ENERGY & COMMERCE
CHAIR RODGERS

MEMORANDUM June 11, 2023

TO: Members of the Subcommittee on Environment, Manufacturing, and Critical Materials

FROM: Committee Majority Staff

RE: Hearing titled, "Securing America's Critical Materials Supply Chains and Economic Leadership."

I. INTRODUCTION

On Thursday, June 13, 2024 at 10:30 a.m. (ET) the Subcommittee on Environment, Manufacturing, and Critical Materials will hold a hearing in 2322 Rayburn House Office Building titled, "Securing America's Critical Materials Supply Chains and Economic Leadership."

II. WITNESSES

- **Matt Vincent**, Executive Director, Montana Mining Association
- **Michelle Michot Foss**, Fellow in Energy, Minerals, and Materials, Baker Institute for Public Policy, Rice University
- **Martin Stratte**, Partner, Hunton Andrews Kurth
- **David Klanecky**, Chief Executive Officer and President, Cirba Solutions

III. BACKGROUND

A. Critical Materials Framework History

Congress stated a national policy for materials and minerals more than forty years ago in the National Materials and Minerals Policy, Research, and Development Act of 1980 (1980 Act, P.L. 96-479): "It is the continuing policy of the United States to promote an adequate and stable supply of materials necessary to maintain national security, economic well-being and industrial production with appropriate attention to a long-term balance between resource production, energy use, a healthy environment, natural resources conservation, and social needs."[7]

The 1980 act was later amended by Congress in the Energy Act of 2020. Sections 7002(a) and 7002(c) of the Energy Act of 2020 defines a "critical mineral" as any mineral, element, substance, or material designated as critical by the Secretary of the Interior, acting through the Director of the U.S. Geological Survey (USGS), using three criteria:

- Essential to the economic or national security of the United States[1];"
- "The supply chain of which is vulnerable to disruptions (including restrictions associated with foreign political risk, abrupt demand growth, military conflict, violent unrest, anti-competitive or protectionist behaviors, and other risks throughout the supply chain)[2];" and
- "Serve an essential function in the manufacturing of a product (including energy technology, defense, currency, agriculture, consumer electronics, and healthcare-related applications), the absence of which would have significant consequences for the economic or national security of the United States."[3]

According to the Congressional Research Service (CRS), the Secretary of the Interior acting through the USGS may designate any mineral, element, substance, or material as a critical mineral that another federal agency determines to be strategic and critical to the defense or national security of the United States. Furthermore, the 1980 Act directs the Secretary of the Interior, acting through the Director of the USGS, to consult with the Secretaries of Defense, Commerce, Agriculture, and Energy and the United States Trade Representative in designating critical minerals."[4]

The Energy Act of 2020 defined a "critical material" as any non-fuel mineral, element, substance, or material that the Secretary of Energy determines has a high risk of a supply chain disruption; and serves an essential function in one or more energy technologies, including technologies that produce, transmit, store, and conserve energy; or a critical mineral (30 U.S.C. 1606).[5]

USGS Designation Process for Critical Minerals

The USGS developed a methodology for designating critical minerals that consists of three possible evaluations based on whether enough data exists for a fully quantitative analysis:

- A quantitative evaluation of supply risk wherever sufficient data were available using three indicators:
  - A net import reliance indicator of the dependence of the U.S. manufacturing sector on foreign supplies;
  - An enhanced production concentration indicator which focuses on production concentration outside of the United States; and
  - Weights for each producing country's production contribution by its ability or willingness to continue to supply the United States.
- A semi-quantitative evaluation of whether the supply chain had a single point of failure, or
- A qualitative evaluation when other evaluations were not possible.[6]

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[1] 30 U.S.C 1606 (c)(4)(A)(i)
[2] 30 U.S.C. 1606 (c)(4)(A)(ii)
[3] 30 U.S.C 1606 (c)(4)(A)(iii)
[4] https://crsreports.congress.gov/product/pdf/R/R47982/1., 11
[5] 30 USC 1606 (a)(2)
[6] https://crsreports.congress.gov/product/pdf/R/R47982/1

In 2022, the USGS published a list of 50 critical minerals, which can be found here.[7] According to the USGS, over 80 percent of our nation's supply of critical minerals comes from foreign sources.[8] Further, there is no domestic production of at least 14 critical minerals, and the U.S. imports over half of its consumption of 43 of the 50 critical minerals.[9]

B. History of Federal Laws and Policy Concerning Critical Minerals

Energy Act of 2020 and Federal Activities

Since the Energy Policy Act of 2020's amendments, the 1980 Act has called for the President to coordinate with the responsible agencies and departments to carry out several measures, including:

- Identify materials needs and assist in the pursuit of measures that would assure the availability of materials critical to commerce, the economy, and national security;
- Establish a mechanism for the coordination and evaluation of Federal materials programs, including those involving research and development so as to complement related efforts by the private sector as well as other domestic and international agencies and organizations;
- Establish an analytical and forecasting capability for identifying critical mineral demand, supply, and other factors to allow informed actions to be taken to avoid supply shortages, mitigate price volatility, and prepare for demand growth and other market shifts;
- Promote and encourage private enterprise in the development of economically sound and stable domestic materials industries;
- Facilitate the availability, development, and environmentally responsible production of domestic resources to meet national material or critical mineral needs; and
- Avoid duplication of effort, prevent unnecessary paperwork, and minimize delays in the administration of applicable laws (including regulations) and the issuance of permits and authorizations necessary to explore for, develop, and produce critical minerals and to construct critical mineral manufacturing facilities in accordance with applicable environmental and land management.[10]

Inflation Reduction Act (IRA)

The Inflation Reduction Act (IRA) contains multiple critical minerals provisions. The IRA created an advanced manufacturing production tax credit for taxpayers who produce certain eligible components in the U.S., including critical minerals, that are then sold to an unrelated person.[11] For critical minerals, the credit is equal to 10 percent of the costs incurred by the

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[7] Critical Mineral Resources: National Policy and Critical Minerals List (congress.gov)
[8] Developing a Domestic Supply of Critical Minerals and Materials | Department of Energy
[9] Ibid.
[10] https://crsreports.congress.gov/product/pdf/R/R47982/1
[11] Strengthening the US Supply Chain for Critical Minerals and the Inflation Reduction Act – Opportunities and Challenges | Insights | Mayer Brown

taxpayer with respect to the production of covered minerals.[12] The provision allows the opportunity for stacking tax credits, allowing an entity to receive a credit for producing and refining a mineral.[13] This credit begins phasing out in 2030 and is not available after 2032 unless extended.

The IRA also included sourcing requirements for critical minerals in electric vehicle (EV) applications as a condition to obtain a portion of the EV tax credit. Beginning in 2024, the IRA mandates that to receive half of the EV tax credit, at least 50 percent of the value of certain critical minerals in an EV's battery must be sourced and processed in the U.S. or a trade partner country -- increasing this valuation by 10 percent per year through 2027.[14] Starting in 2025, an EV battery may not contain any critical minerals that were extracted, processed, or recycled by a "foreign entity of concern."[15] The IRA also appropriated up to $500 million for the "enhanced use" of the Defense Production Act, which can be used to assist with production of critical minerals.[16]

Infrastructure Investment and Jobs Act (IIJA)

The Infrastructure Investment and Jobs Act (IIJA) included $407 million for critical minerals and rare earth elements extraction and recycling, research and development, and pilot programs for processing.[17] Sec. 40205 directed the Secretary of Energy to fund a facility to demonstrate the commercial feasibility of a rare earth element extraction and separation facility and refinery in collaboration with an academic partner.[18]

Sec. 40210 directed the Secretary of Energy, in coordination with the Director of the National Science Foundation (NSF), to issue grants to support research on critical minerals mining, recycling, and reclamation strategies and technologies to make better use of domestic resources and to eliminate national reliance on minerals and mineral materials that are subject to supply disruptions.[19]

Sec. 40401 amended the Energy Policy Act of 2005 to expand the innovative energy loan guarantee program to include projects that increase supply of domestically produced critical minerals as well as those that invest in manufacturing zero-carbon technologies for medium- and heavy-duty vehicles, trains, aircraft, and marine transportation as eligible project categories.[20]

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[12] Ibid.
[13] Ibid.
[14] U.S. Treasury Releases Final Electric Vehicle Tax Credit Regulations | Insights | Sidley Austin LLP
[15] Strengthening the US Supply Chain for Critical Minerals and the Inflation Reduction Act – Opportunities and Challenges | Insights | Mayer Brown
[16] Ibid.
[17] Infrastructure and Jobs act: Critical Minerals – Policies - IEA
[18] Ibid.
[19] Ibid.
[20] Ibid.

The IIJA also provided the USGS $510.7 million to improve our understanding of critical mineral resources.[21] With a portion of this money, the USGS launched the Earth Mapping Resources Initiative (Earth MRI). Earth MRI is an effort to modernize the surface and subsurface geologic mapping of the U.S., with a focus on identifying areas that may have the potential to contain critical mineral resources. The figure below is the Earth MRI map developed by the USGS that represents potential critical mineral systems in the U.S as of February 2023.

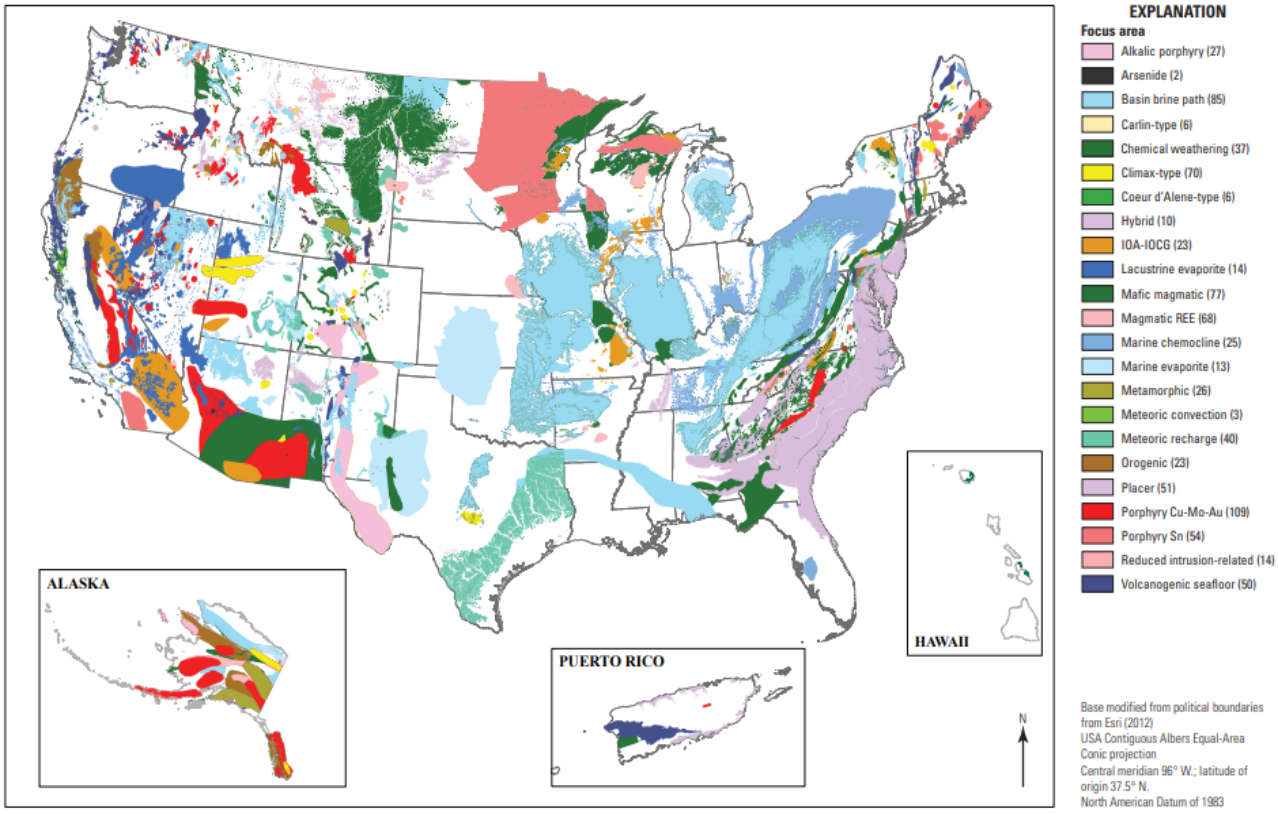

Figure 2. Maps showing focus areas for 23 mineral systems that could host critical mineral resources in the United States and Puerto Rico. Numbers in parentheses in the explanation refer to the numbers of focus areas for each mineral system. Data from Dicken and others (2022), which provides the extent of individual focus areas.

C. Critical Minerals Market and Applications

Focusing on specific energy technologies, wind power installations require significant amounts of copper, aluminum, and rare earth elements that comprise permanent magnets. The CRS noted that manufacturing wind turbines "would be 100% dependent on permanent magnet imports, primarily from China."[22] In addition, solar energy projects rely on aluminum, indium, gallium, and tellurium. The International Energy Agency (IEA) projected that expansion of solar energy projects will increase the demand of cadmium, tellurium, silicon, arsenic, gallium, and indium, depending on the type of solar photovoltaic (PV) technology. Similarly, EV batteries rely

[21] USGS makes $5 million in Bipartisan Infrastructure Law funding available to research critical minerals and rare earth elements found in mine waste | U.S. Geological Survey
[22] Rare Earth Elements: The Global Supply Chain (congress.gov)

on five critical minerals: lithium, cobalt, manganese, nickel, and graphite. Compared to a conventional internal combustion engine car, an electric car requires six times the mineral inputs. The IEA also estimated that the demand for lithium will increase by 43 times by 2040.

Critical minerals are crucial for renewable energy technologies and EVs and batteries, and China dominates much of those supply chains. According to a recent Brookings report:

- China refines 68 percent of nickel globally, 40 percent of copper, 59 percent of lithium, and 73 percent of cobalt;
- China dominates global production of battery cells, including 70 percent of cathodes, 85 percent of anodes, 66 percent of separators, and 62 percent of electrolytes;
- China has 78 percent of the world's cell manufacturing capacity for EV batteries;
- Three-fourths of the world's lithium-ion battery megafactories are located in China; and
- China is "the largest consumer of the minerals it refines.[23]

Meanwhile, China is unquestionably the largest emitter of greenhouse gas emissions in the world, far surpassing all other developed countries.[23] Consequently, a push for 100 percent wind and solar, and EVs, without first building out our domestic critical minerals supply chains, means we will be dependent upon China and its environmental practices.

D. Permitting Mines for Critical Minerals

According to the National Mining Association, it takes an average of seven to ten years to permit a mine in the United States.[24] There are more than three dozen federal environmental laws that cover the critical mineral mining process from cradle to grave, including:

- National Environmental Policy Act (NEPA),
- Federal Land Policy and Management Act (FLPMA),
- Clean Air Act (CAA),
- Clean Water Act (CWA),
- Safe Drinking Water Act (SDWA),
- Resource Conservation and Recovery Act (RCRA),
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA),
- Toxic Substances Control Act (TSCA),
- Emergency Planning and Community Right-to-Know Act (EPCRA),
- Endangered Species Act (ESA),
- Migratory Bird Treaty Act (MBTA),
- Surface Mining Control and Reclamation Act (SMCRA),
- River and Harbors Act, Federal mining laws,
- National Historic Preservation Act (NHPA), and
- Mine Safety and Health Act (FMSHA).[25]

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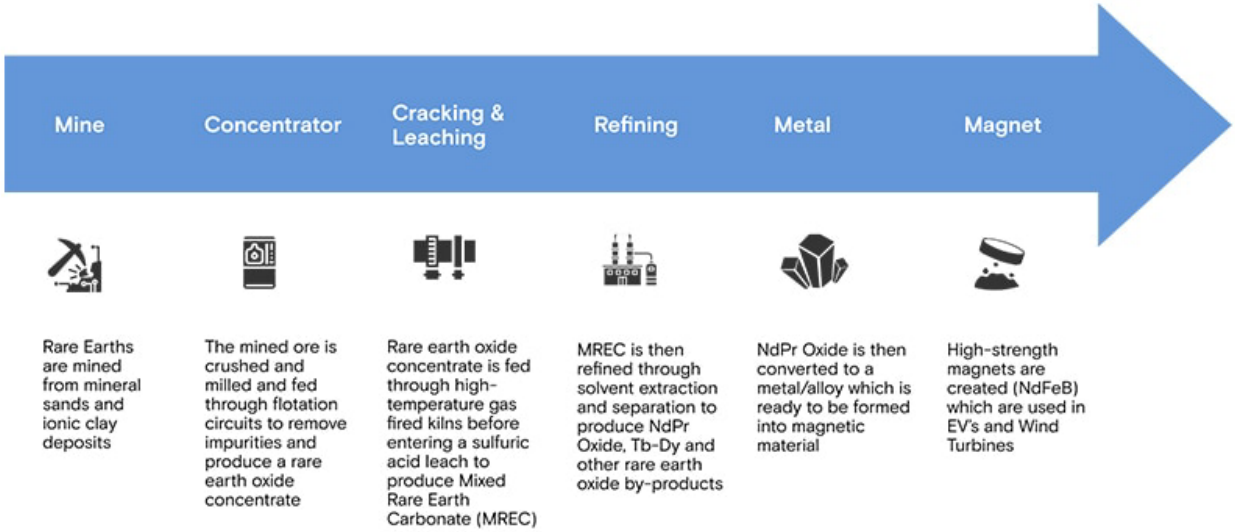
[23] The Carbon Brief Profile: China
[24] SNL-mining-report-v6 (nma.org)
[25] Microsoft Word - Federal Environmental Laws that Govern US Mining 2023 (nma.org)

In recent years, the global lead time to open a mine has grown to 17.9 years in 2020-23, versus 12.7 years for a similar mine 15 years ago. In the U.S., this lead time, combined with permitting, has been shown to reduce the value of a typical mining project by approximately one-third.[26]

E. Domestic Supply Chain for Critical Minerals

To use critical minerals for applications like EV batteries, they must first be mined, refined, and processed into high-grade materials – each with variations in processing for each commodity.[27] Generally, this multi-step procedure involves the crushing and roasting of mined ores, followed by a series of chemical treatments to create a purified metal that can be used as an input in consumer products.[28] For rare earth elements, as illustrated in the graphic[29] below, there is a six-step, time- and capital-intensive process requiring advanced expertise and specific machinery to achieve the high purity metal converted into magnets, which are then used in applications like wind turbines and EV drivetrains.[30]



The U.S. presently cannot supply key minerals for itself – let alone the world – creating economic and security risks for the United States.[31] Maximally limiting the influence and impact of geopolitical foes on U.S. supply chains is important, especially in the realm of critical minerals and metals where demand for minerals is set to rise.[32]

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[26] SNL-mining-report-v6 (nma.org)
[27] https://www.goldmansachs.com/intelligence/pages/resource-realism-the-geopolitics-of-critical-mineral-supply-chains.html
[28] Id.
[29] Graphic found in Resource realism: The geopolitics of critical mineral supply chains at: https://www.goldmansachs.com/intelligence/pages/resource-realism-the-geopolitics-of-critical-mineral-supply-chains.html
[30] Id.
[31] https://www.csis.org/analysis/building-larger-and-more-diverse-supply-chains-energy-minerals
[32] https://www.csis.org/analysis/de-risking-critical-mineral-supply-chains-role-latin-america

Even if a friendly nation is mining these metals, ensuring that production makes its way into the hands of refiners and end users is equally crucial. It is at this latter stage that much of the minerals projected to grow the most over the coming decades risk being funneled to China under Beijing's strategy of economic coercion.[33] A key component of any "de-risking" approach must be a U.S. effort to step up mining and refining activity domestically and signal its willingness to push de-risking forward at home as well as abroad.[34] Otherwise, the United States will find itself even more tied to the whims of China, as we saw recently when China began limiting exports of graphite, synthetic graphite, gallium, and germanium.[35]

IV. ISSUES

The following issues may be examined at the hearing:

- The state of the critical minerals and materials markets.
- Challenges and opportunities associated with securing U.S. supply chains for critical materials.
- Risks associated with over-reliance on China for critical materials.
- The consequences of energy and resource policy decisions downstream of the critical minerals and materials markets.

V. STAFF CONTACTS

If you have any questions regarding this hearing, please contact Mary Martin, Brandon Mooney, Jerry Couri, or Drew Lingle of the Committee Staff at (202) 225-3641.

[33] Id.
[34] Id.
[35] Chairs Rodgers, Duncan, and Johnson Seek Answers from Secretary Granholm Over Critical Materials from China (house.gov)