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The Roosevelt Project

Revitalizing America's Critical
Mineral Industry: Fair Trade,
Economic Security, and
Community Resilience

Executive Summary



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About the Roosevelt Project

The Roosevelt Project takes an interdisciplinary approach to understanding and managing the challenges of transitioning toward a deeply decarbonized U.S. economy, aiming to minimize worker and community dislocation while enabling at-risk regions to capture new opportunities for growth. Phase One developed the project's analytical foundation through cross-cutting studies on workforce transitions, community resilience, and policy design for a low-carbon economy. Phase Two applied this framework to four regional case studies—Southwest Pennsylvania, the Industrial Heartland, the Gulf Coast, and New Mexico—conducted with local partners to assess how industrial legacies, labor markets, and policy environments shape equitable decarbonization. Phase Three extends this work by examining U.S. industrial policy frameworks for the energy transition through three national case studies on the electric grid, decarbonized steel, and metals and mining, addressing how to expand transmission equitably, decarbonize heavy industry, and secure critical minerals supply chains. The project, initiated by former U.S. Energy Secretary Ernest J. Moniz, engages faculty and researchers across MIT and Harvard in economics, engineering, sociology, urban studies and planning, and political science.

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ROOSEVELT PROJECT REVITALIZING AMERICA'S CRITICAL MINERAL INDUSTRY: FAIR TRADE, ECONOMIC SECURITY, AND COMMUNITY RESILIENCE

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1. Executive Summary

The United States' economic strength, technological leadership, and national security all depend on a stable and reliable supply of critical minerals, such as cobalt, graphite, lithium, nickel, manganese, and rare earth elements (REEs). These materials are essential for advanced manufacturing, defense systems, energy infrastructure, and consumer technology. However, decades of underinvestment in domestic extraction and processing have left the United States highly import dependent, with vulnerable supply chains that are neither resilient nor secure. In this report, our focus is primarily on mineral extraction, but many of the issues discussed here apply equally—and in some cases even more acutely—to mineral processing. Indeed, processing is an essential and highly concentrated stage of the supply chain to which many of the same concerns we raise regarding security, sustainability, and equity pertain.

The lack of supply chain resilience is not a new problem. The consequences of import dependence have been felt before—most notably during the 1973 oil crisis, when geopolitical instability led to price shocks that rippled through the economy, driving inflation, unemployment, and strategic uncertainty. Today, when it comes to critical minerals, a similar dynamic exists: a handful of countries controls key stages of extraction and refining, leaving the United States exposed to supply disruptions, economic shocks, and geopolitical leverage from foreign suppliers. Mining of a given mineral may be geographically concentrated; however, mineral processing is even more so: China dominates this stage of the supply chain, refining the vast majority of the world's lithium, cobalt, and REEs.

China's domination of the processing phase is enabled by cost advantages, government subsidies, and China's long-term strategic investments in processing infrastructure. As a result, even when minerals originate from allied nations, the United States remains dependent on China for their final usable forms. This dependence is not just an economic concern; it is also a strategic vulnerability. Beijing has already demonstrated a willingness to weaponize its dominance, restricting exports of certain refined minerals in response to geopolitical tensions. China's ongoing grip on mineral processing is not inevitable, but without a shift in policy, the United States will remain at risk of supply disruptions that could cripple key industries.

At the same time, critical minerals play an important role in addressing another major challenge: climate change. As industries transition toward lower-emission technologies, demand for these minerals is projected to rise sharply, particularly in sectors such as battery storage, electric vehicles (EVs), and renewable energy infrastructure. The transition to cleaner energy must not come at the expense of sustainable resource management. Mining and processing must be developed in a way that minimizes environmental degradation and prioritizes long-term resource security.

Addressing the United States' vulnerabilities calls for a coordinated public policy effort. Strengthening domestic mining and processing capabilities as well as expanding US imports from key allies will not only reduce dependence on imports from China but also ensure long-term economic resilience. But as domestic production expands and imports from allies increase, past mistakes should not be repeated. Extractive industries have historically operated without sufficient oversight of environmental sustainability, worker safety, and engagement with affected communities. In the United States, this includes Native American tribes

and other Indigenous communities, who have often borne disproportionate environmental and cultural costs from mining. Any expansion of critical minerals extraction must explicitly safeguard tribal sovereignty, treaty rights, and cultural heritage alongside environmental and economic concerns. If policy fails to address all these concerns up front, development will face costly delays, public opposition, and potential regulatory setbacks. US energy and national security and the climate imperative demand getting this right.

A better approach would be to establish a strategic framework that aligns industry, government, and local communities from the outset. Public investment, regulatory clarity, and incentives for innovation in extraction, refining, and recycling can accelerate responsible domestic production while ensuring that economic benefits are widely shared. At the same time, targeted policies to diversify imports and build alternative processing capacity outside of China can mitigate long-term supply chain risks.

This report outlines key policy recommendations to build a stronger, more resilient critical minerals industry in the United States—one that balances security, economic growth, and social responsibility. By addressing these issues in a timely manner, policymakers can save time, reduce costs, and build a more effective and equitable supply chain strategy. The recommendations in this report provide a starting point for ensuring sustainable energy technology transitions across two primary dimensions: securing sustainable supply and encouraging diversification of imports. Addressing the question of demand can also mitigate some of the aforementioned issues while furthering US competitiveness.

Recommendation I: Reform permitting to accelerate deployment of new projects

The US government should streamline the permitting process for critical mineral mines by holding reviewers accountable to deadlines, enforcing limits on permitting timelines, and implementing transparency and tracking measures. Enforcing review times should not preclude rigorous environmental review and sufficient public comment periods. A streamlined and incentivized permitting process that decreases lead times and inertia will encourage the development of domestic mining projects. At the same time, by setting high standards, such a process should ensure that the increase in mining activities does not come at the cost of environmental degradation or social unrest. Many of the permitting delays in the United States are due to unexpected factors that are difficult to predict at the beginning of a project, like local community reactions, legal challenges, or complications in obtaining environmental permits.¹

Recommendation II: Create community benefits agreements (CBAs) for new projects

By initiating CBAs at the start of new projects, mining operators may take advantage of a multifaceted strategy that enhances community relations, mitigates operational risks, and stimulates local economic development, thereby securing them a social license to operate. CBAs should include the following goals: (a) minimize adverse impacts on local communities, economies, and the environment, (b) maintain open lines of communication between constituents, (c) provide member participation in mine decision-making, (d) bind members for the lifetime of the mine, and (e) establish processes to resolve disputes and avoid litigation.² This proactive approach can also offer a positive contrast to state regulation, where the state intervenes only once it has detected environmental harm. Furthermore, the federal government can incentivize the use of good

neighbor agreements (GNAs), a type of CBA. Strong GNAs enable and support community groups to work alongside mining companies to build mines that can accommodate everyone's needs.

CBAs should be legally binding, attached to the mine site rather than a company, and supported by technical advisors to provide expertise. The mine permitting process in the United States is an iterative one: it is designed so that mines can change over time with very few binary permit-issuing decision points. The CBA framework allows for the involvement of community groups in that iterative process, helping shape mine operations at each decision point to better reflect environmental, social, and community priorities. Not only are CBAs a powerful tool for coalition-building in the mining industry, but their influence can also extend beyond it: the way mine operators interact with the local environment and community is the upstream foundation of multiple other industrial supply chains.

Recommendation III: Seek FAST-41 coverage

The mine permitting process can be streamlined by using existing policy infrastructure within the executive branch. The Federal Permitting Improvement Steering Council (FPISC) is currently considering a rule change to mining provisions in FAST-41 that would allow only critical mineral mines to be FAST-41 designated and would expand FAST-41 coverage to critical mineral supply chain activities. FPISC accepted comments on this proposed rule change in 2023. By taking action on this rule change, the federal government can provide greater certainty to mining companies, increase transparency in the mine permitting process, and integrate environmental review for critical mineral mining infrastructure.

Recommendation IV: Adopt best practices and advanced mining technology

The United States, Canada, and Australia could consider several policy options that are in their collective as well as self-interest to alleviate the challenges arising from the shift in mining employment from coal to critical materials:

- Workforce retraining and relocation programs: Develop and fund retraining and relocation programs specifically tailored to equip former coal workers with the skills needed in critical materials mining.
- Economic diversification initiatives: Support economic diversification in regions historically dependent on coal mining to reduce reliance on a single industry.
- Investment in education and research: Increase investment in research and education focused on critical materials mining, ensuring a steady pipeline of skilled workers.
- Community engagement and support: Implement policies that support communities impacted by the shift to critical materials mining, including job placement services and economic aid.
- Sustainable mining practices: Encourage and fund the development of sustainable mining technologies and practices to improve the industry's outlook and make it more environmentally responsible.
- Public-private partnerships: Foster collaborations between governments, educational institutions, and private companies to create training programs and expand job opportunities in critical materials mining.

Recommendation V: Adopt recent innovations in low-impact mining techniques

Traditional mining methods, such as open pit and underground mining, pose severe environmental risks. By adopting new low-impact techniques like electrification of operations, in-situ leaching, and precision mining, mining companies can reduce surface disturbance, soil erosion, and backfilling. This approach also facilitates quicker site revegetation and rehabilitation.

Important progress toward lowering mining emissions can be achieved either by increasing the operational efficiency or reducing the environmental impact of extraction activities (lowering emissions through an intensity reduction channel) or by switching from fossil fuel combustion and fossil fuel-based electricity to biofuels and renewable-generated electricity (lowering emissions through their direct reduction).

All these initiatives, technologies, and innovations can help achieve sustainability goals by reducing emissions, reducing energy consumption, improving efficiency, and reusing and recycling materials. While each of these approaches has its own challenges and limitations, used in combination, they can contribute significantly toward sustainable mining operations.

Recommendation VI: Establish additional bilateral agreements to secure critical supply

To reduce its overreliance on a limited number of mineral-processing countries, the United States should pursue additional bilateral and multilateral trade agreements that strengthen and diversify its sources of critical minerals. Strategic partnerships with mineral-rich and mineral-processing nations can ensure resilient and sustainable supply chains while reinforcing high labor and environmental standards. Agreements such as those with Canada and Japan already demonstrate how targeted bilateral arrangements can secure access to key materials like cobalt, graphite, and lithium while aligning with U.S. policies like the Inflation Reduction Act. Further integration through initiatives like the Minerals Security Partnership (MSP) can expand the pool of trusted suppliers and incentivize responsible resource governance globally.

In particular, expanding trade cooperation with countries like Australia and mineral-rich nations in Latin America will be essential to meeting the growing demand for mineral-intensive technologies. Many of these countries already hold free trade agreements with the United States or are members of the MSP, but deeper coordination—through task forces, tax treaties, and direct investment—will be needed to fully unlock their potential. Strengthening these bilateral ties will not only secure more stable and ethical supply chains but also support shared economic growth and reduce strategic vulnerabilities in the global minerals market.

Recommendation VII: Establish a border adjustment mechanism that accounts for labor, environmental, and processing practices in the critical minerals sector

Global competition in the critical minerals sector is distorted by wide disparities in labor protections, environmental standards, and processing practices. Countries with weak regulations often enjoy lower production costs, enabling them to outcompete U.S. and allied firms that adhere to higher standards. This cost advantage has fueled a concentration of refining capacity in countries like China, posing significant economic and strategic risks.

To address these imbalances, the United States should consider establishing a critical mineral border adjustment mechanism (CMBAM). Unlike traditional carbon border adjustments, the CMBAM would take a broader view of supply chain externalities. This mechanism would impose targeted tariffs on mineral imports from countries that fail to meet defined benchmarks for labor practices, local environmental impacts, and carbon emissions. This approach would discourage regulatory arbitrage, where companies relocate operations to low-standard jurisdictions, and instead incentivize sustainable practices across the global supply chain, helping to ensure that ethical and sustainable producers remain competitive.

Developing the CMBAM will require careful design and international coordination. Policymakers must define measurable benchmarks, establish transparent enforcement mechanisms, and navigate trade law constraints. Still, if implemented effectively, the CMBAM can become a cornerstone of responsible mineral supply chains—supporting domestic industry, advancing environmental and labor standards, and enhancing long-term economic and national security.

Recommendation VIII: Incentivize research for technological innovation

To drive technological progress in areas such as recycling, material efficiency, alternative battery chemistries, and sustainable solutions across the raw materials value chain, investments in and support for research, development, and innovation in critical raw materials (CRMs) should be actively encouraged and promoted in both the public and private sectors.

Technological innovation can be achieved through coordination and collaboration between institutions, banks, industries, and private sector stakeholders, creating synergies and maximizing the impact of existing funding programs. Furthermore, it is essential to prioritize access to financing for innovations related to CRMs. Given the challenges in securing funding for such projects, public institutions could play an important role in assisting research centers, universities, private entrepreneurs, and start-ups by improving access to financing and providing administrative support.

Recommendation IX: Incentivize research to address market uncertainties

To reduce the uncertainty that characterizes CRM markets, which hinders stakeholders' investment in the sector, research focused on the market dynamics and the supply chain of battery minerals should be promoted.

This effort should foster synergies between the research community and the private sector. Joint research projects could be established, where industry provides researchers with resources and expertise, and researchers contribute with cutting-edge studies. For example, such projects could explore how factors related to supply-chain risks evolve over time and propagate from raw materials to end products, or they could develop models to forecast mineral prices and quantities in ways that reflect the complexity of the sector.

A better understanding of potential supply and demand scenarios, price volatility, and supply chain bottlenecks would provide significant benefits for the industry as it attempts to develop new production capacity.



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