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Testimony Submitted on Behalf of Securing America's Future Energy (SAFE)

Submitted by Abigail Wulf

**To the United States House of Representatives
Committee on Natural Resources Republican Members
Subcommittee on Energy and Mineral Resources**

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On behalf of **SAFE (Securing America's Future Energy)**, thank you for the opportunity to submit a written statement for the Forum on Critical Minerals: Addressing Supply Chain Challenges and Rising Demand.

SAFE is a non-partisan, non-profit organization that enhances the nation's energy security and supports our economic resurgence and resiliency by advancing transformative transportation and mobility technologies and ensuring that the United States secures key aspects of the technology supply chain to achieve and maintain our strategic advantage. SAFE created the Ambassador Alfred Hoffman, Jr. Center for Critical Minerals Strategy to ensure that rare earth and critical mineral supply chains, from mining and processing to manufacturing and recycling, support the foreign and military policy of the United States, reflect our interests and values, and continue to strengthen our economy.

The 2020s will be a critical decade that will challenge the United States' ability to consistently and effectively project its political, military, and economic strength. During this time, the production of batteries, electric vehicles (EVs), semiconductors, and other advanced technologies will take on increased geopolitical importance in the face of a rising China. The nation that prevails in this struggle to control the manufacturing and distribution of these key industries will lead the global transition to a new energy future and the next industrial revolution. The United States cannot afford to lag behind China, risking our position of global economic leadership, leaving us vulnerable to supply disruptions and dependent on nations that do not share our values.

Over the last several years, SAFE has grown increasingly concerned with China's rising dominance over key parts of the automotive and battery manufacturing supply chain, particularly their control over vital midstream components, including processing and anode and cathode production. As SAFE outlined in its [*Commanding Heights of Global Transportation*](#) report, China exerts significant influence over these aspects of the supply chain and uses its power not only to cut off supplies, but also to lure foreign investment and advanced manufacturing to its shores. The United States must resist becoming just the 'assemblers' of next generation technology; we must act now to break China's stranglehold on this emerging market.

Batteries power everything from computers and cars to soldiers and satellites. While battery chemistry is rapidly changing, to meet the projected technological demand, we will need lithium, nickel, cobalt, and manganese-based cathodes, graphite-based anodes, and copper-based current collectors. Additionally, most EV motors and many precision-guided munitions rely on permanent magnets, which are primarily made of neodymium, iron, and boron and draw their power from the unique chemical properties of rare earth elements.

China is the world's largest processor of copper, nickel, cobalt, lithium, and rare earth elements.¹ It controls 75 percent of lithium-ion battery production, including 60 percent of the world's cathode production and 80 percent of the world's anode production.² We, by contrast, remain import reliant for more than half our supplies of these materials except for copper.³ Even minerals produced here will likely be sent to China for processing into useable goods—this is a problem.

Dependence upon our 21st-century near-peer competitor is a massive national and economic security threat and diminishes our ability to project soft power and lead the world into the next industrial revolution. Today, due to their control over mineral supplies, the world is looking to China to lead the way—not the United States. This limits not only our ability to manufacture the necessary goods for our economic security and national defense, it also limits our ability to respond appropriately when confronted with situations that go against our American ideals.

The United States must address at least three areas to gain ground on China in this race:

1) Develop a Systematic Approach to Mapping our Domestic Resource Potential

The United States must establish a systematic approach to mapping its mineral resources by bolstering the **U.S. Geological Survey (USGS) Earth MRI program**, which works side-by-side with State Geologists to understand our resource potential.

While recycling is important for the longevity and success of a critical minerals-based economy, we simply do not have enough raw materials yet to meet projected demand through recycling alone. According to estimates from both the World Bank Group and the International Energy Agency, the world will require large investments in mineral resources to meet projected clean energy needs, including almost 6 million more tons of aluminum, more than a million more tons of copper, and almost 500 percent increases in graphite, lithium, and cobalt through 2050 compared to 2018 levels.⁴

The United States and our allies have the resources, expertise, and high environmental and labor standards to ensure that new production is done safely and sustainably. But we lack the comprehensive mapping information needed to know exactly where our resources are to make

¹ IEA (2021), *The Role of Critical Minerals in Clean Energy Transitions*, IEA, Paris <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>

² SAFE (2021), *The Commanding Heights of Global Transportation* <https://secureenergy.org/the-commanding-heights-of-global-transportation-2/>; Data derived from Benchmark Mineral Intelligence

³ USGS (2021), *USGS Mineral Commodity Summaries 2021* <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021.pdf>

⁴ World Bank Group (2020), *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition* <https://pubdocs.worldbank.org/en/961711588875536384/Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf>

effective land-use planning decisions that balance our national and economic security resource needs with environmental and community protection.

Furthermore, a systematic approach to mapping should help inform a new Threatened List of Minerals, which will allow the U.S. government to make proactive decisions about protecting, maintaining, and growing its mineral resources, rather than relying on the current system to determine criticality, which only deems a mineral as being “critical” once we are already import dependent.

The United States should also incentivize and prioritize projects that demonstrate full-value mining practices, whereby mining companies are responsible for extracting the maximum possible value from the resource(s) with which they have been entrusted – so long as it is economically viable. Full-value mining maximizes what is being taken from the ground while minimizing the environmental footprint of overall mining. Current examples of full-value mining include Rio Tinto’s recent production of battery-grade lithium from waste rock at a former boron mine in California.

2) Focus on Domestic Processing Capacity

The United States should support domestic minerals processing and refining capacity by allowing the private sector to create a **Rare Earths Processing Cooperative** and incentivizing companies to build clean processing and refining facilities here in the United States.

After mining, rare earth elements and other critical minerals must undergo several steps to convert mined ore into useable oxides or metals. China has established the largest minerals processing capability in the world, while the United States has minimal amounts of domestic minerals processing. Therefore, even if the United States were to increase domestic production of mineral resources, they would likely still need to be shipped to China for final processing, and many U.S.-based companies would likely still purchase processed ores from China.

For critical battery minerals like nickel, cobalt, graphite, lithium, and manganese, the United States controls less than four percent of overall global processing, while China controls 65-100 percent of processing capacity.⁵ China also currently controls approximately 90 percent of rare earths processing capacity.⁶

A U.S.-based cooperative to refine rare earths could compete with Chinese suppliers by pooling public and private capital to build and operate an integrated refining, processing and metallurgical facility. By locking in cooperative members—from across the United States and our economic and security partners—as buyers for the rare earth products, the cooperative could guarantee a steady stream of revenue while also locking in an uninterrupted supply of rare earth metals and materials. Members would receive secure access to products in exchange for committing to purchase specified volumes at the cooperative’s cost, which should remain reasonable because the cooperative’s customers are also its owners. Though prices might be

⁵ SAFE (2021), *The Commanding Heights of Global Transportation* <https://secureenergy.org/the-commanding-heights-of-global-transportation-2/>; Data derived from benchmark mineral intelligence

⁶ IEA (2021), *The Role of Critical Minerals in Clean Energy Transitions*, IEA, Paris <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>

higher than prices offered by the Chinese, the supply chain would be secure, and the prices stable—and not manipulated by Chinese companies. A separate thorium bank could take ownership of, and accept liability for, the thorium produced as a byproduct or rare earth refining, store it consistent with all regulatory requirements, and expand the market for thorium.

The United States should also direct the **USGS, Bureau of Land Management, and Environmental Protection Agency to work together to characterize existing tailings piles and other mine waste on abandoned mine land and prioritize reprocessing that waste** to maximize what has already been taken out of the ground and to emphasize good land stewardship.

3) Establish a Market for Domestic and Allied Goods

And finally, the United States must **incentivize a market for goods produced at home and among our close allies and partners using blockchain** to ensure the goods that go into our tech-driven world are sourced using the highest environmental and humanitarian standards.

China mines and processes minerals domestically with low regard for worker or environmental safety, allowing its citizens to carry the heavy burden of pollution.⁷ Moreover, the current crisis over the use of forced Uyghur labor in Xinjiang to produce the high purity polysilicon needed for solar panels is just the latest example of human rights abuses tied to critical mineral resources. About 45 percent of the world's supply of polysilicon for solar panels comes from Xinjiang, where more than 1 million people are being detained in camps and forced to work.^{8,9}

Disregard for the environmental and humanitarian impacts also ensures that it is more difficult for other countries, including the United States and its allies, to compete on cost, particularly when they depend on private capital and markets to build and operate mines and processing facilities.

If we wish to consume products produced to high ethical standards, we must work with our allies and other partners to enforce high environmental and labor standards and use blockchain to help track the provenance of mineral materials from mine to market.

Thank you for this opportunity, and I look forward to discussing these solutions with you further.

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⁷ See, e.g., Jonathan Kaiman, "Rare Earth Mining in China: the Bleak Social and Environmental Costs," The Guardian, Guardian News and Media, March 20, 2014.

⁸ See, e.g., Dan Murtaugh, "Why It's So Hard for the Solar Industry to Quit Xinjiang," Bloomberg, February 10, 2021.

⁹ See, e.g., Aitor Hernandez-Morales et al., "Fears over China's Muslim forced labor loom over EU solar power," February 10, 2021.