market, where Australian nickel producers are closing shop amid a nickel glut coming from Chinese producers in Indonesia. See e.g., SAFE, *A Global Race to the Top*, March 2023, at page 5; and Rick Mills, "Indonesia and China Killed the Nickel Market," Mining.com, March 4, 2024.

11 Beijing announced export controls on germanium, gallium, and graphite, and outright banned the export of rare earths processing technology. Source: See e.g., Siyi Liu and Dominique Patton, "China Bans Export of Rare Earths Processing Tech Over National Security," Reuters, December 22, 2023.

Sulawesi, Indonesia - August 09 2021: Loading Nickel Ore Mining to Barge. (Adhitya Nur / iStock)

# Mapping the Supply Chain: Geography and Geopolitics

This report uses the EV supply chain, from minerals to market, as a case study. EVs are a major driver of critical minerals demand, particularly for lithium-ion batteries. Furthermore, policymakers have increasingly leveraged various tools to influence the critical mineral supply chain over the last decade. Of the 50 mineral commodities the United States Geological Survey (USGS) recognizes as critical for U.S. economy and national security, five of these—lithium, graphite, nickel, cobalt, and manganese—are used in EV batteries, and certain rare earth elements (REEs) form the building blocks of permanent magnets incorporated in electric motors.[11]

## Geography: Locating the Supply Chain's Up, Mid, and Downstream Nodes

### Upstream – exploring and extracting minerals

China's dominance over the upstream supply chain for nearly every critical mineral is significant. The mining of graphite is among the least geographically diversified of critical minerals, with production highly concentrated in China.[13] However, the absence of apparent geographic concentration for certain minerals does not preclude Chinese influence. For many critical minerals, the geographic dispersion of extraction sites belies a profound market concentration. Chinese companies strategically own stakes in over 1,500 major mining operations around the world to divert raw material supply to refineries in China at the direction of and with support from the Chinese government.[14] This strategy allows China to maintain its dominant position in the critical minerals supply chain, even when the physical mining operations are located beyond its borders. The market concentration is most acute in the case of nickel and cobalt, where Chinese companies account for approximately 40 percent of mine production for both metals.

Political and economic realities hamstring U.S. and allied efforts to counteract geographic concentrations domestically and in third party markets. In terms of critical mineral deposits and mines in the United States, existing economically viable deposits are limited; however, increased exploration and mining technology could increase this number.[15] While the United States and its partners are developing mines in geographically diverse regions, many of those projects require a high demand scenario with viable offtakers to successfully start operations. As a result, the most economically viable or advanced projects are still concentrated in existing major producing countries.

### Midstream – refining, processing, and producing anodes, cathodes, and permanent magnets

The midstream is the most vulnerable choke point of the critical mineral supply chain. China aptly leverages this choke point to disadvantage other stakeholders from developing up, mid, and downstream supply chains free of FEOC influence. China is home to nearly 90 percent of cathode active material (CAM) and 97 percent of anode active material (AAM) production capacity. It is also responsible for producing 70, 80, 86, 93, and 90 percent of battery-grade lithium, nickel, cobalt, manganese, and graphite, respectively—concentration levels that sometimes exceed figures for overall refining.[16] China's dominance in critical mineral processing is driven by lower capital expenditure requirements, strong government support

12 Note that rare earth elements are listed separately on the USGS critical minerals list. The primary rare earth metals used in permanent magnet production, which is an essential component of the electric motor, are neodymium, praseodymium, dysprosium, and terbium. Source: U.S. Geological Survey, "U.S. Geological Survey Releases 2022 List of Critical Minerals," Press Release, February 22, 2022.

13 Ibid, at pages 43 and 44.

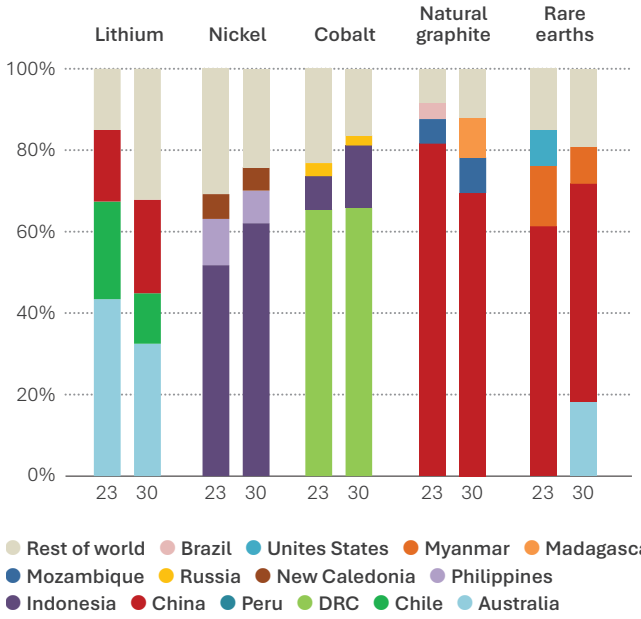
14 Government of Canada, "Mining Market in China," Webpage.

15 International Energy Agency (IEA), *Global EV Outlook 2024*, April 2024, at page 81.

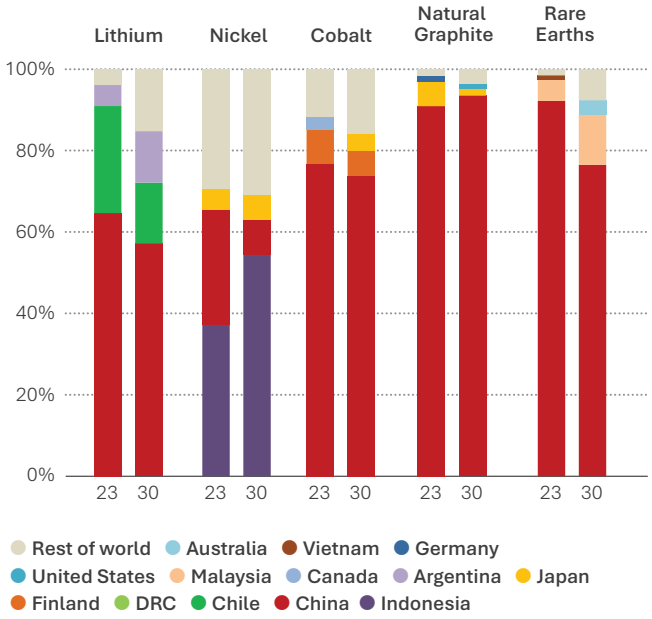
16 Peter Martin and Jennifer Jacobs, "US, Philippines Eye Agreement to Cut China Nickel Dominance," Bloomberg, updated May 1, 2024; and IEA, *Global Critical Minerals Outlook*, May 2024, at page 30.

**Figure 1** Geographic Distribution of Critical Minerals Mining and Refining, 2023–2030

**Geographical Distribution of Mined or Raw Material for Key Energy Transition Minerals in the Base Case, 2023-2030**




**Geographical Distribution of Refined Material Production for Key Energy Transition Minerals in the Base Case, 2023-2030**




Note: Nickel refining data includes production of non-battery grade nickel. Graphite refining data is based on battery-grade spherical graphite production. Rare earths data includes magnet rare earths only. Source: International Energy Agency

through subsidies and favorable policies, and technical know-how. Additionally, domestic CAM and AAM producers ensure consistent market demand, reinforcing China's position in the global supply chain.[17]

U.S. and allied efforts to develop midstream capacity are ongoing but face significant challenges. Forecast AAM and CAM production in North America is expected to satisfy less than half of the regional demand.[18] Growth in AAM and CAM production is constrained by multiple factors that include capital expenditure costs that are two to three times higher in the United States compared to building the same facility in Asia, Chinese overcapacity plummeting prices of minerals, limited technical expertise, and mining companies directing the majority of available critical minerals feedstock to Chinese refineries.

U.S. and allied efforts to develop midstream capacity are ongoing but China is to maintain its dominant position in refining most critical minerals through 2030.[19] While Indonesia is emerging as a major nickel refiner and expanding into battery-grade nickel production, these operations are largely developed by Chinese companies, allowing them to maintain market control.[20]

The landscape of CAM and AAM production will also remain heavily skewed. As of 2024, the only countries with significant CAM production capacity outside of China are South Korea and Japan, with ten and three percent of global CAM manufacturing capacity, respectively.[21] The alternatives are even more limited for AAM. China's production capacity was four to nine times greater than global demand in 2023. This Chinese overcapacity poses a significant challenge not only to North American efforts but also to other countries' attempts to expand their supply chains.[22]

REE supply chains are just as concentrated in the midstream. Almost all REE separation and metal refining takes place in China. Estonia, Malaysia, and Vietnam each have one of the three commercial-scale REE separation facilities in operation outside of China.[23] Additional facilities in Australia are approaching operational status, and smaller-scale refining units in France and the United States are also nearing completion.[24] This progress in refining capacity will need to be matched in REE metal, alloy, and magnet production—supply nodes where China accounts for approximately 90 percent of global production.[25] Japan represents approximately seven percent of global permanent magnet production, leaving the remainder to a few small, internationally dispersed companies.[26] New

17 Emile Detry, et al., "Five Steps for Solving the Rare-Earth Metals Shortage," Boston Consulting Group, July 6, 2023.

18 David Gohlke et al., "Quantification of Commercially Planned Battery Component Supply in North America through 2035," Argonne National Laboratory, 2024, at pages 30 to 34.

19 IEA, *Global Critical Minerals Outlook 2024*, May 2024, at page 42

20 See e..g., Carrie Shi and Yiwen Ju, "China's Lygend delivers first EV battery-grade nickel sulfate from Indonesia," Fastmarkets, March 29, 2023.

21 IEA, *Global EV Outlook 2024*, April 2024, at page 81.

22 Ibid.

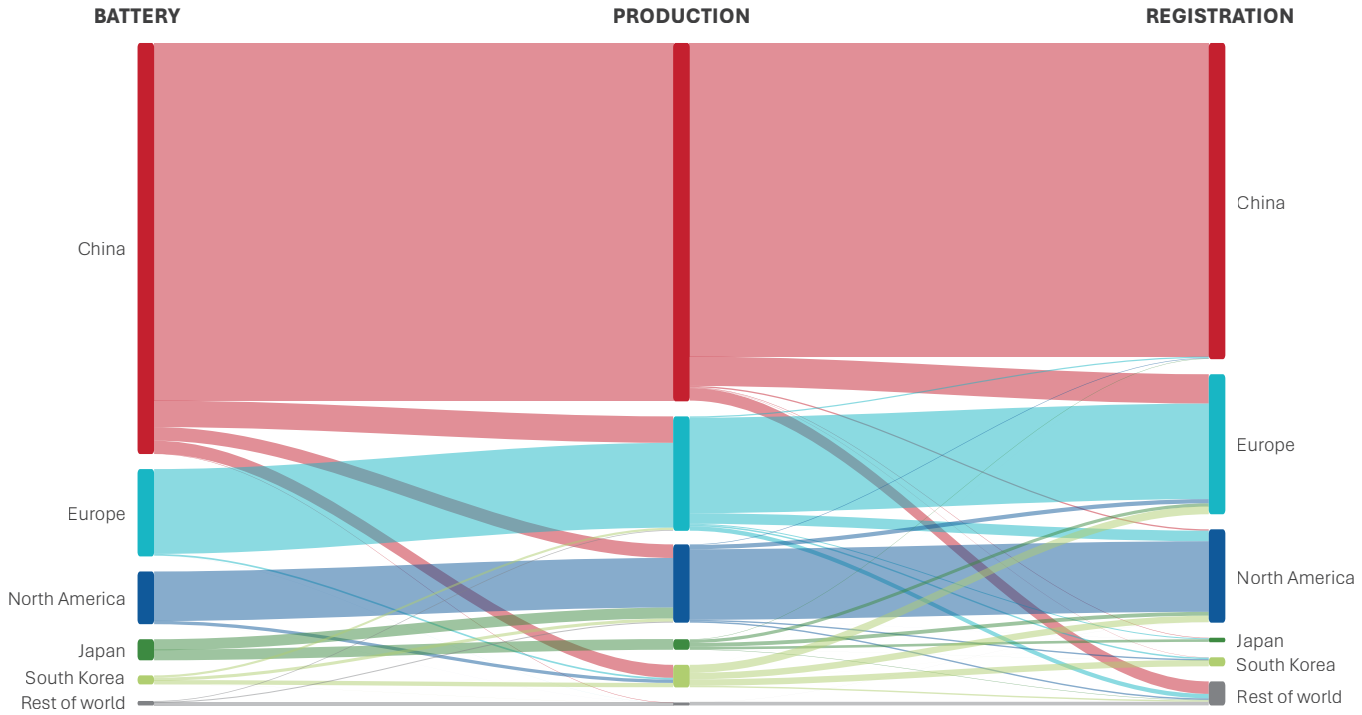
23 IEA, *Global Critical Minerals Outlook 2024*, May 2024, at page 184.

24 Ibid, at page 182.

25 88 FR 9430.

26 Ibid.

**Figure 2** Global Trade Flows of Lithium-Ion Batteries and Electric Cars, 2023




Source: International Energy Agency analysis based on data from Benchmark Mineral Intelligence and EV Volumes.

projects are underway to build more diverse capacity along these supply chain steps including at least two REE magnet manufacturing facilities in the United States.[27] However, they too face significant economic challenges in competing with established Chinese operations.

## Downstream – manufacturing lithium-ion batteries and EVs

Downstream and end-user demand significantly influences the geographic distribution of vehicle assembly and battery manufacturing facilities, as manufacturers tend to locate their production centers close to high-demand areas.[28] Consequently, a substantial share of global EV and EV battery manufacturing is in China, partly because it is home to 60 percent of global EV consumer demand.

The United States and its allies are better positioned in the downstream sector compared to the up and midstream sectors due to growing domestic end-user demand and historically strong manufacturing and engineering sectors, including the automotive industry. North American battery manufacturing capacity is poised to reach 1,000 Gigawatt-hours per year (GWh/year) by 2030, increasing from 55 GWh/year in 2023.[29] This expansion has the potential to supply 10 million EVs. To put this number in context, approximately 15.5 million light-duty vehicles were sold in the United States in 2023.[30]

Despite this growth, Chinese EV and EV battery exports threaten the burgeoning U.S. industry. China's gigafactory capacity is expected to reach double the volume of batteries required to electrify China's entire vehicle fleet by 2030.[31] This massive excess capacity, bolstered by illegal subsidies, creates strong incentives for Chinese manufacturers to target foreign markets, often flooding them with low-priced products and increasing the capacity utilization rates of their facilities. Some of the biggest producers and sellers of EV batteries and cars are Chinese companies, like CATL and BYD, that offer impossibly low prices for competitors to match, destroying the possibility of economic competition.[32] Free market competitors bear the brunt of these predatory practices, which also undermine efforts by the United States and like-minded countries to develop their own domestic manufacturing industries.

27 MP Materials is building a REE metal, alloy, and magnet manufacturing facility in Texas. Vacuumschmelze is building a REE magnet manufacturing facility in South Carolina. The companies received $58.5 million and $111.9 million in investment tax credits, respectively, under the 48C Qualifying Advanced Energy Project Tax Credit. Source: Office of Manufacturing and Energy Supply Chains, "Applicant Self-Disclosed 48C Projects," U.S. Department of Energy, Webpage.

28 Ibid, at page 80.

29 DOE, "FOTW #1271, January 2, 2023: Electric Vehicle Battery Manufacturing Capacity in North America in 2030 is Projected to be Nearly 20 Times Greater than in 2021," January 2, 2023.

30 Cox Automotive, "Cox Automotive Forecast: U.S. Auto Sales Expected to Finish 2023 Up More Than 11% Year Over Year, as General Motors Retains Top Spot, Hyundai Motor Group Jumps Past Stellantis," December 27, 2023.

31 Sam Adham, "Overcapacity in China's Battery Cell Industry Will Lead to Consolidation," CRU Group, August 25, 2023.

32 See e.g., Janis Mackey Frayer and Jennifer Jett, "China's Booming Electric Vehicle Companies Eye U.S. Competitors They See as 'Not Ready'," NBC News, May 7, 2024.

## Geopolitics: Competing Defense, Diplomatic, and Economic Demands

The growing concentration of critical minerals supply chains poses immense risk to U.S. and allied commercial and defense sectors. China's dominance of the global critical mineral supply chain is a component of its broader strategic plan to aggressively pursue commanding leadership positions in a variety of advanced scientific and technological industries of economic and strategic significance.[33] Market distortions perpetuated by China are particularly concerning in the critical minerals sector. While critical minerals themselves comprise only a small fraction—slightly more than 1 percent—of global trade value, their strategic importance far outweighs their market share.[34] These resources are essential to technological advancement, clean energy transition, and defense platforms, making them crucial for both economic competitiveness and national security.

China's integration into the global economy, especially since joining the World Trade Organization (WTO), did not result in the expected convergence with free market practices. Instead, its state-driven economic model, characterized by industrial subsidies, concessional loans, and limited market access for foreign firms, challenges the core assumptions of the post-World War II trade system.[35] By operating under alternative rules, China distorts markets and puts its trading partners at a significant disadvantage, undermining the expected benefits of free trade. Further complicating this issue is China's strategic approach to strategic technology and critical mineral exports, signaling its willingness to restrict exports of raw minerals and midstream products while continuing to export finished goods.[36] China's policy stance effectively leverages its dominance in the critical mineral supply chain to maintain its competitive advantage in high-value manufactured products, potentially limiting other countries' ability to develop or maintain their own advanced manufacturing capabilities. China's accession to the WTO, while intended to integrate it into the global trading system, inadvertently provided the CCP with a platform to implement this strategy, allowing it to benefit from open markets while selectively applying protectionist measures in critical sectors.

While critical minerals themselves comprise only a small fraction—slightly more than 1 percent—of global trade value, their strategic importance far outweighs their market share.

The economic and national security implications of Beijing's control over the critical mineral supply chain is a growing concern within the United States Executive and Legislative branches, with action mounting in 2017 to shift the solidifying status quo. In 2017, the Trump administration prioritized countering the strategic threat that China poses to the U.S. critical mineral supply chain, and subsequently economic and national security, with the release of Executive Order 13817, A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals.[37] The Executive Order called for national action in research and development, improving the understanding of domestic critical mineral resources, enhancing domestic production and manufacturing capabilities, streamlining permitting processes, and developing a skilled workforce to support the domestic critical minerals industry.

The Trump administration also imposed tariffs on Chinese imports, including several critical minerals and related products along the EV supply chain, in 2018 and 2019 as part of its broader trade policy aimed at protecting domestic industries and reducing the trade deficit with China.[38] Additionally in 2019, the Department of State (DOS) launched the Energy Resource Governance Initiative (ERGI), a multilateral effort to create responsible governance and mining practices in resource-rich countries, to foster open and transparent markets, and encourage a level playing field to drive private sector investment.[39]

Six months after taking office, the Biden administration continued these efforts and published a 100-Day Supply Chain Review for critical minerals, emerging from Executive Order 14017. This review examined existing and potential strengths and weaknesses of the U.S. critical mineral supply chain and reaffirmed industrial policies previously prioritized by the Trump administration through

33 SAFE, *Commanding Heights of Global Transportation*, September 2020, at pages 6 and 7.

34 SAFE analysis based on data from the World Trade Organization.

35 U.S. Trade Representative, *2023 Report to Congress on China's WTO Compliance*, February 2024, at pages 2 to 8.

36 SAFE, *Commanding Heights of Global Transportation*, September 2020, at pages 6 and 7.

37 U.S. Department of Commerce, *A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals*, June 2019.

38 Congressional Research Service, "Section 301 Tariffs on Goods from China: International and Domestic Legal Challenges", April 5, 2022, at pages 1 and 2.

39 U.S. Department of State, "ENR ERGI FAQs," September 25, 2019.


Jinan (number 152) missile destroyer acrossed Victoria harbour of Hong Kong returning naval base in mainland of China. (EarnestTse / iStock)

executive actions.[40] The Biden administration also sought to formalize partnerships to counter the strategic threat China poses to the global critical mineral supply chain by establishing the Minerals Security Partnership (MSP) and the Partnership for Global Infrastructure and Investment (PGI). MSP is a collaborative effort between fourteen countries and the European Union (EU) "to catalyze public and private investment in responsible critical minerals supply chains globally."[41] PGI complements this work by advancing "public and private investments in sustainable, inclusive, resilient and quality infrastructure."[42] There are a few critical minerals projects in the scope of PGI. Most recently in May 2024, the Biden administration announced plans to further increase the Trump-era tariffs on Chinese imports of EVs, lithium-ion batteries, and their critical mineral components. New tariffs were introduced for graphite and permanent magnets.[43]

Congress established new or expanded existing programs under the Defense Production Act (DPA), CHIPS and Science Act (CHIPS), Bipartisan Infrastructure Law (BIL), and Inflation Reduction Act (IRA). These pieces of legislation provide various demand and supply-side incentives to create a domestic and U.S. partner-supported market for new production capacity, support processing, manufacturing, and recycling, and foster innovation. The introduction of the 30D Clean Vehicle Tax Credit sourcing provisions under the IRA marked a watershed moment in leveraging trade policy to diversify the critical mineral supply chain.[44] The IRA directs original equipment manufacturers (OEMs) to source critical minerals from free trade agreement (FTA) countries and battery sourcing to North America. The Act also prohibits EVs containing components or materials sourced from FEOCs from becoming eligible for up to $7,500 in consumer tax credits.[45] By using FTAs as a proxy for reasonably secure and responsible sources, this policy linked sourcing practices and consumer incentives. It created one of the strongest market signals to date for automakers to restructure their supply chains and avoid materials and components from FEOCs. However, implementation challenges soon exposed a stark misalignment between existing U.S. trade partnerships and the current global production and trade landscape for these materials. Australia, Canada, South Korea, the EU, and other major U.S. trading partners implemented waves of complementary unilateral legislation and incentive packages following the passage of the IRA.[46]

Recognizing the gap between FTA countries and mineral-rich countries, the United States started negotiating critical mineral agreements (CMAs) to expand IRA-compliant

40 The White House, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth: 100-Day Reviews under Executive Order 14017*, June 2021.

41 The White House, "Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth," June 2021; and U.S. Department of State, "Minerals Security Partnership," Webpage.

42 U.S. Department of State, *Office of the U.S. Special Coordinator for the Partnership for Global Infrastructure and Investment*, 2024.

43 The White House, "FACT SHEET: President Biden Takes Action to Protect American Workers and Businesses from China's Unfair Trade Practices," May 14, 2024.

44 Foreign entities of concern are entities owned by, controlled by, or influenced by the governments of China, Russia, Iran, and North Korea, or any entity legally incorporated within these nations. Source: IRC. § 30D; 42 USC § 18741(a)(5).

45 Ibid.

46 Chemical & Engineering News, "US battery incentives push Canada to offer more: The country is highlighting its access to battery minerals and renewable energy," June 8, 2023; and European Parliament Directorate-General for Internal Policies, "EU's response to the US Inflation Reduction Act (IRA)", June 2023.

## EVs: Driving the Future of Critical Minerals Demand

The conversation surrounding battery materials and REEs is largely driven by the EV supply chain. New mining projects and processing facilities require substantial capital expenditures, which are typically justified by projections of robust future demand. For the battery minerals and REEs, EVs represent a significant and rapidly growing source of demand for these materials, playing a crucial role in justifying investments in new mineral supply.

The EV sector's impact on critical mineral markets is best illustrated by nickel. Nickel is a critical mineral used in long-range cathode chemistries for lithium-ion batteries, as well as in military hardware, including aircraft engines, submarines, and armor plating. Currently, EVs account for 10 percent of global nickel demand.[47] However, this share of global nickel demand is projected to increase to 27 percent by 2030 and 35 percent by 2035.[48] EVs will account for 74 percent of nickel demand growth between 2023 and 2035.[49]

A similar scenario plays out in the other battery minerals and REEs. Between 2023 and 2035, EVs will be the main drivers of demand growth for battery minerals and REEs: 74 percent for cobalt, 87 percent for lithium, 68 percent for graphite, and 50 percent for REEs.[50] It is important to note that while demand drives investment in new production capacity, the geographic distribution of mineral extraction is primarily determined by the location of cost-competitive resources. This is a notable distinction between upstream and downstream activities, as downstream manufacturing tends to follow demand centers.

47 SAFE analysis based on data from IEA's Critical Minerals Data Explorer.

48 Note: All numbers are conservative estimates based on the State Policies Scenario. Source: Ibid.

49 Ibid.

50 Ibid.

sources and bolster supply for U.S. industry.[51] The first and only CMA to date was signed with Japan in March 2023.[52] The United States aims to expand sustainable and responsible critical mineral production and processing domestically and in partner countries to achieve supply chain independence from countries like China by 2035.[53] However, challenges remain, particularly in addressing the market distortions created by China's state-driven economic model and the broader market failure to account for the true costs of mineral extraction, including environmental and labor standards.

Over the last six years, the United States entered a new era of global trade dynamics, this time driven by critical minerals and associated advanced technology sectors. Policies are evolving to address the emerging challenges and opportunities faced by American workers and businesses—and shape the critical supply chains of the future. Both the Trump and Biden administrations emphasized the importance of supporting U.S. jobs, addressing unfair trade practices, promoting responsible production, bolstering supply chain resilience, and expanding engagement with strategic partners. The Trump and Biden administrations also utilized Section 301 Tariffs as a tool to address unfair trade practices, particularly targeting Chinese imports.[54] Although the differences are minimal, the Trump administration focused on renegotiating existing agreements and pursuing their aggressive enforcement of existing labor and environmental provisions, while the Biden administration emphasized collaboration with strategic, like-minded partners to create a floor for global standards and level market dynamics to foster fair competition.[55] During this period, U.S. policymakers enacted many unilateral trade policies, signed on to numerous multilateral frameworks, and experimented with novel plurilateral framework agreements to de-risk supply chains. However, gaps remain in efforts to create a diverse, responsible critical mineral trading network while maintaining high standards.

51 In addition to the U.S.-Japan CMA, the United States is also negotiating CMAs with the European Union and the United Kingdom. Source: Congressional Research Service, "U.S.-Japan Critical Minerals Agreement," updated May 20, 2024, at page 1.

52 Ibid.

53 See e.g., National Defense Authorization Act of 2024, Pub. L 118-31, Section 1414(b).

54 Erica York, "Tariff Tracker: Tracking the Economic Impact of the Trump-Biden Tariffs," Tax Foundation, June 26, 2024.

55 U.S. Traded Representative, "USTR Releases President Biden's 2024 Trade Policy Agenda and 2023 Annual Report," Webpage, March 1, 2024; and USTR, "FACT SHEET: The President's 2020 Trade Agenda and Annual Report," Webpage.

Aerial view of cargo ships in containers sailing in the blue sea.

# The Role of Trade Policy

Historical precedent demonstrates the U.S. government's willingness to employ trade measures to shape and protect the domestic automotive sector. Notable examples, such as the Chicken Tax and the U.S.-Japan Voluntary Export Restraint Agreement of 1981, illustrate the profound and enduring impacts of such policies on downstream manufacturing sectors. The current landscape presents new challenges centered on upstream supply chains, specifically critical minerals, which are essential building blocks of EV components like batteries and the electric motor. As policymakers contemplate potential interventions, they must carefully consider how various trade tools—such as tariffs, quotas, and export controls—interact differently with upstream mineral extraction, midstream processing and refining, and downstream manufacturing processes.

The United States enacted the Chicken Tax in 1964 in retaliation to European import duties on American chicken, introducing a 25 percent tariff on light trucks, effectively discouraging imports of foreign-made pickup trucks and vans.[56] The Tax has had long-lasting effects and continues to shape the automotive industry today, entrenching the dominance of U.S. OEMs in the domestic pickup truck market, while spurring foreign manufacturers to devise creative workarounds to circumvent the tariff.[57] The tax demonstrated how trade measures can become entrenched and outlast their original purpose.

The rising dominance of Japanese automakers in the U.S. market and growing concerns about the viability of the U.S. domestic auto industry led to the U.S.-Japan Voluntary Export Restraint Agreement. The Agreement aimed to provide temporary protections for U.S. auto manufacturers by limiting the import of Japanese cars into the United States, providing lead time for domestic manufacture.[58] The voluntary export restraint program, terminated in 1994, went far beyond its original intent of protecting the U.S. auto industry. By incentivizing Japanese manufacturers to establish production facilities in the United States, it attracted substantial foreign direct investment in the United States and fostered a more closely integrated auto supply chain between the United States and Japan.[59]

Lessons from past automotive trade policies like the Chicken Tax and the U.S.-Japan Voluntary Export Restraint Agreement remain valuable, while modern trade strategies must grapple with complexities that were barely on the radar in previous decades, including securing access to critical minerals, promoting higher environmental and labor standards throughout the production process, reducing dependencies on single sources, and enabling transparency from raw material extraction to final assembly. It is worth reassessing the unique nature of today's challenge. This report section provides an in-depth analysis of various trade policy instruments and their implication across the critical minerals value chain. It examines how these tools align with the existing policy framework and evaluate their efficacy in: (1) diversifying critical mineral supply chain and ensuring uninterrupted U.S. access to critical mineral products, (2) upholding high labor and environmental standards, and (3) enhancing transparency throughout the critical mineral supply chain.

## Unilateral Trade Tools

The United States developed and refined a robust set of trade policies that regulate the import and export of goods to protect national security, foreign policy, and economic interests, while also avoiding undue regulatory burdens on legitimate

Modern trade strategies must grapple with complexities that were barely on the radar in previous decades.

56 See e.g., Mark J. Perry, "The Anti-consumer 25% 'chicken Tax' on Truck Imports Has Insulated Big 3 from Foreign Competition for 50+ Years," American Enterprise Institute, September 23, 2018.

57 See e.g., Mark J. Perry, "The Anti-consumer 25% 'chicken Tax' on Truck Imports Has Insulated Big 3 from Foreign Competition for 50+ Years," American Enterprise Institute, September 23, 2018; and Michal Brandy, Todd Frankel, "The Strange Case of Ford's Attempt to Avoid the 'Chicken Tax,'" Washington Post, July 6, 2018.

58 Joint Economic Committee, "The Legacy of the Japanese Voluntary Export Restraints," June 24, 1985, at page 1.

59 Wells King and Dan Vaughn, Jr. "The Import Quota That Remade the Auto Industry," September 2022, at pages 1 and 3.

international trade. Trade tools analyzed in this section include disclosures, import restrictions, tariffs, and export controls.

## Disclosure Requirements

Disclosure requirements are established to ensure compliance with federal laws and regulations. Over time, as regulations became more complex the scope and sophistication of these disclosure requirements evolved in tandem to enhance supply chain transparency and promote ethical and sustainable sourcing.[60] The United States has two types of disclosures for imported goods: rules of origin requirements and requirements to disclose other information. In the critical minerals sector, rules of origin often fall short of achieving full transparency due to the intricacy of the supply chain.

The United States uses rules of origin to identify the nationality of a product, crucial information for trade regulation. Customs and Border Protection (CBP) agents collect appropriate tariffs and enforce other laws and regulations as appropriate based on a good's country of origin.[61] Many products today, including EVs and their critical mineral components, have complex supply chains that span multiple countries. Raw materials cross multiple borders as they are refined, processed, and manufactured into advanced technologies. Material inputs from multiple countries are often combined in the processing and manufacturing steps. All this movement can make it difficult for exporters and importers to determine the country of origin. CBP typically determines the country of origin based on rules of origin established under FTAs or, in the absence of such rules, based on a substantial transformation criterion—a vague principle established over a century ago.[62]

FTAs provide an opportunity to implement more comprehensive rules of origin that capture a greater portion of the supply chain. One example is the automotive rules of origin under the U.S.-Mexico-Canada Agreement (USMCA), which include specific requirements for regional value content, labor value content, and the sourcing of steel and aluminum.[63] For a passenger vehicle to be considered originating from USMCA countries, 75 percent of its components must be made in North America, 40-45 percent of its component value must be produced by workers earning at least $16 per hour, and at least 70 percent of the vehicle's steel and aluminum must come from North America.[64]

The substantial transformation criterion is narrow compared to FTA rules of origin. CBP applies this criterion if an FTA is not in place.[65] The substantial transformation principle sets the country of origin as the last country where the good went through a fundamental change in form, appearance, or use.[66] As such, the country of origin for CAM does not reflect where its critical mineral inputs were mined and processed.[67] Similarly, the country of origin for battery cells does not reflect where CAM and AAM and their other inputs were produced.[68] The limited information a substatial transformation criterion on AAM and CAM embedded materials provides makes it challenging for CBP to map complete supply chains and creates opportunities for non-market actors to circumvent disclosure requirements and tariffs. Materials from a country the United States has tariff actions against could go through a substantial transformation in a third country, who can then export the product that contains the targeted minerals into the United States without incurring the original tariffs.[69] Notably, this criterion takes precedence over any existing FTA rule of origin to determine the implementation of Section 301 Tariffs.[70]

Other U.S. agencies have their own disclosure requirements for the activities or products they regulate. The history of federal disclosure requirements in the United States dates to the Securities Act of 1933 and the Securities Exchange Act of 1934. Congress enacted these landmark laws after the Great Depression to enhance transparency in financial markets, operating under the assumption that better-informed decision-making by market actors would lead to better outcomes. When it comes to promoting more ethical and sustainable critical mineral supply chains, however, disclosure requirements may not necessarily lead to substantial changes in sourcing practices or improvements in on-the-ground conditions without additional measures. Such measures could include carrots and sticks tied to compliance, technical assistance, and capacity building initiatives to improve standards at the source, support to develop alternative supply both at the source or in another location, and close collaboration with like-minded countries to uphold shared values and promote transparency.

Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act serves as an instructive case study. Its provision mandates companies to disclose certain information on products that contain the conflict minerals, defined as tin, tungsten, tantalum, and gold (3TG), originating from the Democratic Republic of Congo (DRC) and surrounding

60 An example of this is the Uyghur Forced Labor Prevention Act (UFLPA), which requires importers to provide clear and convincing evidence that goods originating from or transported through the Xinjiang Uyghur Autonomous Region of China are not produced with forced labor to get the goods through the U.S. border. UFLPA will be discussed in greater length under import restrictions.

61 U.S. Department of Homeland Security, *What Every Member of the Trade Community Should Know About: U.S. Rules of Origin*, May 2004, at page 8.

62 Ibid.

63 Congressional Research Service, "USMCA: Automotive Rules of Origin," Updated December 8, 2023, at page 1.

64 Ibid.

65 International Trade Administration, "Determining Origin: Substantial Transformation", Webpage.

66 Customs and Border Patrol (CBP), "Marking of Country of Origin on U.S. Imports," Webpage.

67 CBP HQ N324313, March 4, 2022.

68 Note that the assembly of a battery pack using battery cells from another country does not count as substantial transformation. Source: CBP HQ N306161, October 4, 2019.

69 See rules of origin discussion under the disclosure requirements section.

70 CBP HQ N306161, October 4, 2019.

countries to the Securities and Exchange Commission (SEC).[71] However, the SEC has yet to enforce actions against companies violating the disclosure requirements.[72] It is not surprising, then, that a 2019 Government Accountability Office (GAO) report found that only 69 percent of companies implemented mechanisms to conduct due diligence requirements under the Dodd-Frank Act.

The EU drafted its own set of legislation to increase transparency in supply chains with known exposure to conflict minerals, inspired by Dodd-Frank. The regulation requires all EU importers of 3TGs to conduct supply chain due diligence.[73] Importers, however, are failing to meet the due diligence standards because the metal smelters or refineries they import from have minimal transparency mechanisms to verify the origins of their feedstock.[74]

Even when sufficient supply chain information is collected, companies struggle to shift supply chains if viable alternatives do not exist. The same 2019 GAO report noted that only 16 percent of companies reported that they would stop sourcing from their suppliers if they used conflict minerals, largely due to the difficulties in identifying alternative suppliers.[75] If Western investors and companies start shifting sources, they will risk losing any influence they have to improve standards in existing supply chains and create a bifurcated market in a worst case scenario. In a realistic best-case scenario, responsible industry actors will source critical minerals from supply chains that include opaque buyers and traders, still making it nearly impossible to trace the origin of supply chain. Geology restricts the number of alternative critical mineral sourcing options. Typically high levels of instability in critical mineral-rich regions further restrict secure sourcing options.

The EU Batteries Regulation, which has the most comprehensive disclosure requirements for EV supply chains, provides another model for an EV disclosure requirement. Passed in 2023, the Regulation requires all batteries sold within the EU to report certain information, including the battery chemistry, number of recycled materials, and carbon footprint. It also requires companies to establish a due diligence framework. The goal of the legislation is to help consumers make informed decisions when purchasing batteries or EVs.[76]

71 Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L 111-203 § 1502, and 77 FR 56273.

72 U.S. Securities and Exchange Commission, "Updated Statement on the Effect of the Court of Appeals Decision on the Conflict Minerals Rule," Public Statement, April 7, 2017.

73 EU Regulation 2017/821.

74 Lotte Hoex, et al. *The EU Conflict Minerals Regulation: Higi Stakes, Disappointing Results*, IPIS and PAX, October 2023, at page 5.

75 U.S. Government Accountability Office (GAO), *Conflict Minerals: Actions Needed to Assess Progress Addressing Armed Groups' Exploitation of Minerals*, September 2020, at page 19.

76 Directorate-General for Environment, "Circular economy: New law on more sustainable, circular and safe batteries enters into force," European Commission, Press Release, August 17, 2023.

Even when sufficient supply chain information is collected, companies struggle to shift supply chains if viable alternatives do not exist.

More recently, the EU approved its Corporate Sustainability Due Diligence Directive, which significantly expands disclosure requirements for companies doing business within its borders. The Directive mandates EU companies, their subsidiaries, and their supply chain business partners—regardless of location—to disclose adverse human rights and environmental impacts.[77] This includes reporting on greenhouse gas emissions and labor practices throughout the entire supply chain. It is too early to assess the effectiveness of the EU Batteries Regulations and Corporate Sustainability Due Diligence Directive, as the different requirements will phase in through 2027 and 2029, respectively.[78] However, companies may fail to meet due diligence and reporting standards if they cannot gain visibility beyond their tier 2 suppliers, such as those at tier 8, tier 9, or even tier 12 of the supply chain.

In the United States, the NDAA provides the only disclosure requirement tailored specifically to critical minerals supply chain and is limited to the government defense procurement context.[79] Section 857 of the 2023 NDAA mandates contractors selling magnets to the Department of Defense (DOD) to disclose the location where the REEs in the magnets were mined and processed.[80] These specific requirements allow the U.S. government to more accurately map defense supply chains for a critical industry.[81]

The disclosure requirements for magnets complement defense acquisition rules that prohibit deploying sensitive material sourced from non-allied foreign nations, namely China, Russia, North Korea, and Iran.[82] The sensitive materials restrictions currently apply to neodymium-iron-boron (NdFeB) magnets and their metal alloys. Starting in 2027, the prohibitions will also include REEs components mined, refined, separated, and melted in the four covered nations.[83] The supply chain mapping required by the REE disclosure requirements, in this case, can

77 EU Directive 2024/1760.

78 Ibid.

79 James M. Inhofe National Defense Authorization Act for the Fiscal Year 2023, Pub. L. No. 117-263, § 857(a)(1), 136 Stat. 2395, 2727 (2022).

80 Marcia Madsen, Luke Levasseur, Cameron Edlefsen, and Evan Williams, "US NDAA for Fiscal Year 2023: Important Changes to Procurement Laws and Policy," Mayer Brown, December 30, 2022.

81 Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010).

82 10 U.S. Code § 4872.

83 National Defense Authorization Act of 2024, Section 854, Pub. L. 118-31.

help both companies and the DOD assess compliance with the sensitive materials restrictions.

The NDAA disclosure requirement is also facing criticism for the additional burden placed on companies, especially start-ups and small and medium-sized enterprises, without incentives.[84] Meeting the due diligence and reporting requirements can be costly for companies and can impact competitiveness against entities that are not held to the same standards. To mitigate these concerns, future policies should be designed to reduce unnecessary burden for companies and provide a clear value proposition for compliance to address competitiveness concerns.

## Import Prohibitions

Strong disclosure and rule of origin requirements are essential for effective import prohibitions, which "limit the entry of certain products into the United States…based primarily on country of origin and product type."[85] Such policies are inherently protectionist in nature but are justified via two main framings: protecting domestic producers from unfair competition or ensuring that goods entering the country reflect the nation's values.[86]

The United States has several import prohibitions pertaining to forced labor and environmental standards. These provide interesting case studies for critical minerals. The foundation of all import restrictions related to forced labor is Section 307 of the Tariff Act of 1930, which prohibits "importing any product that was mined, produced, or manufactured wholly or in part by forced labor, including forced or indentured child labor" into the United States.[87] The United States justifies import prohibitions on the grounds of moral principles.

> Policymakers would need to grapple with setting standards stringent enough to ensure responsible sourcing while avoiding thresholds so high that they severely limit U.S. access to essential materials.

In December 2021, Congress amended Section 307 through a bipartisan effort to include the Uyghur Forced Labor Prevention Act (UFLPA), targeting Xinjiang, a region in Northwest China prominent for heavy industry—producing aluminum, iron, steel, polysilicon, and increasingly lithium, among other goods relevant to high-tech industries.[88] The passage of UFLPA followed the DOS January 2021 determination that China has, and continues to, commit genocide and crimes against humanity, predominantly targeting Muslim Uyghurs and other ethnic minorities in Xinjiang.[89]

This Act is unique because it establishes a 'rebuttable presumption' that any goods produced wholly or in part in Xinjiang or by an entity on the UFLPA Entity List are made with forced labor.[90] Prior to UFLPA, CBP was in charge of identifying and prohibiting the entry of goods produced with Uyghur forced labor using its authorities from the Section 307 of the Tariff Act of 1930. The agency would issue withhold and release orders if there was reasonable suspicion that the goods were made with forced labor. Otherwise, goods could enter the United States with little to no scrutiny.[91]

This rebuttal presumption created a higher bar for importers to clear. Because it assumes all goods wholly or partially made in Xinjiang or by an entity on the UFPLA Entity List are made using forced labor, importers must provide evidence that forced labor was not used in any part of the product's manufacturing process to clear customs. This evidentiary standard covers not just the final production facility but also extends to all inputs, including subcomponents and raw materials.

UFLPA directs the Forced Labor Enforcement Taskforce (FLETF) to identify high-priority sectors for enforcement, starting with cotton, tomatoes and polysilicon. The initial list, published in 2022, also identified apparel as a high-priority sector. In its 2024 update to its UFLPA implementation strategy, FLETF added three more sectors to its lists: aluminum, polyvinyl chloride (PVC), and seafood.[92] While the law applies to all U.S. imports, imports in high-priority sectors receive greater scrutiny.[93]

84 SAFE takeaways from the National Defense Industry Association's Mine-To-Magnet Workshop, January 16, 2024.

85 eCustoms, "U.S. Import Controls," Webpage.

86 Timothy Meyer, *Consumption Governance: The Role of Production and Consumption in International Economic Law*, Brigham Young University, May 24, 2024.

87 Christopher A. Casey et al., "Section 307 and Imports Produced by Forced Labor," Congressional Research Service, updated October 25, 2023.

88 Human Rights Watch, "China: Carmakers Implicated in Uyghur Forced Labor," February 1, 2024.

89 U.S. Department of State, "Determination of the Secretary of State on Atrocities in Xinjiang," Press Release, January 19, 2021.

90 Uyghur Forced Labor Prevention Act, Public Law No. 117-78, 135 Stat. 1525 (2021).

91 GAO, *Force Labor: CBP Should Improve Communication to Strengthen Trade Enforcement*, March 2021, at page 23.

92 U.S. Department of Homeland Security, *2024 Updates to the Strategy to Prevent the Importation of Goods Mined, Produced, or Manufactured with Forced Labor in the People's Republic of China*, Report to Congress, July 9, 2024.

93 CBP's expansion of high-priority sectors was bolstered by a significant budget increase in FY2023, with an additional $101 million allocated to forced labor enforcement. This doubled CBP's resources compared to FY2022. Source: Ibid, at page v; and John Brew, et al., "Congress Increases CBP's Forced Labor Enforcement Budget to More Than $100 Million," Crowell, February 8, 2023.

## Senate Finance Committee Report on Insufficient Due Diligence in the Auto Sector: UFLPA Compliance Gaps

Although the UFLPA is the most robust import prohibition program currently operating, a 2024 Senate Finance Committee report found that major automakers operating in the United States conducted insufficient supply chain due diligence and were subsequently complicit with the Chinese Communist Party's (CCP) forced labor regime.[94] BMW Group (BMW), Jaguar Land Rover Limited and its wholly owned sales subsidiary Jaguar Land Rover North America (Jaguar Land Rover), and Volkswagen AG (VW AG) all submitted voluntary disclosures to CBP disclosing that cars they sold or intended to sell in the United States included components manufactured with forced labor. The Committee's investigation, findings, and associated company disclosures heightened Congressional concerns that automakers do not possess adequate visibility and compliance procedures to ensure their supply chains remain free of forced labor.[95]

At the onset of the investigation in early January 2023, most automakers and their tier 1 suppliers guaranteed the Committee that they employ vigorous due diligence programs per UFLPA requirements.[96] Vehicle supply chains often contain twelve or more tiers of suppliers for a specific component, composed of thousands of primary suppliers and subsuppliers.[97] They are complex, opaque, and nearly impossible to reliably trace the origin of embedded materials in a final product. However, by February 2024, these companies informed the Committee that they overwhelmingly could not trace their supply chains back to their origin, relying heavily on self-reporting surveys completed by tier 1 suppliers. These tier 1 suppliers then typically require their supplies to complete the same survey, forming a chain of self-assessment that can cascade through all the tiers of a component's supply chain. Automakers use this self-reported information to check their suppliers and subsuppliers against the UFLPA Entity List. [98]

Some manufacturers employ a second form of due diligence, utilizing software to scan the media for mentions of reported entities or companies participating in poverty alleviation or pairing assistance, which are CCP euphemisms for its forced labor programs.[99] In addition to these remote due diligence methods, some automakers conduct onsite audits of tier 1 suppliers on regular intervals or following reported human rights or sustainability concerns. Typically, companies maintain contractual provisions with their tier 1 suppliers to enforce standards by pausing shipments or terminating contracts.[100]

Most of the automakers and tier 1 suppliers interviewed by the Committee stressed the unreliability of standard due diligence measures. Most companies rely on their subsuppliers to honestly provide accurate information. The only way to verify these responses is to rely on publicly reported information that software systems then scan for mentions of companies on the UFLPA Entity List or terms associated with forced labor. To obfuscate their involvement in the CCP's forced labor regime and make it more difficult to use open-source data to identify forced labor in supply chains, Chinese companies are moving away from publicizing their participation in forced labor programs.[101]

Finally, China's Anti-Foreign Sanctions Law, enacted in 2021, makes it virtually impossible to conduct proper audits. The law authorizes punitive measures against Chinese entities accused of implementing or facilitating foreign sanctions. Even answering basic due diligence inquiries could be construed as aiding sanctions implementation.[102] Companies that are able to conduct audits within China are required to adhere to CCP restrictions, often requiring auditors to schedule their visit of tier 1 suppliers and joint ventures located in China in advance, reducing the likelihood of assessing a normal work environment.[103]

94 Senate Finance Committee, "Insufficient Diligence: Car Makers Complicit with CCP Forced Labor," May 20, 2024, at page 2.

95 Ibid.

96 Ibid, at page 6.

97 Ibid, at page 5.

98 Ibid, at pages 5 and 6.

99 Ibid

100 Ibid, at page 6.

101 Ibid.

102 The Allard K. Lowenstein International Human Rights Clinic, Comment submission to the Forced Labor Enforcement Task Force, DHS Docket No. DHS-2022-001, December 2021, at page 12.

103 Senate Finance Committee, "Insufficient Diligence: Car Makers Complicit with CCP Forced Labor," May 20, 2024, at page 6.

CBP, or other designated government agencies supporting the enforcement of UFLPA import prohibitions, need adequate resources and administrative capacity to provide greater scrutiny into EVs, EV components, and critical minerals inputs. Bolstered administrative capacity includes increasing staffing levels and providing adequate funding for the acquisition of new technologies.[104] Further expanding the list of high-priority sectors without sufficient capacity to take on the additional work can create significant economic inefficiencies, as experienced with solar modules in 2023.[105] Solar manufacturers reported substantial backlogs at customs amid CBP's efforts to increase its enforcement stringency, resulting in substantial delays and disruptions across the solar supply chain.[106]

Finally, effective implementation of UFLPA requires companies to have high visibility into their supply chains. China's domestic laws and CCP's influence over companies can be seen as actively undermining supply chain transparency efforts. The UFLPA's primary goal is the elimination of Uyghur forced labor risks. Therefore, the greater scrutiny under UFLPA should be leveraged to shift away from Chinese suppliers to more transparent market actors instead of attempting to engage with or reform the existing system in China. This is quite different from other situations where shifting supply chains away from low-standard jurisdictions might hinder the United States' ability to improve conditions on the ground.

Shifting supply chains can be difficult regardless of the policy motivation if little to no alternative production capacity exists. The import restrictions could create new opportunities for alternative suppliers to enter the market and help diversify global supply chains. Its success, however, would depend on the transition period. Implementing import bans without allowing supply chains to catch up can have unintended consequences. For example, it can restrict the U.S. industry's access to material inputs.

Beyond the UFLPA jurisdiction-specific import restrictions, the United States also has import restrictions that align with domestic standards set by the federal government. For example, the 1970 Clean Air Act (CAA) authorized the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards to "protect public health and public welfare and to regulate emissions of hazardous air pollutants."[107] It also created a requirement that all new and used vehicles and engines manufactured domestically or abroad must meet these standards to legally operate in the United States.[108] The import restriction created by CAA relies on CBP enforcement, using the standards set by EPA.

104 DHS, 2024 Updates to the Strategy to Prevent the Importation of Goods Mined, Produced, or Manufactured with Forced Labor in the People's Republic of China, Report to Congress, July 9, 2024, at page 23.

105 Kate Wilcox, "Uptick in UFLPA Module Detentions Could Impact Module Supply in Q4 2023 and Beyond," Kinect Solar, October 10, Vehicles 2023.

106 Ibid.

107 EPA, "Summary of the Clean Air Act 42 U.S.C. §7401 et seq. (1970)," Webpage.

108 EPA, "Learn About Importing and Engines," Webpage.

UFLPA-like import restrictions based on other environmental standards or child labor concerns in the critical minerals space would require new laws passed by Congress. Their implementation would come with distinct challenges. Beyond the protests from downstream industries, the net global impact of such a policy is hard to predict. In a worst-case scenario, if alternative supplies are not readily available, such restrictions could significantly harm U.S. industries that rely on these critical minerals. In the best case, it would improve the standard of goods being imported into the United States, most likely without meaningfully impacting global dynamics. This presents a dilemma for policymakers who are motivated to engage and reform practices rather than disengage entirely, as in the case with the UFLPA. This risk of higher-standard U.S. players exiting markets over restrictions, leaving that jurisdiction open for further Chinese influence, underscores the need for a carefully calibrated approach that balances ethical sourcing with economic realities.

Furthermore, unlike a clear prohibition of forced labor or child labor, or CAA's specific emissions targets, it is unclear as to which proxies will adequately determine if a critical mineral or finalized product with embedded critical minerals meets acceptable sourcing, environmental, and labor standards. Policymakers would need to grapple with setting standards stringent enough to ensure responsible sourcing while avoiding thresholds so high that they severely limit U.S. access to essential materials. A phased-in approach, starting with the most accepted standards could set initial thresholds that are achievable for a sizable portion of the market, while allowing industries to adapt and improve practices gradually.

## Tariffs

Tariffs—duties imposed on items imported from a foreign country—have been a fundamental tool of U.S. trade policy since the nation's founding. In 1789, shortly after the ratification of the Constitution, Congress administered the first customs tariffs, collecting duties to promote trade and raise revenue for the federal government.[109] The primary purpose of tariffs is to protect domestic industries and decrease the volume of imports. While changing the domestic market dynamics, tariffs do not inherently enhance competitiveness at the global level.

In the case of critical minerals, the trade policy objectives may extend beyond simply reducing imports and encouraging domestic production. They can aim to promote more environmentally and socially responsible mining and processing practices globally by specifically targeting imports from countries with lower standards. These more nuanced critical mineral supply chain goals highlight the limitations of existing tariff authorities.

U.S. law permits the executive branch to impose tariffs in circumstances that meet a set of established benchmarks.

109 Tyler Halloran, "A Brief History of Tariffs in the United States and the Dangers of Their Use Today," Fordhan Journal of Corporate & Financial Law, March 17, 2019.

The Tariff Act of 1930 allows for the imposition of antidumping duties when the Department of Commerce (DOC) determines that a foreign country is selling goods in the United States at less than fair value (dumping), and the U.S. International Trade Commission (USITC) finds that this practice is causing material injury to a U.S. industry.[110] Similarly, the Executive branch can impose countervailing duties under the same Act if DOC determines that a foreign government is providing subsidies to its exporters, and, again, when USITC finds that these subsidies are causing material injury to a U.S. industry. Governments rely on antidumping and countervailing duties (AD/CVDs) as a tool to level the domestic playing field.

AD/CVDs typically require industry actors to submit a petition claiming that domestic industries are harmed unfairly by imports before DOC or USITC can launch an investigation. These duties can be less effective for nascent industries with little to no domestic players. However, these measures can also be applied in cases where dumped or subsidized imports threaten material injury to an industry, or where the establishment of an industry in the United States is materially injured. While the U.S. infrequently employs the material injury standard, it could provide protections relevant to nascent industries along the critical minerals value chain.[111]

Under the Trade Expansion Act of 1962, the President has the authority to impose Section 232 Tariffs on items the DOC identify as threatening to national security. The President then has 90 days to determine whether to agree with the DOC findings and adjust imports through tariffs or quotas. The Trump administration leveraged Section 232 to institute a 25 percent tariff increase on steel imports and a 10 percent tariff increase on aluminum in 2018.[112] DOC found that unfair trade practices are systematically weakening U.S. innovation capabilities and diminishing domestic manufacturing capacity posed a national security threat.[113] This interpretation, while consistent with the expansive wording of Section 232, represented a departure from conventional public understanding of national security risks.[114]

These tariffs targeted all countries that exported aluminum and steel to the United States, including strategic allies and trading partners. U.S. Trade Representative (USTR) quickly granted exemptions to Australia, Canada, and Mexico following bilateral negotiations and domestic industry pressure. USTR also granted duty-free quotas to Argentina, Brazil, and South Korea.[115] In 2021, the United States established a tariff rate quota for aluminum and steel imports from the EU to enter the country tariff-free only after the Biden administration launched negotiations for the Global Arrangement on Sustainable Steel and Aluminum.[116] The United States also established tariff rate quota regimes imports from the United Kingdom and Japan in 2022.[117]

Tariff measures like Section 232 Tariffs are least disruptive for U.S. downstream industry when there are sufficient domestic producers or foreign exporters are exempt from tariffs. A 2022 investigation on the national security impacts of NdFeB magnet imports into the United States demonstrates the limitation of tariff policies in the absence of well-developed domestic and allied supply chains for NdFeB magnets or alternatives. The investigation concluded that this dynamic presented a threat to national security but stopped short of recommending a Section 232 Tariff due to possible effects in the downstream. The report highlighted China's control over more than 90 percent of the global NdFeB magnet and alloy market, U.S. dependence on China for three-quarters of its NdFeB magnet imports, and the lack of a significant U.S. presence along the supply chain, except for mining.[118]

The Trade Act of 1974 includes two important authorities for imposing tariffs. The President can impose Section 201 Tariffs—sometimes referred to as safeguard tariffs—if the USITC determines that a surge in imports seriously injured a domestic industry producing the same goods.[119] Section 301 of the Act authorizes USTR to impose tariffs on foreign countries that violate U.S. trade agreements or engage in acts that are unjustifiable, unreasonable, and burden U.S. commerce.[120] The Obama, Trump, and Biden administrations used Section 201, 232 and 301 Tariffs, providing valuable lessons on their effectiveness and limitations in addressing trade challenges.

110 CBP, "1789: First Congress Provides for Customs Administration," Website.

111 The material injury standard is rarely invoked and remains poorly defined in practice. Since the early 1980s, it has been considered in fewer than two dozen cases. The 2019 ruling for the stainless-steel keg marked the first time in nearly three decades that the Commission made a final affirmative finding of material injury. Source: Whitney Rolig, "ITC Revives Important Trade Remedy Tool for New U.S. Industries Facing Unfair Import Competition," Picard, Kentz & Rowe LLP, October 14, 2019.

112 Congressional Research Service, Section 232 of the Trade Expansion Act, 2022.

113 U.S. Department of Commerce, *The Effect of Imports of Aluminum on the National Security*, January 17, 2018, at page 5.

114 The national security definition under Section 232 includes the following: "general security and welfare of certain industries, beyond those necessary to satisfy national defense requirements, which are critical to minimum operations of the economy and government." Source: U.S. Department of Commerce, *The Effect of Imports of Aluminum on the National Security*, January 17, 2018, at page 1.

115 Brazil and South Korea only have duty-free quotas for steel products. Source: U.S. International Trade Commission, *Economic Impact of Section 232 and 301 Tariffs on U.S. Industries*, May 2023, at page 52.

116 Pietro N. Bianchi, "Global Arrangement on Sustainable Steel and Aluminum Negotiations Failed, Maybe," Barned Richardson Global Trade Law, December 5, 2023.

117 Crowell & Moring LLP, "Section 232 Tariffs – Not All Quotas are Created Equal," Lexology, January 30, 2023.

118 The strategic investments by the Department of Defense's support of MP Materials, Lynas, Noveon Magnetics, TDA Magnetics, and e-VAC to build a mine-to-magnet supply chain domestically underscores the limitations of trade policy alone and demonstrates the necessity for proactive, multi-faceted policy approaches that extend beyond traditional trade tools to effectively address critical mineral supply chain vulnerabilities. Other U.S. agencies like the ARPA-E have been working for a longer time to support organizations like Niron Magnetics in developing substitutes. Source: U.S. Department of Commerce, *The Effect of Imports of Neodymium-Iron-Boron (NdFeB) Permanent Magnets on the National Security*, September 2022; and Todd Lopez, "DOD Looks to Establish 'Mine-to-Magnet' Supply Chain for Rare Earth Materials," U.S. Department of Defense, March 11, 2024.

119 U.S. International Trade Commission, "Understanding Safeguard Investigations," Webpage.

120 Andres B. Schwarzenberg, "Section 301 of the Trade Act of 1974," Congressional Research Service, updated May 13, 2024.

## U.S. Solar Tariffs: A Cautionary Tale for Policy Implementation

The U.S.-China prolonged solar trade disputes that began in the mid-2000s, and the resulting tariffs imposed by both countries provide a stark reminder of the complex challenges and potential pitfalls associated with strategically leveraging tariff actions. The United States has a complex history with solar tariffs. Democratic and Republican leaders introduced tariffs that had varying effects on the domestic industry and global solar supply chains.

In 2012, the United States imposed antidumping duties on solar panel manufacturers in China, citing unfair trade practices and government subsidies that allowed Chinese companies to sell their products at below-market prices, harming U.S. manufacturers.[121] Commerce added new duties in 2014, attempting to limit circumvention.[122] That same year, the Chinese Ministry of Commerce announced retaliatory tariffs on U.S. polysilicon, a critical material used in the production of solar panels.[123]

U.S. tariffs action continued to escalate. The Trump administration imposed additional Section 201 and Section 301 Tariffs on solar cells and modules.[124] The United States exempted FTA countries and select developing countries, including Brazil, Cambodia, Indonesia, and Ukraine, from these solar tariffs.[125] The Biden administration extended the Trump-era Section 201 Tariffs and introduced additional Section 301 Tariffs for solar cell and module imports and more recently increased the duty on these goods from 25 percent to 50 percent.[126]

These rounds of tariffs, and resulting retaliatory action, focused on the upstream leading to a shift in global supply chains. U.S. polysilicon producers, which made up almost one-third of global supply in 2022, lost competitiveness in the world's largest market for polysilicon. Restricted access to Chinese buyers decimated the U.S. solar industry. China, on the other hand, emerged as the world's largest polysilicon producer.[127] China now dominates over 80 percent of the solar panel manufacturing stages, including polysilicon, ingots, wafers, cells, and modules.[128] U.S. tariffs on solar cells and modules did not result in positive changes to the global solar market or build and maintain a robust domestic industry.

Multiple economic and geopolitical factors contributed to the mixed outcome for these solar tariffs. First, Chinese producers effectively circumvented the AD/CVD tariffs. Following an inquiry into the matter in 2023, the DOC found solar modules from China were shipped through Cambodia, Malaysia, Thailand or Vietnam to avoid paying U.S. duties.[129] Instead of boosting U.S. manufacturing, the tariffs shifted minor production to countries exempt from U.S. tariffs or do not have corresponding tariffs. Over 80 percent of U.S. solar imports came from producers in Southeast Asia often linked to Chinese companies. Due to a two-year pause on new import tariffs, the identified guilty producers have avoided additional penalties.[130] In response, a consortium of U.S.-based solar manufacturers filed a new AD/CVD petition to address this circumvention.[131] A similar scenario unfolds in the implementation of Section 301 Tariffs as well.

Second, Section 201 Tariffs were only in place for four years (from 2018-2022), starting at 30 percent in year one and decreasing by five percent over the following three years.[132] The initial tariff announcement did not guarantee the renewal of the tariffs. The limited duration did not send the right signals to usher in investments in domestic manufacturing.

Third, these tariffs did not address the underlying factors that make U.S. production less competitive compared to other countries. Congress attempted to address these competitive factors with the passage of the 45X manufacturing tax credit for solar manufacturers along

121 77 FR 73018.

122 See, e.g., Forbes, "Obama Administration to Impose Tariffs on Chinese Solar Panels," March 20, 2012.

123 Lilly Yejin Lee & Noah Kaufman, "Q&A: Solar Tariffs and the US Energy Transition," Center on Global Energy Policy, November 13, 2023.

124 Erica York, "Tariff Tracker: Tracking the Economic Impact of the Trump-Biden Tariffs," Tax Foundation, June 26, 2024.

125 Orrick, "Frenetic Activity Regarding Solar Energy Equipment Import Duties," May 20, 2024.

126 The White House, "FACT SHEET: Biden-Harris Administration Takes Action to Strengthen American Solar Manufacturing and Protect Manufacturers and Workers from China's Unfair Trade Practices," Press Release, May 16, 2024.

127 See, e.g., Solar Power World, "China's share of world's polysilicon production grows from 30% to 80% in just one decade," April 27, 2022.

128 IEA, *Special Report on Solar PV Global Supply Chains*, July 2022, at page 18.

129 U.S. Department of Commerce, "Department of Commerce Issues Final Determination of Circumvention Inquiries of Solar Cells and Modules from China," Press Release, August 18, 2023.

130 The White House, "Declaration of Emergency and Authorization for Temporary Extensions of Time and Duty-Free Importation of Solar Cells and Modules from Southeast Asia," Press Release, June 6, 2022.

131 Will Norman, "First Solar, Qcells and others launch AD/CVD petition to DOC," PVTech, April 24, 2024.

132 Solar Energy Industries Association, "Clean Energy Industry Groups Issue Statement on New AD/CVD Petitions," Press Release, April 24, 2024.

A factory worker nadling a solar panel. (Lim Weixiang, Zeitgeist Photos / iStock)

the supply chain in 2022—which led to a resurgence in domestic manufacturing.[133] Tariffs can protect the existing domestic producers to an extent by penalizing bad actors, but work best when paired with incentives to support growth of domestic industries.

Fourth, U.S. tariff action only focused on the end node, leaving polysilicon producers in the upstream vulnerable to the resulting retaliatory action. This vulnerability was exacerbated by the lack of a robust domestic midstream, particularly in ingot and wafer production—something that the 45X manufacturing tax credits are looking to change. China or Chinese companies operating in Southeast Asia account for 99 percent of solar ingot and wafer production capacity today.[134] Without domestic buyers or even ex-China buyers, U.S. polysilicon producers were largely dependent on the Chinese market.[135] This experience illustrates the importance of considering the entire supply chain when crafting policies.

Finally, it is important to discuss the case for bifacial panels to acknowledge the interplay between policy and innovation: technological innovation can outpace static policies and policies themselves can create favorable economic environments for the adoption of one technology over the other. Initially exempted from tariffs due to their then-small market share, these panels became an unexpected focal point of technological advancement, with significant improvement in their efficiency and cost effectiveness.[136] Consequently, the market saw a surge in bifacial panel imports, effectively circumventing the tariffs' intended impact on the broader solar panel market.[137] This case study highlights how policies can inadvertently pick winners among competing technologies, underscoring the need for more technology-neutral, nimble, and adaptable policies.

133 Office of Energy Efficiency & Renewable Energy, "Federal Tax Credits for Solar Manufacturers," Webpage; and SEIA Supply Chain Dashboard.

134 Mark Shenk, "US Solar Wafer Build Stutters as Chinese Surplus Bites," Reuters, March 7, 2024; and interview with solar PV companies.

135 Emma Foehringer Merchant, "Struggling US Polysilicon Producers Are a Forgotten Casualty in the Solar Trade War With China," Greentech Media, March 29, 2018.

136 See e.g., Kelley Pickerel, "Bifacial Solar Panels Lose Tariff Exemption After Biden Reverses Course," May 16, 2024.

137 Ibid.

**Figure 3** Select Section 301 Tariffs and Change in Tariff Schedule

| Product Type | Applicable HTS Codes | Trump 301 Rate | Announced Biden 301 Rate | Tariff Change Effective Beginning |
|---|---|---|---|---|
| Tariff increases or new tariffs announced in May 2024 | | | | |
| Natural Graphite | 2504.10.10<br>2504.10.50<br>2504.90.00 | 0% | 25% | 1-Jan-26 |
| Lithium-ion Batteries for EVs (pack) | 8507.60.0010 | 7.5% | 25% | 27-Sep-24 |
| Lithium-ion Batteries for Other Applications (pack) | 8507.60.0020 | 7.5% | 25% | 1-Jan-26 |
| Electric Vehicles | 8702.40.31<br>8702.40.61<br>8702.90.31<br>8702.90.61<br>8703.60.00<br>8703.70.00<br>8703.80.00<br>8703.90.01 | 25% | 100% | 27-Sep-24 |
| Permanent magnets | 8505.11.00 | 0% | 25% | 1-Jan-26 |
| Solar PV cells | 8541.42.00 | 25% | 50% | 27-Sep-24 |
| Solar PV modules | 8541.43.00 | 25% | 50% | 27-Sep-24 |
| No Change | | | | |
| Battery-Grade Nickel | 2833.24.00 | 25% | 25% | - |
| Battery-Grade Cobalt | 2833.29.10 | 25% | 25% | - |
| Battery-Grade Lithium | 2836.91.00<br>2825.20.00 | 25% | 25% | - |
| Cathode Active Materials and Precursors | 2825.90.90 | 25% | 25% | - |
| Lithium-ion Battery Cells | 8507.90.80 | 25% | 25% | - |

Source: SAFE Analysis

For battery materials, the most relevant tariffs are the Section 301 Tariffs on goods from China, initially imposed by the Trump administration in 2018 and continued, and in some cases, expanded by the Biden administration following a required four year review. The Section 301 Tariffs target strategic sectors that account for approximately two-thirds of U.S. imports from China.[138] These sectors include critical minerals, EVs, batteries, battery components, semiconductors, steel, aluminum, solar cells, and cranes. Chinese overcapacity and dominance in these sectors threaten the growing number of U.S. investments in developing its domestic capacity.[139]

As demonstrated in the case of solar panels, tariffs alone are insufficient to significantly boost the competitiveness of U.S. industries, especially in the critical minerals sector. High investment and production costs are the primary obstacles to establishing midstream processing, battery component manufacturing, and magnet manufacturing capacity in the United States—especially compared to China's untenable below-cost operations bolstered by illegal subsidies. Permitting delays pose the most significant hurdle for the domestic mining sector, resulting in projects with extended timelines and high costs. Additionally, elevated energy and material costs are present at nearly every stage of a domestic supply chain, further increasing the overall production cost of operating in the United States. The up and midstream industry signaled more support for the policy message accompanying Section 301 Tariff increases—which emphasized U.S. intent to apply

138 Andres Schwarzenberg, "Section 301 Tariff Exclusions on U.S. Imports from China," Congressional Research Service, May 13, 2024.

139 The White House, "FACT SHEET: President Biden Takes Action to Protect American Workers and Businesses from China's Unfair Trade Practices," Press Release, May 14, 2024.

reciprocal treatment to China in trade relations—than the actual tariff hikes.[140]

Downstream actors held differing perspectives from their up and midstream supply chain counterparts. The American Automotive Policy Council urged the Biden administration to delay graphite tariffs planned to take effect in 2027 by at least a year to provide the industry with more time to switch suppliers.[141] The Council also expressed concerns about the new tariffs on permanent magnets, echoing the findings of the aforementioned Section 232 investigation into NdFeB magnets, arguing that the planned 2027 timeline for the tariff phase in was too short to develop alternative supplies.[142] Autos Drive America, another industry group, raised additional concerns about how tariffs increased on other battery inputs could negatively affect U.S. EV and battery producers.[143]

Downstream stakeholders were consistent in their views on government supply chain intervention via tariffs. If the United States enacts tariffs or similar remedies, are imposed on critical inputs from China without sufficient alternative sources (domestic or allied), downstream manufacturers in the United States may face higher costs and supply disruptions. An absence of alternative sources undermine the global competitiveness of U.S. industries and could lead to their offshoring. Such an outcome would undermine the very projects the United States is trying to advance by eliminating the downstream offtakers and buyers of these critical inputs putting their manufacturing facilities in the United States.

None of the current U.S. tariff tools target the production attributes of products. Existing tariff authorities do not have substantial influence on labor and environmental standards, as they are imposed on products to safeguard domestic industry and national security interests rather than promote specific production methods.[144] Congress aims to establish a new border adjustment mechanism that essentially operates a tariff based on environmental or labor standards. Current discussions focus on establishing a border adjustment modelled after the EU Carbon Border Adjustment Mechanism (CBAM). CBAM, still under negotiation, seeks to impose a carbon tariff on imported carbon-intensive products like cement or steel.[145]

It is important to stress that unilateral or politically motivated tariff increases often entail a risk of recipient countries enacting retaliatory duties, constricting access to their domestic economy, and resulting in consumers—or downstream industries depending on which goods are subject to tariffs—to pay increased rates for imported commercial products.[146] As such, tariff policies that do not carefully consider the market dynamics along a goods' entire supply chain risk unintentionally harming the very industry they aim to protect.[147]

> Tariffs alone are insufficient to significantly boost the competitiveness of U.S. industries.

## Export Controls

In 1940, Congress authorized the President to control the export of select U.S. goods for economic, foreign policy, or national security concerns.[148] Today, various government agencies—including the Departments of Commerce, Energy, and State—administer U.S. export control regimes to prohibit the exportation of "defense articles and services; dual-use goods and technology; certain nuclear materials and technology; and items that would assist in the development of nuclear, chemical, and biological weapons or the means to deliver them."[149] These are generally sectors where the United States leads in advance technology innovation. Creating an imperative to protect intellectual property or other sensitive information is of strategic importance to the United States.

However, critical minerals or certain mineral-intensive technologies like EV batteries do not fall under this category because the U.S. industry is still striving to catch up—in terms of expertise and knowledge—to competitors in this sector. Moreover, the United States is a significant importer of critical minerals and battery components, which means that it does not produce a substantial amount of raw and

140 Findings from SAFE's Trade Roundtable, May 2024.

141 Gavin Bade and Ari Hawkins, "Biden hounds the Philippines on labor rights," Politico, July 1, 2024.

142 Ibid.

143 Ibid.

144 SAFE analysis.

145 Ankita Gangotra et al., "4 US Congress Bills Related to Carbon Border Adjustments in 2023," World Resources Institute, December 13, 2023.

146 Brian Hergt, "The Effects of Tariff Rates on the U.S. Economy: What the Producer Price Index Tells Us, "U.S. Bureau of Labor Statistics, October 2020.

147 Erika York, "Tracking the Economic Impact of U.S. Tariffs and Retaliatory Actions," Tax Foundation, updated June 26, 2024.

148 Note that export controls, restrictions, or bans are not permitted under WTO, with a few exceptions. Article XI:2(a) permits temporary export prohibitions to prevent or relieve critical shortages of essential products. Article XX:b provides general exceptions for measures necessary to protect human, animal, or plant life or health, or relating to the conservation of exhaustible natural resources. Article XXI allows restrictions for national security reasons. There are also ongoing debates about whether developing countries should have more flexibility in implementing such policies to promote economic development. Source: Paul Kerr and Christopher Casey, *The U.S. Export Control System and The Export Control Reform Act of 2018*, Congressional Research Service, June 7, 2021, at page 2; and World Trade Organization, *Export Prohibitions and Restrictions*, April 23, 2020, at pages 3-4.

149 Congressional Research Service, *The U.S. Export Control System and the Export Control Reform Act of 2018*, updated June 7, 2021, at page 1.

Resource-rich countries have turned toward export controls on exporting raw materials to derive greater benefits for their natural resources.

processed materials along the EV supply chain that could be subject to export controls.

Export control conversations for the critical minerals sector have taken a different trajectory compared to other industries. Within the past decade, resource-rich countries have turned toward export controls on exporting raw materials to derive greater benefits for their natural resources by expanding into midstream activities and engaging in value-added activities—a trend exemplified by Indonesia's phased export controls, culminating in a complete export ban on raw nickel ore by 2024.[150] Such policies create a climate of uncertainty that deter private sector investments. Western investors, in particular, demonstrate a reluctance to commit capital in environments where sudden policy changes can drastically alter the business landscape.[151]

Indonesia's initial export ban announcement led to the exodus of Western investors as the country lacked the necessary infrastructure to make building a nickel refinery economically viable.[152] Chinese investors who relied on Indonesian nickel to supply their stainless-steel industry saw an opportunity to fill the void, but were only able to do so with financial support from the Belt and Road Initiative (BRI) and additional incentives provided by the Indonesian government.[153] BRI loans facilitated substantial investments not only in nickel smelters, but the adequate supportive infrastructure, like industrial parks, energy production facilities, and transportation networks.[154] The Indonesian government complemented this funding by implementing a suite of supportive policies that included income tax breaks, discounts on mining royalties, and exemptions from value-added tax and export duties.[155]

In contrast to Indonesia's relatively successful implementation of its nickel export ban, the DRC faced significant challenges in enforcing a similar policy for cobalt. Insufficient refining capacity and critical infrastructure deficiencies, particularly in energy, made it economically unfeasible to process cobalt domestically. As a result, the Congolese government's intermittent attempts since 2013 to incentivize capital investment in developing a domestic midstream industry ended with the government issuing repeated waivers to allow companies to export cobalt concentrate.[156]

The desire to derive greater economic benefits from natural resources and foster domestic industry development is understandable and often seen as a path to sustainable economic growth. Nevertheless, the experiences of Indonesia and the DRC underscore the complexities and prerequisites for effective implementation of export bans. The unpredictability of policy changes, coupled with concerns about infrastructure readiness and economic viability, often disincentivize potential investors, particularly those from Western countries. Currently there are no formal mechanisms for like-minded countries to implement or respond to coordinate on rising export controls. However, the EU plans to engage resource-rich countries on this topic through initiatives like the MSP Forum.

As the United States grapples with how to respond to nations looking to implement export bans on raw materials, U.S. stakeholders are having their own conversations on the merits of restricting the export of end-of-life (EOL) products, scrap, and recycling intermediates like black mass.[157] The primary objective of these discussions is to retain strategic and critical materials within U.S. and allied jurisdictions, thereby expanding domestic sources of these valuable resources and decreasing reliance on adversaries.

150 Thomas Reilly, "African Raw Material Export Bans: Protectionism or Self-Determination?" Global Policy Watch, May 21, 2024.

151 See e.g., Jason Sappor, "COVID-19 Turns Indonesian Ore export Ban into Curse for Nickel Market," S&P Global, July 21, 2020.

152 Angelo Tritto, How Indonesia Used Chinese Industrial Investments to Turn Nickel into the New Gold, Carnegie Endowment for International Peace, April 11, 2023, at page 5; and Eliot Chen, "The Nickel Pickle," The Wire China, May 7, 2023.

153 Tsingshan tried to build nickel smelters in Indonesia before the export ban with support from Chinese state-owned banks (as early as 2009), but nothing materialized until 2013. Source: Angelo Tritto, *How Indonesia Used Chinese Industrial Investments to Turn Nickel into the New Gold*, Carnegie Endowment for International Peace, April 11, 2023, at pages 6-8.

154 Ibid, at page 8.

155 The Economist, "Indonesia Embraces Resource Nationalism," January 26, 2023.

156 Shanghai Metals Market, "Ban on Export of Congo (DRC) Concentrate May Tighten Supply of Copper and Cobalt," May 30, 2021.

157 SAFE findings based on conversations with stakeholders.

## Navigating Trade Policy Priorities for Recycling

A unique quality of critical minerals compared to traditional fuel sources is their infinite recyclability. Unlike gasoline, critical minerals and REEs in an EV battery and motor, respectively, are not combusted or consumed. Building U.S. recycling capacities ensures that mineral-intensive technologies can be reused if they are well maintained during the technology's life-span and when they inevitably reach their end-of-life (EOL), chemical and other industrial processes can separate and reprocess critical minerals and REEs. As such, recycling provides a pathway for more efficient resource use.

When collected, EOL technologies virtually serve as above-ground mines, and create new opportunities to increase domestic critical minerals production. Recycling is especially important in instances for which the United States has either no or limited domestic reserves. These above-ground mines may serve as one of the most feasible means of reducing import reliance and enhancing the nation's minerals security.

Republican and Democratic administrations have both recognized the role of recycling in critical mineral security.[158] There are several government policies and funding programs established, reauthorized, or expanded under the IRA, BIL, and the NDAA to support the burgeoning domestic critical minerals recycling industry in the United States. The success of these policies and programs will depend on a multitude of factors, including the availability of economically viable feedstock for existing and future recyclers. While much of the current feedstock comes from production scrap, EOL products will make up an increasingly significant share in the future.[159]

Subject matter experts and some policymakers raised concerns regarding the potential leakage of EOL products and recycling intermediates, like black mass.[160] Black mass is a toxic powder that is produced as a by-product of battery cell shredding. It contains a mixture of battery materials like lithium, nickel, cobalt, and manganese. Current battery recyclers typically divide recycling activities into two processes that do not have to happen in the same location: the pre-treatment of batteries that produces black mass, and the reprocessing and refining of that black mass to recover individual critical minerals and battery materials.[161] The reprocessing of black mass and processing of virgin critical materials are extremely similar. These processors use the same physical and chemical reactions to extract a raw critical mineral from a rock are the same as the reactions used to

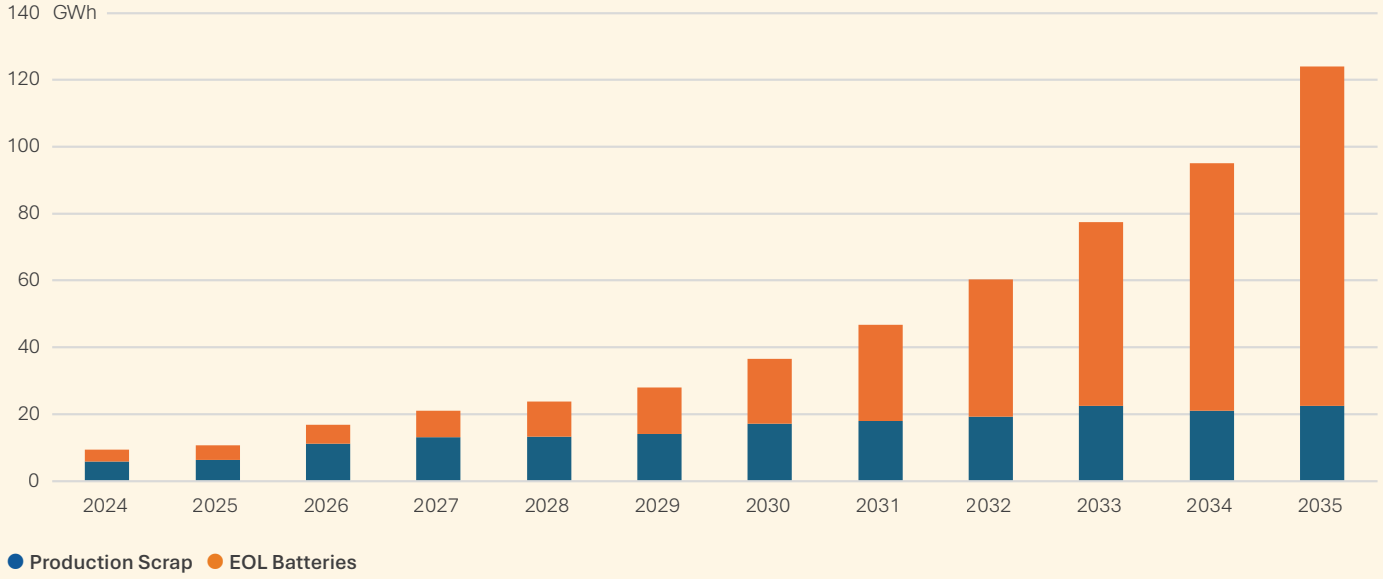
158 See, e.g., DOI, "Trump Administration Announces Strategy to Strengthen America's Economy, Defense," Webpage, June 4, 2019; and The White House, "FACT SHEET: Securing a Made in America Supply Chain for Critical Minerals," Webpage, February 22, 2022.

159 SAFE analysis using data from BloombergNEF.

160 Lee Allen, "Expansions in US Li-Battery Recycling Capacity Raise Concerns Over Feedstock," Fastmarkets, July 19, 2024; and The Select Committee on the Strategic Competition Between the United States and the Chinese Communist Party, *Reset, Prevent, Build: A Strategy to Win Economic Competition with the Chinese Communist Party*, December 2023, at page 45.

161 See e.g., Gholamreza Khodadadmahnoudi, "Recycling spent lithium batteries – an overview of pretreatment flowsheet development based on metallurgical factors," Environmental Technology Reviews, Volume 12, Issue 1, August 2023.

**Figure 4** U.S. Recycling Feedstock from Production Scrap vs. End-of-Life Batteries, 2024-2035




Source: SAFE analysis using information from Bloomberg New Energy Finance


Assorted lithium batteries collected for recycling. (Baloncici / iStock)

recover individual metals from black mass. Thus, countries leading in virgin material processing are also home to the largest recycling capacity.[162] Since a substantial volume of EV batteries in the United States are not close to reaching their EOL, the concerns mentioned above are usually based on industry trends seen in Europe where, black mass producers typically export their products to Asia for reprocessing.[163]

Although China has import bans on black mass due to its toxicity, Chinese companies continue to be the highest-paying buyer for black mass. [164] To work around China's import ban, European black mass producers first export the black mass to Southeast Asia—including countries like Indonesia, Laos, and the Philippines, where refiners convert it into mixed-hydroxide precipitate (MHP). Refiners then export the MHP to China, where refiners recover individual battery-grade products like nickel sulfate and cobalt sulfate.[165] South Korea offers alternative destination for European exports. The recent surge of investment in black mass refining and magnate manufacturing in South Korea has resulted in an emerging market of black mass offtakers.[166]

A major driver of EU black mass exports has historically been the imbalance of pretreatment plants and the processing and material recovery plants that can further transform black mass.[167] However, in a market where Chinese companies remain the highest-paying buyers of critical minerals, European companies that want to expand their processing capacity of black mass find it challenging to secure access to feedstock.[168] In response to these dynamics, industry stakeholders and environmental organizations called for the EU to establish policies that restrict the export of black mass, similar to Beijing's export controls.[169]

Looking at the current market dynamics and Europe's experience, U.S. stakeholders also appear more open to entertain outright bans, restrictions, or disincentives to prevent the export of black mass from the United States.[170] Such policies, however, should not be implemented in the United States based on market dynamics in Europe. Crafting effective policies that suit the U.S. context will require greater information about the feedstock challenges U.S. recyclers face, among other market dynamics.

162 Recycling Magazine, "Black Mass One of the Hottest Issues in Battery Recycling," Webpage, September 10, 2021.

163 Sarah Colbourn and Daniel Fletcher-Manuel, "The Evolving Black Mass Market," The Crucible, August 2023; Mark Peplow, "Lithium-ion Battery Recycling Goes Large," Chemical & Engineering News, November 19, 2023; and Recycling Magazine, "Black Mass One of the Hottest Issues in Battery Recycling," Webpage, September 10, 2021.

164 Eurometaux et al., "Joint Letter on Black Mass," September 28, 2023.

165 TELF AG, "TELF AG on the Growing Demand for Black Mass," Webpage, July 14, 2023.

166 Bryan Billie, Increasing Lithium Supply Security for Europe's Growing Battery Industry: Recommendations for a Resilient Supply Chain, The Hauge Center for Strategic Studies, January 2024, at 24.

167 Ibid.

168 Id., at 25; and TELF AG, "TELF AG on the Growing Demand for Black Mass," Webpage, July 14, 2023.

169 Frédéric Simon, "EU urged to restrict export of 'black mass' from used electric vehicles," Euractiv, September 26, 2023; and Eurometaux et al., "Joint Letter on Black Mass," September 28, 2023; and Bryan Billie, "Increasing Lithium Supply Security for Europe's Growing Battery Industry: Recommendations for a Resilient Supply Chain," The Hauge Center for Strategic Studies, January 2024, at page 24.

170 The Select Committee on the Strategic Competition Between the United States and the Chinese Communist Party, *Reset, Prevent, Build: A Strategy to Win Economic Competition with the Chinese Communist Party*, December 2023, at page 45.

There is a substantial information and data gap throughout the recycling process, hindering the collection and sorting of EOL batteries to their breakdown and reprocessing. For example, the United States does not have a specific Harmonized Tariff Schedule (HTS) code to identify how much black mass it exports every year. The HTS, a standardized numerical method of classifying traded products based on the international Harmonized System, is crucial to track international trade.[171] Black mass is categorized under the same HTS code as various other waste products, making it impossible to track the quantity of black mass annually and the ultimate destination of those exports.[172]

Implementing export bans, controls, or tariffs on black mass without a thorough understanding of the U.S. battery recycling sector and market dynamics could inadvertently harm the nation's growing recycling industry. For instance, if the United States implements a ban on black mass exports while there is an imbalance between battery pretreatment and reprocessing capacity, it will lead to an oversupply of black mass within the country. This oversupply would significantly reduce the value of black mass, negatively impacting U.S. recyclers that are still in the process of scaling up their production capacity to handle the anticipated influx of EOL batteries in the 2030s.[173]

Furthermore, it is important to recognize that countries like China and South Korea have a robust recycling industry in part because they have a strong demand for battery-grade products to feed their CAM and AAM producers. These manufacturers create a reliable market for recycled materials and enable recyclers to bid higher for EOL products or recycling intermediates. In contrast, the United States lacks a significant presence of CAM and AAM producers, which means that there is limited domestic demand for recycled battery materials. Without a strong market signal from potential buyers, U.S. recyclers have little incentive to invest in the second step of the recycling process—the reprocessing and refining of black mass into individual critical minerals and battery-grade products. Trade policies alone cannot support the burgeoning critical minerals recycling industry in the United States. Policymakers can complement these efforts with funding R&D or facilitating offtake agreements to stimulate demand for recycled materials.

The REE recycling industry is in a similar state to critical mineral recycling. Firstly, U.S. recyclers struggle to compete with foreign players, particularly those from Pakistan, India, and Russia, who are willing to pay above the U.S. market value for scrap materials containing REE elements. This price disparity makes it increasingly difficult for domestic recyclers to secure an adequate supply of feedstock, as specialized import-export companies often aggregate and sell these scrap materials to the highest bidder. [174] Consequently, a significant portion of the estimated 12,000 shipments of traction motor scrap exported from the United States each year are processed abroad and the stripped permanent magnets sent to China for further recycling. [175]

Secondly, the lower U.S. market value for REE-containing scrap can be attributed to the absence of a robust domestic market for recycled REE products. Although the United States has a REE mine, a light REE separations facility, and a few specialized magnet finishers, it lacks sufficient capacity in critical functions including heavy REE separation, metal making, alloying, and sintered magnet manufacturing.[176] This gap in the domestic supply chain means that even if U.S. recyclers can successfully recover REEs from scrap materials, they lack domestic buyers who can further process these materials into valuable end products for magnet making. The only alternative is for U.S. recyclers to find buyers in other countries.

171 U.S. International Trade Commission, "Harmonized Tariff Schedule of the United States (HTS)," Webpage.

172 Findings from SAFE's Trade Roundtable, May 2024.

173 See Figure 4.

174 SAFE interviews with industry players.

175 Volza, "Electric Motor Scrap Exports from United States: Overview," June 24, 2024, Webpage.

176 SAFE analysis based on company reports and data from IEA.

## Trade Preference Programs

Trade preference programs act as a counterpart to tariffs, providing enhanced market access and favorable rates to eligible exporters and goods.[177] The United States has two nonreciprocal trade preference programs— the Generalized System of Preferences (GSP) and African Growth and Opportunity Act (AGOA)—that are most relevant to the critical minerals sector. Other countries, like Canada, Japan, and the EU also have similar trade preference programs. As a policy tool, trade preference programs offer an incentive-based approach, by providing preferential tariff rates to eligible countries, to incentivize their export-driven industry growth and support international development goals. GSP and AGOA share similar country and product eligibility requirements. To meet GSP or AGOA eligibility, countries must meet certain criteria related to factors, like worker rights, intellectual property protection, and providing equitable market access for U.S. goods. Eligible products must also meet specific rules of origin requirements, including that at least 35 percent of the appraised value must result from the production or manufacturing process of the recipient GSP or AGOA country.[178] Certain import-sensitive products are excluded from trade preference program eligibility, and there are limits on the quantity or value of any one product imported from a single country under the program to ensure these products do not hinder the completeness of U.S. goods. The sitting U.S. President, with support from USTR, reviews and approves country eligibility annually for both programs. GSP and AGOA country eligibility requirements create a pathway for the United States to promote compliance with higher human rights, labor, and environmental standards across economic sectors in eligible countries.

GSP and AGOA offer similar economic benefits and drawbacks to beneficiary countries. Benefits include a competitive advantage in the U.S. market, increased exports, encouragement of investment in the region, and boosted private sector activity and economic growth. AGOA has also led to some diversification of exports, although U.S. imports remain concentrated in a few countries and industries. Although GSP and AGOA benefits are unevenly distributed among eligible countries, with some recipients benefiting significantly more than others. It is important to note that AGOA and GSP beneficiaries are not IRA eligible unless they have an FTA, providing few substantial benefits for the critical minerals industry.

GSP is the largest U.S. trade preference program in existence, providing duty-free treatment for imports of certain products from designated beneficiary developing countries. Established in 1974, GSP aims to promote economic growth in developing countries through trade rather than aid. Prior to its expiration on December 31, 2020, GSP provided duty-free access for over 3,500 products from 123 beneficiary countries, with additional benefits for the least-developed countries.[179] For the United States, GSP results in lower costs for imported intermediate goods, potentially making U.S. manufacturers more competitive. However, some U.S. producers of import-competing products contended that they were adversely affected by AGOA imports.[180] The program's history of periodic lapses in reauthorization created uncertainty for beneficiary countries and U.S. importers. As of July 2024, GSP remains expired, and Congress is considering various options for its potential reauthorization and reform.[181]

Congress established AGOA in 2000 to provide duty-free access to the U.S. market for most exports from eligible sub-Saharan African countries. The program aims to increase U.S. trade and investment with the region, promote sustainable economic growth through trade, and encourage the contestant application of the rule of law and market-oriented reforms. Currently, 32 out of 49 potential African countries are eligible for AGOA benefits. As of 2023, beneficiary countries that have potential economic critical mineral deposits include Botswana, the DRC, Mozambique, South Africa, Tanzania, and Zambia.[182] AGOA covers a wide range of products, including all those under GSP and some additional items such as certain textiles, apparel, and automobiles. Lawmakers are actively engaged in bipartisan efforts to reauthorize and reform AGOA, as it is set to expire in 2025.[183]

The political and economic environment in Africa has substantially evolved since the United States enacted AGOA, creating an increased need to adapt U.S. policy to reflect the realities on the continent. Three of the most influential factors that will direct the future of U.S.-Africa diplomatic, economic, and security relationships are the continent's increasing presence and power within the global stage, creation of a free trade zone, and growing number of diplomatic, economic, and security partners. African nations have increasing presence and leverage in the global energy, economic, and security landscape partly due to the continent's endowment of critical mineral deposits and projected population growth rate. Over a third of the critical minerals necessary for a global transition to a carbon-free economy are spread across Africa, making a transition nearly impossible without strong trade flows and partnerships with African nations.[184] The continent's population is also projected to double by 2050, reaching 2.5 billion—at a time when population rates are projected to decline in wealthy nations—making up a large percent of the global consumer and workforce base.[185] By 2050, the working-age population

177 U.S. Trade Representative, "Preference Programs," Webpage.

178 U.S. Trade Representative, "Generalized System of Preferences (GSP)," Webpage; and U.S. Trade Representative, "African Growth and Opportunity Act (AGOA)," Webpage.

179 Congressional Research Service, *Generalized System of Preferences (GSP): Overview and Issues for Congress*, updated November 22, 2023.

180 Liana Wong, "African Growth and Opportunity Act (AGOA)," Congressional Research Service, updated July 17, 2024, at page 1.

181 Generalized System of Preferences Reform Act, H.R.7986, 118th Congress (2023-2024).

182 88 FR 31579.

183 Senate Foreign Relations Committee, "Risch, Coons Introduce Legislation to Renew Trade Partnership Between U.S. and Sub-Saharan African Countries," Press Release, April 11, 2024.

184 Rosa Whitaker, "America Can't Be First If We Keep Putting Africa Last," International Business Times, July 23, 2024.

185 The New York Times, "Old World Young Africa," October 28, 2023.

in Africa will surpass the combined total of the working-age population in China and India, and quintuple that of the working-age population in Europe.[186] These mineral deposits and projected population growth rates provide substantial leverage for Africa to influence not only the continent's, but also the world's, economic growth and environmental, labor, and human rights standards.

The African Union (AU) voted to establish an African Continental Free Trade Area (AfCFTA) to support a liberalized, single market for goods and services by facilitating trade flows and growing regional value chains.[187] In January 2021, 54 of the 55 AU members ratified AfCFTA, representing a combined GDP of $3.4 trillion and a population of 1.3 billion.[188] AfCFTA established protocols on investment, intellectual property rights, trade in goods and services, rules and procedures for settlement disputes, and competition policy.[189] These uniform protocols throughout the continent have the potential to exponentially reduce trade costs and timelines, as well as foster an attractive investment and business environment once implemented. While trading under AfCFTA began in 2021, governments have only completed one pilot project that involved eight countries and 96 products.[190] Neither the AU nor the participating governments have been able to calculate the total value of goods traded in the pilot program or how much lower AfCFTA tariff rates were compared to previous country tariffs.

Although African governments have fostered varying degrees of diplomatic, economic, and security partnerships with global powers since the wave of decolonization that swept the continent from 1945 to 1960, these relationships have deepened and expanded at uneven rates.[191] China, Russia, and the Gulf States have fostered some of the strongest diplomatic, economic, and security relationships on the continent while U.S. policymakers struggle to shift the U.S. Africa relationship from one defined by foreign assistance to one characterized by a mutually beneficial partnership. An inability to foster meaningful partnerships with African nations threatens U.S. energy, economic, and national security.

China has already interwoven itself within the finance, security, and diplomatic frameworks of strategic countries across Africa, including by creating 25 economic and trade cooperation zones, supporting infrastructure projects in 35 countries, and signing 1,188 loans totaling $160 billion between 2000 to 2020.[192] The Gulf States and Russia have also increased their financial and security assistance, and subsequent influence, in strategic nations. The Gulf States have leveraged their longstanding cultural and religious ties to African nations to build strong diplomatic relationships and gain soft power, primarily in north and east Africa.[193] This engagement has since evolved, with Gulf countries such as the United Arab Emirates, Saudi Arabia, and Qatar rapidly increasing their investments across the continent, particularly in the mining sector. These initiatives are part of a broader strategy by Gulf States to enhance their presence in Africa, evidenced by substantial investment pledges—exceeding $53 billion in 2023 alone—targeting the mining, infrastructure, and commercial agriculture sectors. [194] Although there is not a substantial trade volume between Russia and Africa, there are a growing number of relationships between Russia and African countries with prominent mining sectors. Russia primarily fosters these relationships by providing financial and security assistance to—predominantly authoritarian—governments.[195] Typically, private military companies provide security assistance to leaders that have lost command and control of the military and face high levels of country instability.[196] Relationships between African governments and leaders in Beijing, Moscow, and the Gulf Cooperation Council are primarily transactional, providing capital, technical expertise, or military assistance, to African nations without stipulations tied to governance or rule of law. If the United States does not successfully forge a new era of partnerships on the continent, it risks ceding these critical relationships and its ability to support high environmental, labor, and human rights standards regionally and globally.

The low economic benefits for eligible countries and utilization of AGOA and GSP—while active—may suggest that trade preference programs provide insufficient incentives to adequately increase capacity for critical minerals mining and processing at the scale needed to meet global demand.[197] GSP initially proved successful in boosting trade, most notably from 1989 to 1993; however, trade rates stagnated by the mid-2000s.[198] Since 2006, GSP imports to the United States have declined by roughly 40 percent. In a similar trend, during the first decade of AGOA, exports from beneficiary countries to the United Staes nearly tripled from $22 billion in 2000 to over $61 billion by 2010.[199] However, around 2015, exports from beneficiary countries to the United States dropped to early 2000s levels and have only begun to slowly increase

186 Lauren Leatherby, "How a Vast Demographic Shift Will Reshape the World," The New York Times, July 16, 2023.

187 African Union, "The African Continental Free Trade Area," Webpage.

188 World Bank Group, "The African Continental Free Trade Area," July 27, 2020.

189 African Union, "The African Continental Free Trade Area," Webpage.

190 Chola Lawal, "Can Africa's new free trade treaty boost business on the continent?" Al Jazeera, February 16, 2020.

191 U.S. Department of State, "Decolonization of Asia and Africa, 1945–1960," Webpage.

192 The International Institute for Sustainable Development, "Chinese Investment in Africa Rises as Project Values and Bilateral Trade Decline," October 25, 2021; Institute of Developing Economies," at page 10. China's Infrastructure Print in Africa," Webpage; and House Foreign Affairs Committee, "China Regional Snapshot: Sub-Saharan Africa," updated November 14, 2022.

193 Chido Munyati, "A New Economic Partnership is Emerging Between Africa and the Gulf States," World Economic Forum, April 28, 2024.

194 Matthew Page and Ricardo Soared de Oliveira, "The Cost of the Gulf's Booming Business in Africa," Time, May 10, 2024.

195 Jack Margolin, "PAPER TRAILS How a Russia-based logistics network ties together Russian mining companies and military contractors in Africa," C4ADS, June 13, 2019.

196 Ibid.

197 Zainab Usman and Alexander Csanadi, "How the AGOA Reauthorization Process Could Help Diversify U.S. Critical Mineral Supplies," Carnegie Endowment for International Peace, April 30, 2024.

198 Ryan Olson, "The Generalized System of Preferences: Time to Renew and Reform the U.S. Trade Program," September 10, 2014.

199 Claire Klobucista and Mariel Ferragamo, "AGOA: The U.S.-Africa Trade Program," Council on Foreign Relations, updated December 4, 2023.

export volume recently.[200] These limited incentives may not provide enough of a financial gain to cover the cost of navigating and complying with higher standards under tariff preference programs.[201] Factors that could make the cost of GSP or AGOA eligibility untenable include unfamiliarity with the program, lack of beneficiary government support to exporters, absence of adequate infrastructure, import sensitivity restrictions, and a lack of human capital, among other factors.[202]

## Joint Trade Tools

Unlike most unilateral trade tools, joint trade tools aim to promote economic cooperation, integration, harmonize regulations, and create a framework for sustained cooperation and dispute resolution between trade partners. The current U.S. joint trade tool regime includes 14 bilateral and multilateral FTAs with 20 countries, negotiated and enacted to reduce two-way barriers to exports, protect American interests in foreign markets, and enhance the rule of law in partner nations.[203] However, in recent years, U.S. policy shifted away from comprehensive trade agreements focused on slashing duties for market access.[204]

This trend began with the Trump administration's limited trade agreements with Japan signed in 2020, focusing on agricultural and industrial goods, and rules for digital trade.[205] The Biden administration built on the U.S.-Japan Trade Agreement (USJTA) with a CMA in 2023. It was signed to ensure critical mineral extraction and processing in Japan provided IRA-compliant supply stream for the 30D clean vehicle tax credit.[206] The CMA covered only the five critical minerals used in the electrodes of EV batteries.[207] The Biden administration continued this trend by introducing a novel approach to trade cooperation in the form of: non-binding plurilateral frameworks designed to streamline cross-border commerce—by reducing non-tariff barriers—and harmonizing regulatory practices, moving away from previous prioritization of tariff reductions.

### Free Trade Agreements (FTAs)

FTAs have traditionally been the cornerstone of the U.S. trade policy toolbox. An FTA is a legally binding agreement, recognized internationally between "two or more countries where the countries agree on certain obligations that affect trade in goods and services, and protections for investors and intellectual property rights, among other topics."[208] FTAs reduce or eliminate tariffs on qualified goods, protect American-owned intellectual rights, allow U.S. exporters to influence product standards, permit U.S. companies to bid on government contracts and supply services, and ensure fair treatment for U.S. investors in FTA countries. The United States also has an established practice of promoting the implementation of multinational environmental and labor standards through trade agreements.

The United States has signed FTAs with twenty countries.[209] The last agreement entered into effect in 2012.[210] The limited number of FTAs and absence of new FTAs within the last 12 years reflect the inherent challenges in negotiating comprehensive trade agreements. FTAs typically encompass a wide range of industries, each with unique stakeholders across multiple countries' economies, making it difficult to successfully align the economic interests of all stakeholders. Moreover, FTA negotiations increasingly face opposition from various groups concerned about their impact on U.S. jobs and industries.[211]

There is a notable gap between current FTA coverage and the full spectrum of resource-rich countries since existing FTAs were designed primarily to boost traditional economic sectors—such as agriculture, internal combustion engine (ICE) vehicles, or final products—and to enhance diplomatic relations between partner countries. While some existing FTA partners, such as Australia, Canada, Chile, and South Korea house critical mineral extraction or processing capacity within their borders, other important producers and potential producers of critical minerals are absent from the U.S. FTA network. This misalignment is particularly evident when considering the countries targeted by other U.S. initiatives, such as the MSP.

While existing U.S. FTAs do not have critical minerals-specific provisions, they include several legally binding, enforceable, and sanctionable environmental and labor provisions that can serve as the foundation for greater cooperation to promote a race to the top in critical minerals production. A trade agreement with enforceability mechanisms that are properly employed typically produces the best environmental and labor results. Enforcement mechanisms can include oversight committees and commissions and dispute settlement mechanisms provide opportunities for continued engagement to further raise and harmonize standards among trade partners—and potentially

200 Ibid.

201 Zainab Usman and Alexander Csanadi, "How the AGOA Reauthorization Process Could Help Diversify U.S. Critical Mineral Supplies," Carnegie Endowment for International Peace, April 30, 2024; and Ryan Olson, "The Generalized System of Preferences: Time to Renew and Reform the U.S. Trade Program," September 10, 2014.

202 Congressional Research Service, *Generalized System of Preferences (GSP): Overview and Issues for Congress*, updated November 22, 2023.

203 U.S. International Trade Administration, "Free Trade Agreement Overview," Webpage.

204 See e.g., Trevor Sutton and Mike Williams, *A New Horizon in U.S. Trade Policy*, Center for American Progress, March 14, 2023.

205 Congressional Research Service, "U.S.-Japan Agreements and Negotiations," April 3, 2020, at page 1.

206 Ibid, at page 2.

207 Ibid.

208 U.S. International Trade Administration, "Free Trade Agreement Overview," Webpage.

209 U.S. Customs and Border Protection, "U.S. Comprehensive Free Trade Agreements and Other Trade Agreements," Webpage.

210 Congressional Research Service, *U.S. and Global Trade Agreements: Issues for Congress*, updated May 17, 2018, at page 6.

211 See e.g., Daniel Michaels, "In New World of Trade Diplomacy, Free Trade and Tariffs Take a Back Seat," Wall Street Journal, May 7, 2023; and Luke J. Lindberg and Gary Black, "2023 is the Year to Renew Trade Promotion Authority," The Hill, January 21, 2023.

Wood cargo being inspected at the Iberia control post in Peru, June 28, 2011. Prices of raw materials like exotic hardwoods are skyrocketing in China and the boom is putting pressure on the tropical Peruvian rainforest. (Dado Galdieri/Bloomberg / Getty Images)

## Forest Governance Provisions in the U.S.-PERU Trade Promotion Agreement

The U.S.-Peru Trade Promotion Agreement (PTPA) includes an annex on forest governance that requires Peru to audit specified timber producers and exporters and to perform verifications for certain shipments of wood products. The provisions in the annex pushed Peru to make several changes to the country's legal code and government institutions:

- Establish "key forest sector institutions, such as an independent forestry oversight body—Organismo de Supervisión de los Recursos Forestales y de Fauna Silvestre (OSINFOR)—which performed over 4,000 inspections of 1.7 million hectares from 2009 to June 2016, resulting in thousands of resolutions to sanction illegal activity or mandate corrective actions to improve forest management;"[212]
- "[Amend] Peru's criminal code in 2008 to include substantial penalties for illegal logging and wildlife trafficking;"[213]
- "[Adopt] laws and other measures necessary to comply with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);"[214] and
- "[Enact] a new Forestry and Wildlife Law in 2011 and [implement] regulations in 2015 that improve forest sector governance."[215]

Importantly, the PTPA also created an Interagency Committee on Trade in Timber Products from Peru (comprising USTR and U.S. Departments of State, Agriculture, Interior, and Justice) to monitor Peru's compliance with the Forest Annex.[216] The Committee could require verifications that specific shipments of timber complied with Peruvian laws and regulations. If the government fails to provide verifications, the USTR could instruct CBP to block all future imports of timber from the non-compliant firm.[217]

The Peruvian government made their first ever response to a verification request in August 2016 following the Timber Committee's request in February 2016.[218] Since then, Lima failed to sufficiently verify three different shipments to the United States in 2017.[219] The USTR subsequently directed CBP to block all future timber imports from the presumptively non-compliant firm.[220]

The USTR could incorporate a similar model in future trade agreements to promote responsible critical minerals production. However, without traceability systems in place, verifications would be more challenging for critical minerals that are exported to a third country for further transformation into manufactured products before being imported into the United States. This scenario highlights the need for robust traceability systems combined with enforcement mechanisms that apply to both direct and indirect imports.

212 USTR, "U.S. Timber Committee Responds to Peru's Timber Verification," Press Release, September 19, 2018.

213 Ibid.

214 Ibid.

215 Ibid.

216 Interagency Committee on Trade in Timber Products from Peru, "Statement Regarding Implementation of the PTPA Forest Annex and Peru's July 2018 Verification Report," U.S. Trade Representative, September 17, 2018, at page 1.

217 FR Doc. E9-10648.

218 Interagency Committee on Trade in Timber Products from Peru, "Statement Regarding July 2016 Timber Verification Report from Peru," U.S. Trade Representative, August 17, 2016.

219 Interagency Committee on Trade in Timber Products from Peru, "Statement Regarding Implementation of the PTPA Forest Annex and Peru's July 2018 Verification Report," U.S. Trade Representative, September 17, 2018, at page 2.

220 Ibid.

By 2015, trade agreements and capacity-building activities connected to these agreements resulted in more than 700 new environmental laws and regulations in partner countries.

the world.[221] The Forest Governance Annex under the U.S.-Peru Trade Promotion Agreement is a particularly useful case study.

Implementation legislation for trade agreements can earmark resources to help partners build the governance capacity required to set and enforce higher standards. By 2015, trade agreements and capacity-building activities connected to these agreements resulted in more than 700 new environmental laws and regulations in partner countries.[222] Moreover, capacity-building efforts can reach beyond regulatory enforcement. They can also help achieve other environmental objectives. For instance, while negotiating the U.S.-Chile FTA, the two countries also negotiated an Environmental Cooperation Agreement focused on eight areas, including remediating mine pollution in Chile.[223] After the agreement entered into force, EPA participated in a number of capacity-building activities with Chilean counterparts to share cost-effective methods to reduce pollution in contaminated mine sites and provided training on environmental risk assessment and enforcement measures at mining sites.[224]

The USMCA, renegotiated from the North American Free Trade Agreement (NAFTA), is one of the United States' most important FTAs, designed to benefit North American workers and businesses across a wide range of sectors, including the automotive and chemical industries. It includes a few groundbreaking provisions.[225] USMCA adopts some of the most stringent automotive rules of origin compared to other trade agreements to increase automotive production and assembly in North America. Under the renegotiated rules, manufacturers must meet four rules of origin requirements to qualify for preferential treatment under the USMCA: 1) a regional value content (RVC) requirement for the overall vehicle; 2) RVC thresholds for automobile parts; 3) a labor value content rule; and 4) a value content requirement for the steel and aluminum used in vehicles.[226] The value content requirements based on labor and material inputs are the most innovative additions to the USMCA. The new rules of origin require 40 to 45 percent of the value added to the vehicle to come from workers earning at least $16 per hour and at least 70 percent of vehicle producers' annual aluminum and steel purchases to come from North America.[227] The agreement also established a Rapid Response Mechanism, allowing signatory countries to quickly act if they think a company in one of the other signatories is mistreating its workers—for example, preventing workers from forming unions or negotiating as a group.[228]

These provisions could serve as a foundation for future trade agreements with strategic partners. They can be adapted and strengthened to specifically address the unique challenges associated with critical mineral supply chains, such as the need for responsible mining practices, the prevention of child and forced labor, and the promotion of recycling and circular economy principles.

Negotiating comprehensive FTAs that include such provisions, however, may prove challenging in the current political climate. The Trump and Biden administrations both took stances against granting new market access concessions, and U.S. industries became increasingly vocal about foreign competition. Various stakeholders often blame FTAs for job losses, wage stagnation, or economic disruption in certain industries. U.S. politicians and industry groups accused NAFTA of facilitating the relocation of over 300,000 auto jobs—approximately one-third of the U.S. industry—to Mexico.[229] This loss was particularly prominent in the Rust Belt states, where union labor has traditionally been strong.[230] The Trans-Pacific Partnership (TPP) faced similar opposition, with labor organizations leading the charge against what they perceived as another piece of legislation that would offshore jobs.[231] More recently, the Biden administration opted not to pursue renewal of Trade Promotion Authority (TPA) following its expiration in 2021.[232] TPA empowers the Executive branch to negotiate trade agreements that Congress can approve or reject without amendments or filibusters.[233]

221 SAFE, *A Global Race to the Top*, March 2023, at page 52.

222 SAFE analysis based on information in U.S. Trade Representative, *Standing Up for the Environment*, Special Report, May 2015.

223 U.S. Department of State, "United States – Chile FTA Environmental Chapter."

224 Environmental Protection Agency, "EPA Collaboration with Chile," Webpage.

225 Center for Automotive Research, *NAFTA Briefing: Trade Benefits to the Automotive Industry and Potential Consequences of Withdrawal from the Agreement*, January 2017, at page 1.

226 William Alan Reinsch, "USMCA Automotive Rules of Origin: Economic impacts, Competitiveness Effects, and Relevance," Center for Strategic & International Studies, November 4, 2022.

227 Congressional Research Service, "USMCA: Automotive Rules of Origin," December 8, 2023, at page 1.

228 USTR, "United States Announces Successful Resolution of Rapid Response Mechanism Labor Matter at Asiaway Automotive Components México, S. de R.L. de C.V.," Press Release, February 16, 2024.

229 Andrew Chatzky, "NAFTA and the USMCA: Weighing the Impact of North American Trade," Council on Foreign Relations, July 1, 2020.

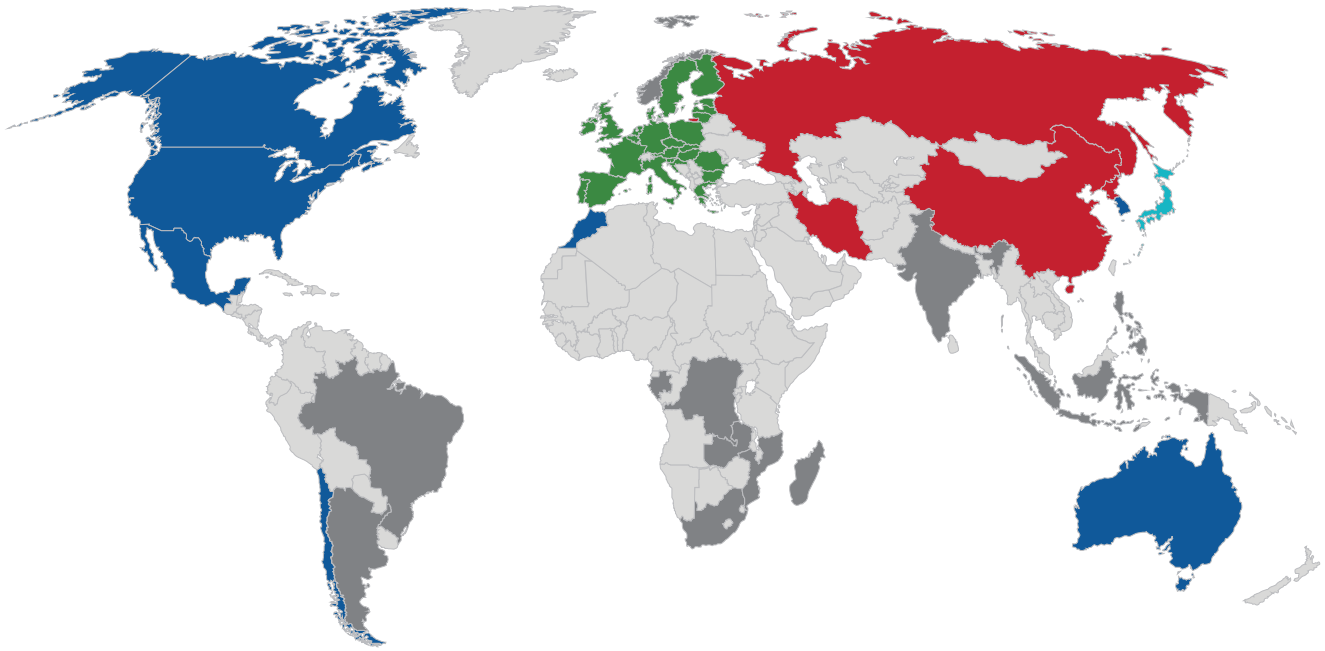
230 Note: Rust Belt states include Illinois, Indiana, Michigan, Missouri, New York, Ohio, Pennsylvania, West Virginia, and Wisconsin.

231 Andrew Chatzky, "NAFTA and the USMCA: Weighing the Impact of North American Trade," Council of Foreign Relations, July 1, 2020.

232 Steven Overly, "Bipartisan Resentment Grows as Biden Pursues New Trade Talks," Politico, June 13, 2022.

233 Ian Ferguson, "Trade Promotion Authority (TPA): Frequently Asked Questions," Congressional Research Service, updated June 21, 2019.

**Figure 5** Map of IRA Eligible and non-IRA-eligible Critical Mineral-Producing Countries



- **U.S. or free trade agreement (FTA) countries:** Australia, Canada, Chile, Mexico, Morocco, United States
- **Countries with a critical minerals agreement (CMA):** Japan
- **Countries wth ongoing CMA negotiations:** EU, UK
- **Countries without an FTA or CMA:** Argentina, Brazil, Democratic Republic of the Congo, Gabon, India, Indonesia, Madagascar, Mozambique, Philippines, South Africa, Zambia
- **Foreign entities of concern:** China, Iran, North Korea, Russia

Note: European countries, South Korea, and Japan host critical mineral processing facilities.
Source: SAFE Analysis.

Amid a constrained domestic political environment, it could be helpful for the United States to pursue targeted critical minerals agreements that are narrower in scope compared to traditional FTAs. Moreover, these agreements could focus on establishing environmental and labor standards that are directly relevant to the critical minerals sector, promoting supply chain transparency, and encouraging cooperation and capacity building. By concentrating on a single sector, negotiators can delve deeper into the technical aspects of mineral extraction, processing, and trade, potentially leading to more effective and implementable standards.

## Critical Mineral Agreements (CMAs)

CMAs, a concept that emerged in the wake of the IRA, may pave a path for a sectoral approach to agreements that are easier to negotiate and build consensus around. The critical minerals sourcing provisions for the 30D Clean Vehicle Tax Credit under the IRA requires an EV battery to have a requisite percentage of the value of the applicable critical minerals extracted or processed in the United States or a country with which the United States has a free trade agreement. This requirement creates frictions between the United States and vital trade partners in diversifying the global critical minerals supply chain since only a limited number of critical mineral-producing countries have existing FTAs.

In the absence of sufficient mineral-rich FTA partners, the Biden administration created a new type of agreement, CMAs, to bridge the gap between IRA tax credits and countries with strong mining and processing industries. USTR signed the first and, thus far, only CMA with Japan within a year of IRA's passage to smooth diplomatic relations and provide a pathway for the companies in Japan

> The time-limit for the 30D tax credit raises questions about the long-term impact and adaptability of any CMA provision beyond 2032.

## Key Components of Trade Agreements for Critical Minerals

Each CMA or sectoral agreement should include some or all of these topic areas which can be categorized into three types: incentives provisions, standards provisions, and enforcement provisions.

### Incentives Provisions

- **Export and Import Freedom.** A provision that commits both parties to not impose any export controls or import tariffs on critical minerals shipments.
- **Trade Facilitation.** A provision that lays out mutual trade facilitation obligations that each country will guarantee for critical minerals shipments.
- **Development Finance.** A provision putting in place development finance vehicles to invest in sectors supportive of the critical minerals sector, like energy and transportation infrastructure.

### Standards Provisions

- **Labor Standards.** A provision on cooperating for engagement, information-sharing, and enforcement actions related to labor rights in the mining and processing of critical minerals. This provision should include opportunities for partner countries to reform their labor laws if they are non-existent or insufficient.
- **Environmental Standards.** A provision on domestic measures to promote community engagement and reduction of environmental and societal impacts in mining and processing operations. The provisions should include opportunities for partner countries to reform their environmental protection laws if they are non-existent or insufficient.

### Enforcement Provisions

- **Interagency Committees.** A provision to create a Critical Mineral Committee (CM Committee) similar to the Timber Committee in the U.S.-Peru Trade Promotion Agreement.
- **Dispute Settlement.** A provision establishing a mechanism for investors to challenge policies they believe violate labor and environmental standards or unfairly impact their investments.
- **Other Enforcement Mechanisms.** Redundant enforcement provisions could be modeled after the USMCA's Rapid Response Mechanism (RRM) to disincentivize practices that are non-compliant with partner country labor and environmental laws by creating tariff penalties.

to qualify for IRA sourcing provisions. USTR's decision to pursue this agreement was based on three primary factors: 1) Japan's status as a close ally, thus a secure supplier, 2) its existing mineral processing capabilities, and 3) the foundation provided by the USJTA. Critics argue that the CMA circumvented the traditional Congressional approval process for trade agreements.[234] However, the administration contends that the authority granted through the 2019 USJTA and U.S.-Japan Digital Agreement, two agreements that were negotiated under the last TPA, justifies this streamlined negotiation process.[235] Although its legal status is in doubt, the United States is reportedly pursuing similar CMAs with other close allies, including the EU and United Kingdom. Argentina, Norway, the Philippines, and Indonesia also expressed interest in negotiating respective CMAs.

CMAs currently serve as a tool to qualify critical minerals, extracted and processed in select nations, under the 30D sourcing provisions. These provisions send the strongest U.S. demand signal to date, hoping to incentivize companies to invest in select countries to build IRA-compliant value chains. The scope of CMAs beyond 30D eligibility remains unclear, and the 30D credit itself will currently end in 2032. The time-limit raises questions about the long-term impact and adaptability of any CMA provision beyond 2032.

Despite these uncertainties, CMAs offer a unique opportunity. By leveraging the prospect of IRA-eligibility to bring countries to the negotiation table, CMAs enable the potential to craft agreements that address the distinct political, economic, judicial, and investment risk landscapes in partner countries—a level of flexibility not available for unilateral tools more closely bound by the principle of non-discrimination.[236] This more tailored approach could be a double-edged sword if not managed correctly. It could potentially increase U.S. access to critical minerals while also creating a complex patchwork of agreements with varying standards and implementation processes globally. To mitigate this risk, it's crucial that all CMAs uphold a consistent standards framework, while allowing for differences in incentive or enforcement.

One of the major challenges facing CMAs is their enforceability. Unlike traditional FTAs ratified by Congress, the U.S-Japan CMA lacks enforceable provisions and dispute resolution mechanisms. Instead, it relies on cooperation and economic goodwill to ensure adherence. Each nation brings its own unique set of circumstances to the table—varying levels of economic development, political stability, and historical ties with the United States. These factors inevitably color perceptions of how reliable a non-enforceable agreement might be. Future CMAs might require more "teeth," or enforcement mechanisms, to ensure compliance and protect national interests, especially when engaging with jurisdictions that face higher levels of instability or with which the United States has a history of trade disputes.

234 See e.g., Cameron Cavanagh, "The United States Rights a Wrong with Critical Minerals Agreements," Georgetown Security Studies Review, April 26, 2023.

235 See e.g., Office of the U.S. Trade Representative, "United States and Japan Sign Critical Minerals Agreement," Press Release, March 28, 2023.

236 Non-discrimination is a fundamental principle of the WTO system. This principle is exemplified by two key clauses. The Most Favored Nation (MFN) clause requires countries to treat all their trading partners equally. Meanwhile, the national treatment clause mandates that imported goods must be treated equally to locally produced goods. Source: World Trade Organization, "Principles of the Trading System," Webpage.

Indonesia, October 07, 2021 — A convoy of dump trucks hauling material from a pit mine. (Ari Widodo / iStock)

# Navigating Tradeoffs and Tensions

While trade policy is a useful tool in supporting supply chain diversification, it comes with a set of tradeoffs and limitations for policymakers to consider before designing and implementing new policies.[234] These challenges stem from the need to balance competing priorities such as de-risking supply chains, bolstering domestic manufacturing, and promoting responsible production practices. The complexity of global supply chains further complicates matters, as exemplified by the issue of embedded minerals, where targeted trade remedies can be circumvented through third-country manufacturing. Additionally, policymakers must grapple with the disparity between the urgent demand for critical materials in downstream industries and the protracted timelines for developing domestic supply chains. These tough decisions underscore the necessity of considering trade policy within a broader strategic framework, emphasizing the complementarity of other policy tools such as international cooperation, investment incentives, permitting reform, and research and development support to create a comprehensive approach to supply chain resilience.

Unilateral and multilateral action offers distinct advantages in addressing critical mineral supply chain challenges. Unilateral policy tools enable relatively swift, decisive measures without the need to gain consensus from other countries with potentially differing priorities. Unilateral policies can also provide the means to prompt allied or like-minded countries to adopt similar actions with trade impacts. For instance, the EU enacted the Net-Zero Industry Act (NZIA) and Critical Raw Materials Act (CRMA) in response to the IRA.[237] More recently in the trade realm, Canada announced that it would impose 100 percent tariffs on EV imports from China and 25 percent tariffs on aluminum products imported from China. These tariffs match the Section 301 tariff increases announced three months prior by President Biden. The United States can also use unilateral trade policies as leverage for greater cooperation on other areas. The Biden administration tried to use the Section 232 Tariffs on aluminum and steel enacted under the Trump administration, for example, as leverage to negotiate a coordinated tariff scheme based on green aluminum and steel with the EU.[238]

On the other hand, unilateral action can entail significant risk, especially for the nation leading in policy setting, potentially impeding progress toward energy, economic, and national security goals. Unilateral trade policies such as tariffs and export controls include the unintended potential to harm downstream industries and consumers by contributing to higher prices or supply limitations. This criticism is exemplified in the solar industry's strong opposition to solar panel tariffs due to increased project costs, automakers' vocal concerns over the recent Section 301 Tariff hikes, and the addition of graphite to the tariff list.[239] DOC demonstrated a similar apprehension to industry groups in its 2021 decision to refrain from recommending Section 232 Tariffs on NdFeB magnets.[240]

Additionally, adversaries and allies alike could respond to unilateral U.S. trade policies that negatively affect their economies by imposing reciprocal tariffs—potentially triggering a tariff war, or export controls on raw and processed critical minerals. The latter scenario is already playing out in the semiconductor industry. The U.S. imposed stringent export controls on advanced chips made with U.S. inputs, and successfully persuaded Japan and the Netherlands, two countries with strategic contributions to the global semiconductor value chain, to implement similar restrictions for

237 Christian Scheinert, "EU's Response to the US Inflation Reduction Act (IRA)," European Parliament, June 2023.

238 Note: See the callout box on the Global Arrangement for Sustainable Steel and Aluminum (GASSA). Source: Inu Manak and Helena Kopans-Johnson, "In Green Steel Discussions, the United States Is Playing Dirty," Council on Foreign Relations, November 8, 2023.

239 See e.g., Solar Energy Industry Association, "Study: Solar Tariffs Cause Devastating Harm to U.S. Market, Economy and Jobs," December 3, 2019; and Gavin Bade and Ari Hawkins, "Biden hounds the Philippines on labor rights," Politico, July 1, 2024.

240 U.S. Department of Commerce, The Effect of Imports of Neodymium-Iron-Boron (NdFeB) Permanent Magnets on the National Security, September 2022.

semiconductor manufacturing equipment.[241] China retaliated against the United States by announcing export controls on germanium and gallium, two critical minerals used in semiconductor manufacturing.[242]

Furthermore, if other countries do not adopt similar trade policies, there could be substantial global misalignment, creating a conductive environment for adversaries to circumvent and weaken unilateral U.S. trade policies. Chinese manufacturers were able to circumvent the U.S. solar tariffs by routing production through Southeast Asian countries.[243] A similar trend is emerging for battery materials, where the United States primarily relies on unilateral policies like the IRA sourcing provisions and Section 301 tariffs. Chinese companies are increasingly entering into joint ventures with firms in allied countries to produce CAM and precursor materials.[244] In these arrangements, the Chinese partner often provides low-cost feedstock materials, leveraging and maintaining their dominant position in critical mineral processing.[245] Exporters can then export the resulting product into the United States free of additional duties.[246]

The United States wields significant advantages in multinational trade negotiations and policy, particularly concerning issues related to global energy and security. U.S. economic leverage through market access concessions, influential soft power, and robust existing international networks is emboldened when coordinated with major U.S. trading partners. U.S. and G7 investment capabilities also enable enduring, mutually beneficial cooperation through initiatives like the PGI. These assets position the United States favorably to complement unilateral and domestic policies with multilateral action to develop diverse, sustainable, and transparent critical mineral supply chains.

Multilateral action also entails challenges for the United States. Traditionally, tariff reductions were the primary incentive driving trade agreements. Nations were willing to negotiate and make concessions in exchange for improved market access through lower tariffs.[247] This model, however, faces limitations in the current global critical minerals trade landscape, especially if sectoral agreements gain prominence. U.S. duties on battery materials and REEs range anywhere from zero to four percent, limiting U.S. ability to offer significant tariff reductions in negotiations.[248] This constraint becomes particularly challenging when attempting to incorporate more prescriptive environmental and labor provisions. The cost of compliance in these cases is often higher than the tariff reduction benefit.

## U.S. and Allied Trade Policies

It will be crucial for the United States to collaborate closely with allies to effectively address the challenges posed by the complex, global nature of critical mineral supply chains and minimize loopholes that undermine the effectiveness of trade policies. By aligning approaches and presenting a united front, the United States and its partners can send a stronger, more consistent market signal that encourages responsible sourcing practices, promotes supply chain resilience, and drives positive change in challenging market dynamics.

Harmonizing the application of tariffs and other trade measures is particularly important. Imposing tariffs on specific products from specific jurisdictions can allow for a more targeted, risk-based approach. However, as discussed previously, the global nature of critical mineral supply chains make it rather easy for exporters to circumvent tariffs imposed on specific products from specific countries, such as battery-grade materials from China. To minimize this loophole, the United States can work to develop coordinated policies that account for trade policies that consider the entire value chain. While supporting enhanced supply chain transparency in the long-term, the United States can start working with strategic countries that play a disproportionately important role in specific supply nodes—as in the case of semiconductors—to start taking action with the potential for indirect imports, the possibility of transshipment or re-exports, and a baseline of common standards. Such cooperation is also important to prevent a patchwork of different regulations across jurisdictions.

Harmonizing trade policies between multiple actors is especially difficult when parties have differing motivations that drive their trade policy. Some countries may be primarily focused on protecting their domestic industries against unfair trade practices, while others may place a greater emphasis on promoting sustainable development or supporting human rights in mining communities. The recent Global Agreement on Sustainable Steel and Aluminum (GASSA) between the U.S. and EU demonstrates both the potential and the challenges of aligning trade policies among negotiating parties aiming to influence economic, environmental and labor dynamics.

241 See e.g., Emily Benson, "Updated October 7 Semiconductor Export Controls," Center for Strategic and Industrial Studies, October 18, 2023; and Silvia Amaro and Arjun Kharpal, "The U.S. Imposed Semiconductor Export Controls on China. Now a Key EU Nation is Set to Follow Suit," CNBC, March 9, 2023.

242 James Aredy and Sha Hua, "China Restricts Exports of Two Minerals Used in High-Performance Chips," The Wall Street Journal, July 4, 2023.

243 Department of Commerce, "Department of Commerce Issues Final Determination of Circumvention Inquiries of Solar Cells and Modules from China," Webpage, August 18, 2023.

244 Heejin Kim and Gabriella Coppola, "Chinese Firms Are Seeking Korean Partners to Skirt US EV Rules," Bloomberg, July 30, 2023.

245 Gregor Sebastian, Reva Goujon and Armand Meyer, Pole Position: Chinese EV Investments Boom Amid Growing Political Backlash, Rhodium Group, February 29, 2024, at page 4.

246 SAFE's understanding of the U.S. country of origin and substantial transformation rules. See e.g., CBP HQ N324313, March 4, 2022.

247 See e.g., U.S. International Trade Administration, "Free Trade Agreement Overview," Webpage.

248 SAFE analysis based on data from World Trade Organization.

## Lessons Learned from Global Arrangement on Sustainable Steel and Aluminum

GASSA, born out of the left-over aluminum tariffs imposed on the EU provides a good case study on how misalignment of competing policies can undermine successful cooperation. GASSA has its roots in the Section 232 Tariffs on aluminum and steel announced under the Trump administration.[249] The tariffs, which the DOC justified implementing on national security grounds, strained international trade relations because the tariffs applies to U.S. allies and adversaries. The Trump administration eventually provided exemptions to a few jurisdictions but the EU was not included.

The Biden administration inherited pending trade disputes with strategic security and economic partners. Policymakers crafted GASSA as a potential solution to address multiple complex and shared goals. On the U.S. side, these included: 1) working with allied and like-minded countries in a coordinated effort to address global overcapacity in steel and aluminum production, 2) discouraging domestic producers from moving to locales with less restrictive emissions rules, and 3) advancing climate commitments by creating market signals to adopt cleaner production methods.[250]

The European Commission shared the U.S. goals of promoting clean aluminum and steel production methods and addressing Chinese overcapacity.[251] However, perhaps the largest motivator for the EU to engage in GASSA negotiations was the desire to remove U.S. duties imposed on aluminum and steel imports from EU countries. The Section 232 Tariffs imposed on European steel and aluminum were replaced with a tariff rate quota scheme at the beginning of the GASSA negotiations.[252]

While U.S.-EU alignment on environmental priorities provided a loose framework that the negotiating parties could build upon, there were stark differences in the views on how to best address China's overcapacity and non-market practices—the main challenge necessitating U.S. Section 232 tariffs. These differences

Ursula von der Leyen, president of the European Commission, center, speaks during a meeting on steel and aluminum in the Cabinet Room of the White House in Washington, DC, US, on Friday, Oct. 20, 2023. (Al Drago/ Bloomberg / Getty Images)

presented significant difficulties in agreeing upon crucial aspects of GASSA's implementation, such as determining appropriate tariff levels. Washington seemingly wanted to apply the Section 232 tariffs as the common external tariff based on emissions and levied against third countries under GASSA; whereas Brussels wanted to eliminate existing tariffs and determine coordinated tariffs based on the carbon intensity of the products, aligned with the EU's Carbon Border Adjustment Mechanism.[253]

GASSA represents an innovative approach to international trade agreements, aiming to merge traditional trade policy concerns like industrial overcapacity with environmental and sustainability goals. The divergent objectives ultimately resulted in a gridlock, demonstrating how the misalignment of competing policy priorities and approaches can impede the swift and effective implementation of international trade agreements. Despite best efforts, the negotiators missed the October 2023 deadline, and both the negotiations and the temporary tariff exemptions on steel and aluminum products from the EU were extended until 2025.[254]

249 See e.g., SAFE, Political Tailwinds: Examining Trade Policy for the U.S. Aluminum Industry, June 2023.

250 Inu Manak and Helena Kopans-Johnson, "In Green Steel Discussions, the United States Is Playing Dirty," Council on Foreign Relations, November 8, 2023.

251 Ibid.

252 Karl Tsuji, "U.S.-EU Joint Statement Modifies U.S. Section 232 Steel and Aluminum Tariffs, Lifts EU Retaliatory Tariffs, and Announces Negotiations of a First-ever Carbon-based Sectoral Arrangement," U.S. International Trade Commission, January 2022, at page 1.

253 Inu Manak and Helena Kopans-Johnson, "In Green Steel Discussions, the United States Is Playing Dirty," Council on Foreign Relations, November 8, 2023.

254 See e.g., Nick Lazzaro, "Aluminum Association Urges US, EU to Finalize 'dormant' Metals Trade Deal," S&P Global, June 28, 2024.

## Balancing De-Risking, Domestic Manufacturing, and Responsible Production Priorities

Recent policies try to strike a delicate balance between interrelated but competing U.S. priorities to: 1) de-risking by building diverse supply chains and reducing reliance on FEOCs for advanced technologies and their critical mineral inputs, 2) supporting domestic (re)industrialization and job creation efforts, especially in downstream manufacturing sectors, and 3) promoting sustainable and ethical mining practices across diverse international contexts.

Individual policies often involve trade-offs between these competing priorities. For instance, policies focused on protecting domestic industries like tariffs may indirectly contribute to responsible production practices, as U.S. and allied countries are generally held to higher standards in their operation, but this is not guaranteed. In fact, these policies are not based on environmental or labor performance, so they foster market dynamics that level the global playing field when it comes to standards. Conversely, import prohibitions like Section 307 and UFLPA address specific labor forced concerns, but their implementation can risk U.S. access to material inputs if alternative producers with higher standards do not readily exist. These concerns explain why Section 307 had a consumptive demand exemption until Congress removed it in 2015.[255] The consumptive demand clause permitted the import of products made with forced labor if the United States could not satisfy its demand for products subject to import prohibitions in any other way.[256] Furthermore, even with policies that support higher standards in place, U.S. and allied producers will still need to contend with oversupply or other unfair practices, which continue to distort the global markets.[257]

The final Departments of Energy and Treasury rules interpreting FEOCs and providing guidance for the implementation of FEOC provisions provide another example of policy trade-offs. FEOC provisions are particularly stringent because they directly impact the eligibility of electric vehicles for the 30D Clean Vehicle Tax Credit. Specifically, if an automaker uses any components or critical minerals from FEOCs in their supply chain, their vehicles become ineligible for these valuable consumer incentives. Lawmakers designed this strict rule to reduce U.S. reliance on potentially adversarial nations for critical materials and technologies. However, the rules were set to take effect before industry actors could establish sufficient non-FEOC production capacity for many of the critical minerals implicated by the rule, creating a potential bottleneck for U.S. manufacturers. Facing competing priorities and not wanting to slow down deployment of EVs, the Biden administration clarified that foreign subsidiaries of Chinese companies would not automatically be classified as FEOCs.[258] The implications of this decision, intended to support domestic manufacturers in the downstream and meet deployment goals, inadvertently undermine long-term de-risking and responsible production goals, as already evident in the nickel industry.

> Individual policies often involve trade-offs between competing priorities.

Under this subsidiary ruling, nickel produced in Indonesia by Chinese companies, often with lower environmental and labor standards, does not automatically count as coming from a FEOC. Subsequently, auto companies sourcing nickel from Indonesia can most likely produce IRA-compliant vehicles.[259] This interpretation advantages the less expensive, but often less responsibly produced nickel from Chinese-owned operations in Indonesia at the expense of the more environmentally conscious allied producers. Other nickel producers continue to be forced out of the market by their Chinese competitors, as seen from BHP's suspensions of its nickel operations in Western Australia.[260]

## Embedded Minerals and Trade Policies

When considering targeted trade remedies like the Section 301 Tariffs on EVs, lithium-ion battery components, and their critical mineral inputs coming from China, it is important to recognize the complex and global nature of the critical mineral supply chain. Tariff increases, for example, are imposed on specific products, such as on battery-grade materials imported from China, to protect the competitiveness of domestic producers at that specific supply chain node. However, this approach assumes sourcing decisions are a simple, binary choice between the United States and China. Battery-grade materials are already produced in more than two countries, and investors have an even larger pool of countries to choose from when making investment decisions for future production capacities. The final decision on where to source existing inputs and where to make new investments depends

255 Christopher Casey, et al., "Section 307 and Imports Produced by Forced Labor," Congressional Research Service, October 25, 2023, at page 1.

256 Ibid.

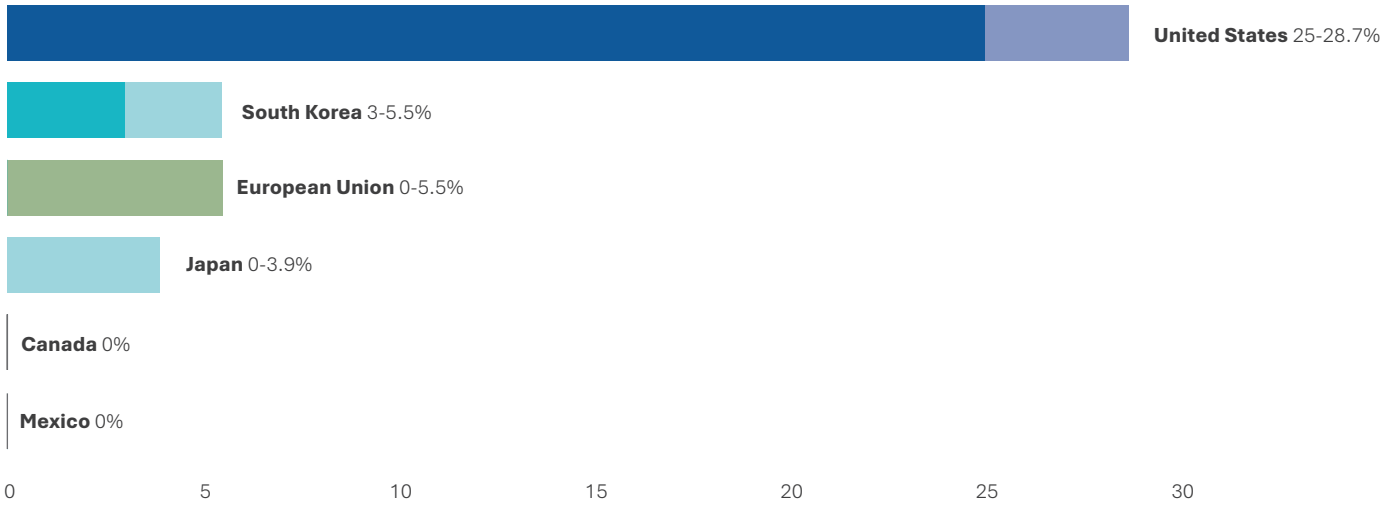
257 While all countries provide some form of subsidy or support to sectors of strategic concern, China's level of subsidization far exceeds typical practices and significantly distorts global trade. CATL exemplifies the scale of government support companies receive. Its subsidies in 2020, when the company had already established its leading position in the global lithium-ion market, added up to a fifth of its net income. Source: Henry Sanderson, "China's Electric Vehicle Battery King," Time, September 29, 2022.

258 89 FR 37079.

259 SAFE analysis based on a review of company ownership data.

260 BHP, "Western Australia Nickel to Temporarily Suspend Operations," Press Release, July 11, 2024.

**Figure 6** Tariffs Imposed on Imported Battery Materials from China




Note: Battery materials include lithium hydroxide, lithium carbonate, cobalt sulfate, nickel sulfate, natural graphite, and cathode active materials.
Source: SAFE analysis using information from the World Trade Organization.

in part on policy signals. Therefore, implementing tariffs on specific products from specific countries without aptly accounting for potential embedded material may not be as effective as policymakers initially intended.

Consider instances where a Chinese company produces battery-grade materials and exports them to close allies and trading partners. For example, China accounts for up to 80 percent of South Korea's lithium hydroxide imports.[261] South Korean companies convert this material into electrode-active materials which are key components of lithium-ion batteries. The process of converting battery-grade materials into electrode active materials is usually treated as a significant transformation that uses materials from more than one country as inputs, and that adds substantial value to the product. Thus, the country of origin for the products would be considered South Korea. [262] This South Korean-made electrode active material can then be exported to the United States without being subject to the Section 301 Tariffs, even though they contain Chinese-sourced materials.

Policies that focus on one supply chain step create a loophole for cheaper Chinese-made battery-grade materials and other inputs, especially in the more upstream parts of the supply chains, to enter the U.S. market indirectly, circumventing the tariffs. U.S. imports of battery materials from China could decrease, but rather than producing more battery materials domestically, the United States may end up importing more CAM from South Korea. Such a shift in supply chains would not reduce actual reliance on China for critical minerals in the upstream.

## Long Project Timelines vs. Urgent Need for Materials in the Downstream

Supply chains are not developed overnight. Globally, average mine projects take around 16 years to move from discovery to production stage.[263] Processing facilities need at least three to five years to be built.[264] An additional one to two years is required for product qualifications.[265] A variety of reasons including permitting challenges, financing issues, or difficulties in site selection can extend this timeline. The average mine project timeline in the United States, for example, is 29 years as opposed to the global average of 16 years.[266]

Despite upstream delays, the United States is rapidly advancing its downstream capacity. Plans are in place for over 1,000 gigawatt hours (GWh) of battery production capacity to come online by 2030.[267] This progress in downstream industries creates an urgent need for critical materials that the upstream and midstream sectors in domestic, allied and like-minded countries are not yet positioned to meet. Policies should be crafted with these divergent timelines in mind to ensure long-term development of robust domestic and allied supply chains without adversely affecting near-term manufacturing and deployment goals.

261 Kyung-Min Kang, "Korea's Heavy Dependence on China for Raw Materials Deepens," The Korea Economic Daily, September 12, 2023.

262 SAFE's understanding of the U.S. country of origin and substantial transformation rules. See e.g., CBP HQ N324313, March 4, 2022.

263 Paul Manalo, "Discovery to production averages 15.7 years for 127 mines," S&P Global, June 6, 2023.

264 Mark Beveridge, "Metal Market Supply Squeezes and Rising Costs of LiBs," Presentation, Benchmark Mineral Intelligence, May 11, 2022.

265 SAFE findings from interviews with companies.

266 Mohsen Bonakdarpour, *Mine Development Times: The US in Perspective*, S&P Global, June 2024.

267 Department of Energy, "FOTW #1271, January 2, 2023: Electric Vehicle Battery Manufacturing Capacity in North America in 2030 is Projected to be Nearly 20 Times Greater than in 2021," January 2, 2023

30D sourcing provisions do not fully consider realistic project development timelines. This oversight is particularly evident in the case of graphite. According to the timeline set by Congress, FEOC rules for graphite should be enforced starting in 2025. China, however, currently controls more than 80 percent of natural graphite extraction and 99 percent of spherical graphite production.[268] The majority of announced graphite extraction and processing projects are not expected to come online before 2027.[269] The mismatch between FEOC rules and ex-China supply significantly influenced the administration's decision to implement a transition rule for graphite. To effectively implement FEOC rules thereafter and avoid finding itself in a position where it has to consider extending the transition rule beyond 2027, the administration needs to send clear, credible market signals that will stimulate IRA-compliant production capacity. Without such signals, the industry risks falling into a pattern of repeated transition rule extensions, and failing to achieve the intended diversification of the graphite supply chain.

To prevent similar policy-implementation misalignments and enhance credibility of U.S. policies, policymakers can opt for a more incremental approach with phased implementation of unilateral policies like tariffs and import prohibitions. This approach should demonstrate the administration's commitment to its implementation schedule, which is more effective than announcing sweeping changes years in advance. Policymakers should carefully assess the current state of domestic and allied production capacity at each stage of the supply chain and tailor their policies accordingly to match the development of U.S. and allied capacity along the critical minerals value chain. Additionally, continued industry support will be crucial to alter market dynamics and assist new projects in successfully commencing production.

The analysis of various trade tools has exposed limitations in trade policy, both within the United States and on the international stage. These shortcomings underscore the necessity of complementary policies to bolster and amplify the efforts being pursued through trade channels, and vice versa. To foster growth in the trade of responsibly produced goods, it is imperative to first channel more investment into responsible producers. Producers in the United States and allied nations like Canada and Australia stand out as a prime example of more responsible producers, due to their comparatively robust environmental and labor regulations. Although there is always space for improvement, U.S. laws generally align with the most stringent industry standards.

Unilateral tools, such as tariffs and import restrictions offer a degree of protection for domestic producers, particularly against unfair trade practices. However, they fall short of addressing the full spectrum of factors that put domestic projects at a competitive disadvantage. Trade policies, in isolation, cannot surmount all the obstacles U.S. producers encounter. To close this gap, the U.S. government introduced a range of programs through BIL and IRA, designed to stimulate investments in the domestic critical minerals landscape. The most notable initiatives in terms of the funding support they provide or the strong demand signals they send include:

- 45X Advanced Manufacturing Tax Credits for lithium-ion batteries, battery components, and critical minerals;
- Battery material processing and battery manufacturing and recycling grants administered by the DOE;
- Loans administered by the DOE's Loan Programs Office (LPO);
- 30D Clean Vehicle Tax Credit, and;
- Defense Production Act (DPA) Title III Program.

Notwithstanding these initiatives, gaps persist in the government support provided to build domestic critical minerals production capacity.[270] The 45X tax credits offer a credit equivalent to 10 percent of production costs. Uncertainties loom over the final rules, which, as of the publication of this paper, have not been released. Across the REE supply chain, tax credits are limited to specific oxides, with no production tax credits available for metals, alloys, or magnets. The introduction of tax credits for magnets would not only bolster the magnet industry but also reinforce efforts to support upstream mining and processing by generating stronger market demand for the REE processing capacity in the United States.

For most critical minerals and electrode active materials, capital costs are one of the major investment barriers. U.S. facilities are two to three times more expensive to build than in other countries.[271] The DOE's battery material processing and the battery manufacturing and recycling grant programs offer a total of $6 billion to bridge investment gaps in domestic capacity. With the first tranche of funding already announced and the second tranche expected in August 2024, there are concerns about the competitiveness and viability of selected projects—especially in the absence of robust market demand for processed materials.[272]

It is worth noting that critical minerals extraction activities are excluded from the Advanced Manufacturing Tax Credits and DOE grant programs. LPO's Title 17 Clean Energy Financing Program is one of the few accessible federal incentive programs for critical minerals mining projects. The other alternative is the DPA Title III program, which can only support feasibility studies and by-product or co-product extraction.[273]

The 30D Clean Vehicle Tax Credit generated the strongest demand signal to date to support the diversification of critical

268 IEA, *Global Critical Minerals Outlook 2024*, May 2024, at page 172.

269 SAFE analysis based on company reports.

270 26 U.S. Code § 45X.

271 SAFE findings from interviews with companies.

272 SAFE findings from conversations with stakeholders.

273 Office of Industrial Base Policy, "Defense Production Act (DPA) Title III Receives Emergency Supplemental Funding for Ukraine," June 26, 2022, at page 1.

mineral supply chain. Its sourcing provisions to determine eligibility for the credit use FTAs as a proxy to identify relatively secure sources of critical minerals. The selection of FTA countries also allows the United States to capitalize on existing mechanisms and relationships to enhance environmental and labor conditions. The sourcing provisions are stricter for batteries and battery components, where a specified share of value must be added in North America. Finally, there are additional rules that prohibit the sourcing of batteries, battery components, and critical minerals from FEOCs. These sourcing provisions do not extend to lithium-ion batteries utilized in other sectors or to REEs and permanent magnets deployed in an electric vehicle.[274]

It is also worth noting the existing research, development, and demonstration programs to support the development of substitutes and alternative technologies to better manage growing U.S. demand for critical minerals sourced from abroad. The Critical Materials Innovation Hub is working to develop technologies to make more efficient use of materials and develop alternatives for REEs and other critical minerals.[275] ARPA-E (Advanced Research Projects Agency–Energy) provides funding to earlier-stage disruptive new technologies to support their pathway to commercialization.[276] Its past funding efforts have included developing alternative materials like REE-free magnets, a potential substitute to alleviate the overreliance on adversarial supply that the Section 232 Tariff investigation pointed out.[277] However, more can be done to incentivize commercial production of critical mineral substitutes and alternative chemistries. This effort could start with developing technology-neutral production incentives and demand signals in key sectors like battery and permanent magnet manufacturing.

Trade policies play a pivotal role in supporting the domestic critical minerals industry, but they have limitations in helping overcome the financial and operational hurdles U.S. producers face. The complementary policies and programs introduced through recent legislation strive to bridge these gaps and establish a more comprehensive support system. Nevertheless, further refinement and expansion of these initiatives may be necessary to ensure the long-term competitiveness and sustainability of the U.S. critical minerals supply chain.

On the international front, the United States is leveraging both its financing instruments and strategic partnerships to strengthen and diversify global critical mineral supply chains. Public finance tools, such as the U.S. International Development Finance Corporation (DFC) and Export-Import Bank of the United States (EXIM), are channeling more

Trade policies play a pivotal role in supporting the domestic critical minerals industry, but they have limitations in helping overcome the financial and operational hurdles U.S. producers face.

investment into strategic critical minerals projects. Key multinational initiatives including the MSP and PGI work to bolster global critical mineral supply chains. MSP aims to catalyze public and private investment into critical mineral supply chains worldwide, while PGI focuses on developing supportive infrastructure for these supply chains. The United States is also leveraging other platforms like the Indo-Pacific Economic Framework (IPEF), G7, and the Quadrilateral Security Dialogue with Australia, India, and Japan to address supply security concerns and promote responsible production along critical mineral supply chains.

However, a misalignment between international efforts and domestic policies threatens to undermine the efficacy of these multilateral tools. Most monetary and non-monetary U.S. government support in this space is directed toward countries that are unable to provide IRA-compliant materials under the 30D sourcing provisions. This means that U.S. demand signals for battery materials are actively putting at a disadvantage the very projects that the U.S. government seeks to advance. As discussed above, USTR has yet to take the necessary steps to negotiate a CMA or another trade agreement to facilitate IRA compliance despite interest expressed by some resource-rich countries.

274 89 FR 37706.

275 Ames National Laboratory, "About the Critical Materials Innovation Hub," Webpage.

276 Department of Energy, "Advanced Research Projects Agency-Energy (ARPA-E)," Webpage.

277 ARPA-E, "ARPA-E Investor Update Vol. 18: Niron Magnetics' Clean Earth Magnet," updated March 12, 2023.

## An Overview of Select Multinational Frameworks

The United States is actively engaged in various multinational initiatives to support the development of critical mineral projects worldwide. These efforts aim to diversify supply chains, promote responsible sourcing, and foster sustainable economic growth in resource-rich countries.

One notable initiative is the MSP, a multinational partnership to bolster critical energy mineral supply chains. Established in 2022, the MSP is a global initiative of 14 partner countries and the EU. It aims to accelerate the development of diverse and sustainable critical minerals supply chains by working with host governments and the private sector to facilitate targeted financial and diplomatic support for strategic projects along the critical minerals value chain.[278]

Certain critical mineral projects, particularly those located on the African continent face significant infrastructure gaps that hinder their development and viability.[279] In such cases, initiatives like the PGI play a crucial role. PGI is G7's flagship initiative aimed at providing an alternative to China's Belt and Road Initiative to mobilize private sector capital to invest in sustainable infrastructure projects in developing countries. By providing financing and technical assistance for infrastructure development, PGI can help bridge the gaps and enable the successful implementation of critical mineral projects.[280]

The Lobito Corridor is a prime example of how PGI can support critical mineral development. The corridor, which spans from Zambia and the DRC to Angola, has the potential to unlock access to vast mineral resources, including copper and cobalt. Through PGI, the United States and its partners are working to mobilize investment in the construction of a multi-use rail line and port facilities—improvements necessary to enable the transportation of critical mineral products to Western markets.[281] To date, nearly $1 billion has mobilized for the corridor, between PGI countries, host governments, and the Africa Finance Corporation.[282]

Perhaps more importantly, these joint infrastructure investments make the region more attractive for critical mineral projects. The multilateral investment engagement has proven more effective in unlocking private sector investment in the region than unilateral tariff relief.

In addition to these initiatives, the Biden administration is also engaging with partners through the Indo-Pacific Economic Framework (IPEF). IPEF is a plurilateral framework that provides a new trade and economic initiative focused on addressing non-tariff barriers, deepening economic cooperation, and promoting sustainable and inclusive growth in the Indo-Pacific region. It omits traditional tariff and market access provisions that make trade agreements enforceable. IPEF partners create new collaborative tools to enhance supply chain resilience and transparency and promote high environmental and labor standards.[283] The 13 IPEF partners include resource-rich countries that the United States does not have trade agreements with, namely India, Indonesia, Malaysia, Philippines, Thailand, and Vietnam.[284]

Frameworks like IPEF do not fit the criteria established by the Department of Treasury to determine IRA compliance for 30D tax credits. Specifically, the IRA does not reduce or eliminate trade barriers on a preferential basis, does not commit parties to refrain from imposing new trade barriers, and does not reduce restrictions on exports or commits parties to refrain from imposing such restrictions in the future.[285] Countries can opt in or out of participating in different IPEF pillars.

278 U.S. Department of State, "Minerals Security Partnership," Webpage.

279 Finding from SAFE's fact-finding roundtable on critical minerals investment and trade in Africa, December 2023.

280 The White House, "FACT SHEET: Partnership for Global Infrastructure and Investment at the G7 Summit," June 13, 2024.

281 See e.g., U.S. Department of State, "U.S., Zambia, AFC Host PGI Forum to Strengthen Investment in Lobito Corridor," February 8, 2024.

282 Euan Sadden, "Italy pledges $320 million for Africa's Lobito corridor under G7 infrastructure plan," S&P Global, June 14, 2024.

283 U.S. Department of Commerce, "Indo-Pacific Economic Framework for Prosperity," Webpage; and U.S. Department of Commerce, "U.S. and IPEF Partners Establish Supply Chain Bodies and Convene First Virtual Meetings Under Landmark Supply Chain Agreement," Press Release, July 30, 2024.

284 Ibid.

285 89 FR 37706.

# Recommendations

Despite the limitations of certain trade policies outlined in this report, it is evident that trade policy will remain a crucial tool in the arsenal of U.S. leadership, regardless of the outcome of the 2024 election. This assertion is supported by the consistent reliance on trade measures by the Trump and Biden administrations, underscoring bipartisan recognition of trade policy's role—particularly to counteract non-market practices, enhance competitiveness of U.S. industries, and ensure imported goods uphold existing commitments in trade agreement rules or align with our values as a nation. Critical minerals projects along the supply chain, facing competitiveness and standards challenges, closely linked to the auto sector's success, and dependent on global trade, are likely to remain a key focus of trade policy measures.

The report analysis demonstrates that authorities exist to pursue the following four objectives:

- Remedy non-market behavior;
- Ensure imports align with our national values (particularly regarding forced labor);
- Promote higher environmental and labor practices as a condition for greater market access; and
- Provide the U.S. industry with access to mineral markets for inputs to satisfy domestic sourcing requirements, as seen in the recent U.S.-Japan Critical Minerals Agreement (CMA).

While these objectives address specific trade concerns, they contribute to one or two of the following policy goals, but rarely all three at once. First, they help build diverse supply chains, reducing reliance on China for advanced technologies and their critical mineral inputs. Second, they support U.S. efforts to rebuild industry and create jobs, especially in downstream manufacturing. Third, they encourage sustainable and ethical mining practices worldwide.

Historically, the implementation of these trade policies revealed a clear prioritization of certain goals over others. Supply chain diversification and domestic industry support traditionally took precedence. However, all these goals are interconnected in the critical minerals space. The overcapacity of cheap, poorly regulated materials provides Chinese industries with low-cost inputs, enabling Chinese producers to dominate global markets. Failing to pursue all three trade policy goals simultaneously undermines our ability to effectively change market dynamics, potentially leaving the United States at a continued disadvantage in the global critical minerals landscape.

In addition to trade tools struggling to simultaneously address all three of the policy goals outlined above, they often create inherent tensions and tradeoffs that cannot be addressed using trade policies alone. These limitations underscore the need for an innovative approach that pairs developing new, targeted trade measures to complement existing policies with implementing non-trade policies to address the inherent tensions, and incentivize responsible production practices beyond what trade tools can achieve.

In light of U.S. needs for a simultaneous coupling of trade and non-trade policies, this report proposes a comprehensive, three-pronged set of recommendations to effectively diversify critical mineral supply chain while simultaneously elevating global standards for environmental protection, labor rights, and human rights. The recommended strategy encompasses enhancing existing unilateral actions, strengthening bilateral and multilateral trade agreements, and bolstering domestic and allied production capacity. By implementing these interconnected measures, the United States can foster resilient and responsible supply chains that support downstream manufacturing growth, advance national economic and security interests, and promote a more equitable global playing field. This comprehensive strategy acknowledges that building secure and ethical supply chains may require patience and higher short-term costs, but ultimately ensures that the critical mineral industry can emerge more competitive and sustainable in the long run, effectively balancing immediate needs with long-term strategic goals.

ISSUE #1

## Enhancing the Effectiveness of Existing Unilateral Actions

The United States has wielded significant unilateral trade power to shape the critical minerals supply chain, particularly in recent years. Both the Trump and Biden administrations have deployed tariffs to shield domestic industries from unfair competition. The National Defense Authorization Act (NDAA) has introduced stringent due diligence and supply chain mapping requirements, enhancing transparency and enforcement. Policies like the 30D Clean Vehicle Tax Credit incentivize companies to scrutinize their supply chains for compliance. While these measures have made strides, they remain limited in scope—NDAA requirements apply only to defense procurement, and the tax credit focuses solely on electric vehicles. The Uyghur Forced Labor Prevention Act (UFLPA) offers another potential tool for promoting responsible sourcing, though it's not yet enforced in the EV sector. Despite their promise, these policies face unique challenges that undermine their effectiveness or create unintended consequences. The most politically viable path forward involves addressing these challenges and enhancing existing policies before introducing additional unilateral actions. Refining current measures presents an opportunity to maximize their impact on the critical minerals supply chain.

PROPOSAL

**Modernize and reauthorize key trade preference programs, namely Africa Growth and Opportunity Act (AGOA) and General System for Preferences (GSP).**

1. **Maintain the strong eligibility criteria tied to human rights, environmental law, and good governance, currently within draft AGOA and GSP reauthorization legislation, in their final forms.**
2. **To modernize both programs, adopt a phased approach for country eligibility.**
    a. Include new options for the executive branch to warn, partly terminate, or terminate country eligibility for specific sectors or products, along with the ability to issue a notice of no action if it serves U.S. national security interests.
    b. Incorporate graduation criteria to prevent successful countries from abruptly graduating out of the program when they meet a certain development level, disrupting trade relationships.
    c. Provide countries with technical assistance and lead time to achieve eligibility standards and increase program utilization.
    d. Provide DOS with enhanced resources—including funding and embassy staffing in strategic countries—to engage on standards and enhance commercial diplomacy to support AGOA utilization, coordination of U.S. funding and projects, and U.S.-Africa business relationships specifically on critical minerals.
    e. Establish a clear pathway for eligible AGOA countries to negotiate and enter sectoral trade agreements that target critical minerals with the United States, similar to a CMA model. These agreements should operate independently to ensure continuity and effectiveness in critical mineral partnerships regardless of changes in AGOA eligibility or compliance.

PROPOSAL

**Align import restrictions that touch upon environmental, labor, and human rights within various economic sectors and jurisdictions. Existing tools are siloed to address labor, environmental, and human rights concerns. The government should break down these siloes by addressing policy and enforcement gaps using a targeted approach. The U.S. International Trade Commission (USITC) can conduct this analysis to test the effects to U.S. competitiveness, anchored in the reality of a U.S. reliance on trade measures to navigate a market that does not reflect the true cost of producing critical minerals and materials due to market manipulations rewarding deviations from high production standards.**

1. **USITC can lead on an analysis of siloed policies including, but not limited to, UFLPA and proposed Global Arrangement on Sustainable Steel and Aluminum (GASSA), and Carbon Border Adjustment Mechanisms (CBAM) to identify strengths and enforcement gaps of each policy.**
2. **U.S. Trade Representative (USTR) is best positioned to use this analysis to develop and propose policy recommendations to encompass a broader range of production standards, including environmental, labor, and human rights considerations.**

**PROPOSAL**

**Enhance supply chain transparency and due diligence efforts to increase U.S. government and consumer visibility into the critical mineral supply chain and procurement practices, starting with mineral-intensive technologies critical for U.S. national security and economic prosperity.**

1. Amend the Harmonized Tariff Schedule (HTS) of the United States codes to better monitor the flow of material in and out of the United States, including EOL products. Currently, only the first six HTS digits are harmonized. Nations can then choose to further specify products under eight- or ten-digit codes. USTR is well positioned to lead this effort.
2. Expand supply chain tracking requirements for Department of Defense (DOD) procurement under NDAA to include lithium-ion batteries and covered battery minerals to better illuminate and assess supply chain vulnerabilities. The list of covered minerals should, at a minimum, include lithium, nickel, cobalt, manganese, graphite, aluminum, and copper.
3. Pilot a product passport or digital identifier that reports chain of custody as well as environmental and labor data to support the implementation of existing legislation, including UFLPA and 30D tax credits, and ultimately working toward requiring environmental and labor data reporting to be included on the Monroney Label via a unique digital identifier affixed to every new vehicle sold in the United States.
    a. Metrics shall be established for the cobalt, lithium, manganese, graphite, and nickel that are used in electric vehicle batteries, and the REEs that are incorporated into motors, of any vehicle with a battery with the capacity to store at least 7 kWh of electricity.
    b. The Environmental Protection Agency (EPA) shall develop environmental metrics for the supply chains for covered minerals and strategic metals. The metrics should address, at a minimum, water quality, use, and management; waste generation and management; land-use impacts; and reclamation.
    c. The Department of Labor (DOL) shall develop labor metrics for the supply chains for covered minerals and strategic metals. The metrics should address, at a minimum, the risk of forced or child labor.
    d. EPA and DOL shall make use of existing domestic and international metrics to the extent possible and align efforts with digital product passports being developed in allied nations to reduce reporting burden on companies. These efforts ought to be coordinated with the American Battery Materials Initiative, the White House-led, Department of Energy-coordinated, interagency effort to secure the minerals and materials needed to meet EV and broader electrification goals.

**ISSUE #2**

## Creating New Bilateral and Multilateral Trade Agreements and Enhancing Multinational Cooperation

To level the competitive playing field and promote a race to the top in standards, the United States must work with allies and strategic partners to establish policy frameworks that incentivize responsible behavior and strengthen collective market demand signals. While the long-term U.S. goal is to shift from voluntary mining standards to enforceable mining standards among allies and like-minded countries, this report appreciates the difficulty and time required to establish those frameworks.

The United States would benefit from establishing sector-specific trade agreements and leverage existing transparency and capacity building frameworks to lay the groundwork for agreed-upon mining standards. Additionally, the United States should collaborate with allies to coordinate unilateral policies that impact market demand signals and the flow of goods, starting with tariffs.

**PROPOSAL**

**Renew the Trade Promotion Authority and direct the USTR to negotiate and sign enforceable sector-specific trade agreements or commodity agreements with allied countries and key players in the minerals mining and processing space, targeting countries the United States is investing in or building relationships with through the Minerals Security Partnership (MSP) and other international engagements to avoid misalignments.**

1. **Sectors-specific trade agreements, like CMAs, could be easier to negotiate and signal market stability to investors and offtakers. The agreements should incorporate the following elements:**
    a. Require all signatories to incorporate basic environmental, forced labor, and child labor standards specific to mining into their domestic laws and regulations.
    b. Establish a comprehensive oversight and enforcement framework for sustainable resource management consisting of:
        i. A dedicated Critical Minerals Committee, like the Timber Committee in the U.S.-Peru Trade Promotion Agreement, to monitor compliance with the trade agreement's provisions related to environmental and labor standards and respond to non-compliance or potential violations. The Committee will focus on partner countries' governance of their critical minerals sectors. The Committee should include representatives from the USTR, EPA, DOL, Bureau of Land Management (BLM), Mine Safety and Health Administration (MSHA), Department of State (DOS), Customs and Border Protection (CBP), and other relevant federal agencies.
        ii. The Committee could recommend a range of actions, from issuing formal warnings to imposing trade sanctions or tariffs on critical mineral imports from the offending country until compliance is achieved if a country is found to be non-compliant with the agreed-upon standards. This enforcement mechanism would provide a concrete way to ensure that all parties adhere to the environmental, labor, and transparency standards established in the trade agreement, thus promoting responsible and sustainable practices in the critical minerals sector.
    c. Establish a Rapid Response Mechanism for Sustainable Resource Management like the one developed under the U.S.-Mexico-Canada Agreement that allows the United States to impose tariffs on critical minerals imports in good faith if the U.S. government believes that a firm is being insufficiently transparent about its environmental and labor standards compliance. The rapid response mechanism should be run by the Critical Minerals Committee.
    d. Provide technical assistance and capacity building support to strengthen both the enforcement of existing regulations and the development of improved domestic legislation in the critical minerals sector.
    e. Include clauses that promote export and import freedoms to safeguard U.S. national security interests from potential host country exports controls in the critical minerals sector.

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**PROPOSAL**

### Work with allies to coordinate unilateral policies that influence market demand signals and the flow of responsibly produced goods.

1. **Coordinate financing support and infrastructure projects to deconflict competition between the United States and partner countries and effectively counter the largest shared competitor: China.**
2. **Starting with a smaller group of key trading partners (i.e., Australia, Canada, Japan, etc.) that are aligned with the United States on the need to create a market defined by a common higher-standard that enables competition of domestic actors, harmonizes widely accepted standards, and develops a coordinated approach to tariffs to promote the flow of responsibly produced goods and disincentivize the trade of products that do not meet agreed-upon standards.**
    a. Build upon existing platforms that already tackle standard alignment issues at the bilateral and multilateral levels, including the U.S.-Australia Critical Minerals Task Force, U.S.-EU Trade and Technology Council and GASSA, Indo-Pacific Economic Framework for Prosperity (IPEF), the Conference on Critical Materials and Minerals, and MSP to leverage existing information and capture consensus.
    b. Ensure a deep understanding of unilateral trade actions and incentives that could impact this common tariff and U.S. competitiveness.
3. **Leverage the MSP to develop a secure, shared database of verified suppliers and known bad actors amongst MSP countries' financing agencies.**
4. **Establish regular dialogues with MSP partners to strengthen information sharing on supply chain risks, export controls, and non-compliance issues.**

ISSUE #3

## Bolstering Domestic and Allied Production Capacity

Trade policies alone cannot succeed in promoting a resilient and secure critical minerals supply chain. To complement trade policies, the U.S. government must expand efforts to bolster domestic and allied production capacity by leveraging available funding from the IRA and BIL programs, as well as the resources of Export-Import Bank of the United States (EXIM) and U.S. Development Finance Corporation (DFC) to support upstream and midstream projects. Pursuing trade policy in tandem with strategic domestic and international policies, the United States can foster a more resilient, diverse, and sustainable critical minerals supply chain that supports the growth of downstream manufacturing and advances the nation's economic and national security interests. In addition to the recommendations listed below, policy measures to support workforce development and streamline the permitting process for domestic mining projects will also be crucial to enhance U.S. competitiveness in the critical minerals space. The report also does not address these issues, nor the ongoing conversations on price premiums for sustainably-produced goods, which can serve as a market signal to incentivize and support the development of production capacity with higher environmental and labor standards. It is worth noting that certain trade policies that expand or restrict market access based on production attributes can create de facto premiums. While not discussed in greater detail, additional policy measures to support workforce development and streamline the permitting process for domestic mining projects will also be crucial to support U.S. competitiveness in the critical minerals space.

PROPOSAL

**Establish targeted incentives and allocate resources to incentivize the domestic production of critical minerals and materials, as well as substitutes and alternative technologies that can reduce U.S. import dependence on critical minerals.**

1. DOE should prioritize the allocation of its remaining funding authorities to support midstream and upstream projects in the critical minerals supply chain. By concentrating resources on these segments, the DOE can help bridge the gap between raw material extraction and downstream manufacturing, ensuring a more stable and reliable supply of processed critical minerals.
2. Congress should enact legislation to establish a technology-neutral advanced manufacturing tax credit for permanent magnets, modeled after the 45X tax credits for battery cells and modules. This incentive would encourage private sector investment in the domestic production of permanent magnets, a key component in many clean energy technologies and advanced manufacturing applications.

PROPOSAL

**Support coordinated capacity building and joint investment in strategic resource-rich countries.**

1. Institutionalize the MSP and the Partnership for Global Infrastructure and Investment (PGI) under the purview of the DOS.
2. Provide additional funding to allow the DOS, EXIM, and DFC to collaborate with their counterparts in strategic resource-rich countries to foster business relationships and facilitate the development of an allied supply chain via the MSP and PGI.
3. Engage USAID and EPA and their counterparts to develop and implement capacity-building programs in partner countries, focusing on sustainable mining practices, environmental management, and community engagement via the MSP Forum.
    a. Utilize the EPA's experience to assist partner countries in developing and implementing environmental regulations, monitoring systems, and remediation techniques specific to the mining sector.
4. Involve BLM in sharing best practices for land use planning, environmental impact assessments, and reclamation strategies related to mining operations.
5. Leverage the expertise of MSHA to provide technical assistance and training on mine safety and health standards to partner countries, enhancing worker protection in the critical minerals sector.

# Conclusion

Securing a critical minerals supply chain is a complex challenge that requires a multifaceted approach. While trade policies alone cannot comprehensively influence the supply chain, they remain an important tool in U.S. efforts to increase economic competitiveness, diversify supply chains, and promote high global standards in critical minerals production and processing.

The effectiveness of these trade measures is amplified when coordinated with allies and partners, and when complemented by supporting diplomatic and economic policies. As the global landscape of critical minerals continues to evolve, particularly in the face of China's market dominance and the transition to minerals-based energy sources, the U.S. must balance immediate national security concerns with long-term strategic goals.

Moving forward, policymakers should focus on crafting politically feasible legislative solutions, strengthening international relationships, and supporting domestic economic and industrial sectors. This all-inclusive approach will be crucial in building a secure, diverse, and resilient critical minerals supply chain that aligns with U.S. national security interests, economic prosperity, and energy resiliency goals.

Ultimately, the success of U.S. efforts in this arena will depend on its ability to navigate the complexities of global interdependence, geopolitical competition, and the need for sustainable and ethical mining practices. By leveraging a combination of trade, diplomatic, and economic tools, the United States can work towards a more secure and responsible critical minerals supply chain, essential for maintaining its technological leadership and economic competitiveness in the 21st Century.

# Appendix

| Comparing U.S. Trade Tools | | | |
|---|---|---|---|
| **Tool** | **Policy Goal** | **Net Effect** | **Analysis** |
| **Disclosure Requirements** | (A) U.S. Access to Critical Materials | Little to no effect | A critical mineral disclosure requirement could reduce U.S. access to critical mineral products if it unduly raises costs of compliance for importing critical mineral products to the U.S. |
| | (B) High Environmental and Labor Standards | Limited positive effect | A critical mineral disclosure requirement incentivizes sourcing shifts away from unsustainable or unethical sources. |
| | (C) Transparency | Limited positive effect | A critical mineral disclosure requirement shifts the burden of supply-chain mapping to the private sector. Increased transparency in the critical minerals supply chain is a prerequisite to achieving high labor and environmental standards. |
| **Import Prohibitions** | (A) U.S. Access to Critical Materials | Negative effect | Banning the import of critical mineral products that do not meet certain standards would limit U.S. access to these products, at least in the short term. The market will need time to adjust. |
| | (B) High Environmental and Labor Standards | Positive effect | An import restriction allows the United States to unilaterally condition market access on compliance with adoption of higher environmental and labor standards. |
| | (C) Transparency | Positive effect | An import restriction would have the secondary effect of driving supply chain transparency because demonstration that an imported good meets high labor and environmental standards will require companies to enact due diligence processes. |
| **Tariffs** | (A) U.S. Access to Critical Materials | Negative effect | Tariff increases will limit the flow of critical minerals to the United States as they will increase the cost of trade for foreign companies. Tariffs could offset this reduction through a tariff wall. |
| | (B) High Environmental and Labor Standards | Little to no effect | Tariff increases independently do not impact labor and environmental standards as they cannot be levied on a process and production methods (PPM) basis but only on the final product. However, in concert with a renewed GSP and CMAs, tariffs can disincentivize importation of critical mineral products that come from jurisdictions that do not meet high labor and environmental standards. |
| | (C) Transparency | Little to no effect | Tariffs issued independently will not impact the transparency of the critical mineral supply chain. |
| **Trade Preference Programs** | (A) U.S. Access to Critical Materials | Positive effect | The GSP/AGOA scheme incentivizes critical mineral export to the United States through tariff reductions and spurs investment in mining and processing in additional countries, reducing U.S. dependence on China. However, such impact is likely limited by inadequate incentives and low participation in the program. |
| | (B) High Environmental and Labor Standards | Positive effect | The GSP/AGOA scheme is a collaborative approach that incentivizes countries for environmental and labor standard compliance. However, compliance with these standards may pose a burden on developing economies. |
| | (C) Transparency | Positive effect | An internal compliance monitoring system akin to the EU GSP model would contribute to transparency in mining and processing among eligible countries. |
| **Free Trade Agreements** | (A) U.S. Access to Critical Materials | Positive impact | Foreign direct investments (FTAs) offer China-dependent trading partners the market access commitments and potential FDI inflows that they need to export more to the United States and limit dependence on China. However, FTAs would require tariff reductions for all sectors of the U.S. economy. |
| | (B) High Environmental and Labor Standards | Positive impact | FTAs can be written to include enforceable provisions on critical mineral production and processing standards. However, these provisions would be challenging to enforce in target countries. New critical mineral provisions or side letters can be considered for existing FTAs to improve environmental and labor standards via new enforcement mechanisms and the support of existing U.S. interagency committees. The enforceability of this would be limited if these critical mineral commitments are provided in non-binding FTA side letters. |
| | (C) Transparency | Little to no impact | FTAs enhance transparency in the mining sector because of increased bilateral communication at the public and private levels. However, this effect is limited in the short to medium term, given that most of the mineral processing occurs in China. |
| **Critical Minerals Agreements** | (A) Diverse Supply Chains/U.S. Access | Positive impact | CMAs with resource-rich countries can diversify the U.S. EV battery supply chain and increase critical minerals imports to meet domestic demand. However, the mining sectors in some of the potential CMA countries are dominated by Chinese firms, and in the short term, raw minerals will continue to be processed in China. |
| | (B) High Environmental and Labor Standards | Positive impact | CMAs which include environmental and labor requirements will create enforcement mechanisms and reform for environmental and labor laws. However, the effectiveness of these provisions is dependent on such reform. |
| | (C) Transparency | Positive impact | CMAs create mechanisms for interagency committees to review mining and processing practices. However, many CMA partners will need to first establish mining sector oversight institutions. A lack of alternative processing capacity globally will further limit transparency gains at the upstream stage. |

SAFE

SAFE is a non-partisan, non-profit policy thought leadership organization dedicated to accelerating the real-world deployment of secure, resilient, and sustainable transportation and energy solutions of the United States and its partners and allies by shaping policies, perceptions, and practices that create opportunity for all. SAFE unites prominent military and business leaders to develop and advocate for policies that improve America's energy security by significantly curtailing our dependence on oil and promoting responsible use of our domestic energy resources. SAFE relies on the knowledge and experience of four-star retired military officers, Fortune 500 CEOs, and its expert staff to produce high-quality, fact-based analysis and policy recommendations for lawmakers, regulatory agencies, and the public.

ENERGY SECURITY LEADERSHIP COUNCIL

The Energy Security Leadership Council (ESLC) is a group of business and former military leaders committed to reducing U.S. oil dependence. The ESLC is chaired by Adam Goldstein, Former Vice Chairman, Royal Caribbean Cruise Lines, and General James T. Conway, the 34th Commandant of the U.S. Marine Corps, and retains its strategic mix of business and four-star former military leaders.

The Ambassador Alfred Hoffman, Jr.
**Center for Critical Minerals Strategy**

The Ambassador Alfred Hoffman, Jr. Center for Critical Minerals Strategy (CCMS) aims to secure all aspects of the critical minerals supply chain to help ensure the national and economic security of the United States and our allies as we transition from a fossil fuel-based economy to a minerals-based economy. CCMS is the sole NGO partner for private sector engagement to the State Department through the MINVEST project. The Center is also home to the Sub-Committee on Opportunities and Risks in the Critical Mineral Sector (SCOR) project with Appian Capital.

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