

**DEPENDENCE ON FOREIGN ADVERSARIES:
AMERICA'S CRITICAL MINERALS CRISIS**

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON OVERSIGHT AND
INVESTIGATIONS

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

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CONTENTS

Hearing held on Thursday, February 9, 2023	Page 1
Statement of Members:	
Gosar, Hon. Paul, a Representative in Congress from the State of Arizona	1
Stansbury, Hon. Melanie A., a Representative in Congress from the State of New Mexico	3
Westerman, Hon. Bruce, a Representative in Congress from the State of Arkansas	4
Grijalva, Hon. Raúl M., a Representative in Congress from the State of Arizona	18
Statement of Witnesses:	
Loris, Nick, Vice President of Public Policy, C3 Solutions, Arlington, Virginia	7
Prepared statement of	9
Moats, Michael, Professor and Department Chair of Materials Science and Engineering, Missouri University of Science and Technology, Rolla, Missouri	18
Prepared statement of	20
Mintzes, Aaron, Senior Policy Counsel, Earthworks, Washington, DC	26
Prepared statement of	27
Questions submitted for the record	32
George, Jason, Business Manager, International Union of Operating Engineers, Local 49, Minneapolis, Minnesota	33
Prepared statement of	35
Additional Materials Submitted for the Record:	
Submissions for the Record by Representative Stauber E&E Article titled, “Biden admin looks to overseas mining for EV, renewable needs,” dated January 23, 2023	52
Submissions for the Record by Representative Luna Graphic on China’s Exploitation of Child Labor	49
Submissions for the Record by Representative Grijalva Cobalt Institute, Letter to the Committee	68

**OVERSIGHT HEARING ON DEPENDENCE ON
FOREIGN ADVERSARIES:
AMERICA'S CRITICAL MINERALS CRISIS**

**Thursday, February 9, 2023
U.S. House of Representatives
Subcommittee on Oversight and Investigations
Committee on Natural Resources
Washington, DC**

The Subcommittee met, pursuant to notice, at 9:05 a.m. in Room 1134, Longworth House Office Building, Hon. Paul Gosar [Chairman of the Subcommittee] presiding.

Present: Representatives Gosar, Rosendale, Collins, Luna, Westerman; Stansbury, Case, Gallego, and Grijalva.

Also present: Representatives Lamborn and Stauber.

Dr. GOSAR. The Subcommittee is meeting today to hear testimony on the dependence on foreign adversaries: America's critical minerals crisis.

I ask unanimous consent that the gentleman from Colorado, Mr. Lamborn, and the gentleman from Minnesota, Mr. Stauber, be allowed to sit with the Subcommittee and participate in the hearing.

Without objection, so ordered.

Under Committee Rule 4(f), any oral opening statements at the hearing are limited to the Chairman and the Ranking Minority Member. I, therefore, ask unanimous consent that all other Members' opening statements be made part of the hearing record, if they are submitted in accordance with Committee Rule 3(o).

Without objection, so ordered.

Good morning, and welcome to this important hearing titled, "Dependence on Foreign Adversaries: America's Critical Minerals Crisis."

I am honored to be the Chairman of the House Natural Resources Subcommittee on Oversight and Investigations, joined by our Vice Chairman, Mike Collins, our colleagues, and distinguished guests and experts.

I also congratulate Ranking Member Stansbury on her new role. Being a neighbor from New Mexico, it is kind of a fitting title.

This Subcommittee is excited to get back to work.

**STATEMENT OF THE HON. PAUL GOSAR, A REPRESENTATIVE
IN CONGRESS FROM THE STATE OF ARIZONA**

Dr. GOSAR. Today, we will examine the dependence of the United States on foreign adversaries for critical minerals, a dependence that undermines our national sovereignty, our economic prosperity, and our technological innovation. We will explore the current state of our critical mineral supply chain and the actions we must take

to empower our national security and to unleash America's energy and mineral potential.

This is an urgent matter, as we rely on critical minerals for our way of life, from smartphones and laptops, to renewable energy technology, to medical equipment, military gear, energy storage, defense systems, and many essential aspects of modern life and national security that depend on an abundance of critical minerals.

The United States must lead in the production of these minerals and reduce our dependence on nations that do not share our values, interests, or our high environmental standards. By promoting the development of domestic minerals and streamlining the permitting process, we can create jobs here in America, increase economic growth, and enhance our energy and national security.

Minerals are particularly essential for battery storage, and a lack of sufficient battery storage and transmission capacity means renewable resources cannot be stored in large quantities, like coal or natural gas. Without reliable conventional energy sources, communities are subject to rolling blackouts, endangering the health and safety of our local communities. We cannot afford to be dependent on foreign nations to power America.

I say again, our country has a dangerous reliance on foreign nations for energy and critical minerals. Recycling plays an important role, but demand requires American mining, as well.

Additionally, there is a case for climate optimism. It is called American innovation. Everyone here wants to maintain healthy lands and waters, especially many of my Republican colleagues who live in rural areas. Sadly and concerning, most of our critical minerals come from foreign countries, particularly China, despite there being an abundance of valuable materials we could source here at home.

Unfortunately, permitting a new hardrock mine in the United States can take more than a decade. Our unpredictable and overburdening regulatory framework pushes investment abroad, where environmental and labor standards are not nearly as stringent as our own. Promoting responsible renewable American energy development requires domestic hardrock mining to avoid supply chain disruptions and to reduce our import reliance on unfriendly nations.

This hearing is an opportunity to have a constructive conversation about the challenges we face and the solutions we can implement to meet these challenges. So, let's work together with the common goal of unlocking that full potential of our country, to secure a brighter future for all Americans. Together we can balance our national security and environmental goals. Over-regulation, even if well-intended, will simply lead to more production in adversarial nations with few, if any, labor or environmental standards.

I welcome our new Members and appreciate the important work we will do together.

I also welcome and thank our guests for joining. Thank you all for joining us today.

I now recognize the Ranking Member for any statement she may have.

**STATEMENT OF THE HON. MELANIE A. STANSBURY, A
REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW
MEXICO**

Ms. STANSBURY. All right. Thank you, Mr. Gosar, Chairman. It is an honor to be able to serve alongside you, and welcome to our first Subcommittee of Oversight hearing. It is with great joy that I am able to serve as the Ranking Member.

I want to thank our witnesses and guests today and, of course, all of our Members who are here for the first time today. I am Melanie Stansbury, and I represent New Mexico's 1st Congressional District, which is right in the heart of central New Mexico. It is a vast rural district that includes Albuquerque and many of the surrounding rural and tribal communities, which are greatly affected by the work of the agencies that this Committee and Subcommittee have jurisdiction over.

These issues that we cover in the Natural Resources Committee at large, and especially the oversight that we do in this Committee, are of great personal concern to me and to the communities that I represent, not only because of the significance of the beauty and public lands and waters that are within my district and the tribal communities that I help to represent and collaborate with, but also because I myself am a science professional who has worked in natural resources for more than 20 years. I have worked in water resources and drought management since the beginning of my career, and worked on the counterpart of this Committee in the Senate Energy Committee for a number of years, and in the Office of Management and Budget.

In fact, during my time working in the Office of Management and Budget, I was actually the budget and policy analyst who oversaw the budget for the Bureau—the USGS and the critical minerals issues that we are talking about today. So, this is actually a topic that I have worked on for many years, including during my time in the Senate Energy Committee, where I also worked on critical minerals issues in a bipartisan manner with my counterparts on the Committee.

So, the issues that we are going to discuss today are near and dear to my heart. Of course, they are of national strategic importance.

But before I dive into that, I just want to take a moment, since we are beginning the Subcommittee's work, to talk about some of the priorities that we are hoping to work on over the course of this Congress. And I hope and am optimistic that we will find opportunities for bipartisan collaboration, not only for policies to advance the needs of the American people that we represent, but also to conduct appropriate oversight and to root out waste, fraud, and abuse, which, of course, is our role here on the Oversight Committee.

Among the many issues that this Committee will take up and which we are hoping to prioritize in our oversight and policy role are issues around the climate and clean energy transition and, in particular, helping to empower our communities so that they can determine their own economic futures in the process.

New Mexico is an energy-rich state of all forms of energy. And as we are making this transition to a clean energy future, it is

absolutely critical that our workers, our unions, and our communities have a strong voice in every aspect of how we plan those local, regional, and national economies.

It is also crucial that we develop the workforces that help to support the development of those industries, and to help transition those who are going to see new opportunities as we build out a climate resilient grid and energy future.

In addition to that, obviously, this Committee has broad jurisdiction over public lands, forests, and waters. And to the extent that the Oversight Committee takes up issues surrounding those, we will be working on those issues, as well as upholding our responsibilities to our tribes.

So, the issue that we are here to talk about today, of course, is critical minerals. And as we know, critical minerals—and as the Chairman discussed—are crucial to the future of the United States.

Up until the 1990s, the United States was a net exporter of rare earth minerals. And due to trade policies that began, obviously, in the 1980s and extended into the 1990s, American mining companies were no longer able to compete due to global prices. And as a result of that, we saw the rise in especially Chinese investment in mining, and not only in China but across the world.

Recent efforts by the Chinese Government to stockpile and to restrict the trade of these elements have put the United States and other global countries at risk. For the United States, this is a national security issue. This is an issue that affects every aspect of our economy, as we are completely dependent, every single one of us, on these electronics that run our lives these days, and every aspect of our lives.

So, the question before us is how do we responsibly develop our critical minerals supply chain through recycling, re-use, innovation, international trade relationships, and making the best and most appropriate use of existing resources in the United States?

Let me be clear. We cannot mine and permit our way out of this problem. There may be mining solutions that may be a part of what we have to do, but that is not the sole solution to addressing our critical minerals and national security shortage.

So, I look forward to working with the Chairman, and with that I yield back.

Dr. GOSAR. I thank the gentlelady. I now recognize the Full Committee Chairman, Mr. Westerman, for any statement.

STATEMENT OF THE HON. BRUCE WESTERMAN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ARKANSAS

Mr. WESTERMAN. Thank you, Chairman Gosar, and good morning, everyone. Thank you for joining us for our first Subcommittee hearing for the 118th Congress. And it is very fitting that this hearing be with the Oversight and Investigations Subcommittee.

As I have said before, I think the purpose of this Committee, and the whole Committee, is to shine light, discover truth, and make changes as are needed. And this Committee is where much of that light-shining will take place.

Oversight should be a bipartisan effort by Congress to exercise our constitutional duty to have checks and balances over an administration. And I believe that is true regardless of who the majority or the minority party is in the Congress, or who sits at the Oval Office.

I do want to offer my congratulations to Chairman Gosar and Ranking Member Stansbury. You have an important role here, and I look forward to your leadership and the work of this Subcommittee. I appreciate the opening statements of both the Chairman and the Ranking Member. And I think, with that attitude, we should be able to do the work of the Committee.

And I would add to what Ms. Stansbury said, that we can't mine and permit our way out of this. Actually, we would have to permit and then mine, but it is permit, mine, refine, and manufacture. We have to create those supply chains that allow us to compete with the—it is, basically, with the Chinese Communist Party, it is with Vladimir Putin and Russia. And it is a lot of bad actors around the world that are supplying the ingredients that go into these phones and other devices.

In the last Congress, the Inflation Reduction Act, and there are, literally, hundreds of billions of dollars to build green energy systems. And all of those green energy systems are reliant on mining. It comes back to mining, and then the processes that take place after that.

So, we have been blessed with energy and minerals here in the United States. Both the Chairman and the Ranking Member come from states that are abundantly blessed with energy and minerals and therein the focus of where a lot of these policies need to be addressed, as well as my friend Mr. Stauber from Minnesota.

So, at the same time, Congress passed a law to spend billions of dollars on electrifying our economy. We are also seeing actions from the Administration to shut down mining, and those two things really don't go hand in hand. They are competing interests, and they make the problem even worse.

We talked in the hearing yesterday about some of these issues, and the fact that the World Bank says we need to mine as much copper in the next 20 to 25 years as has been mined in the history of the world. That is a big challenge. If you just focused every effort that we had to do that, it would still be hard to meet those challenges. We need to do more recycling, but there is not enough to recycle to even come close to meet the demands that we have.

When you look at the critical minerals list and you look at where those critical minerals are being supplied from, honestly, we should be embarrassed that we are so far down the list when we have been blessed with deposits of those critical minerals here in the United States. And if we develop those minerals here and develop the other parts of the supply chain, then that means generating huge amounts of wealth for the United States, for U.S. workers, for great jobs in rural communities.

I live in a rural community, and I think just about everybody on this dais lives in an area that is either rural or close to a rural community, and we know how important these jobs are to the local economies.

And we can do it cleaner and safer, and with less human rights violations, actually, I will say with no human rights violations.

[Chart.]

Mr. WESTERMAN. And the situation we are in right now, as these pictures behind me depict, cobalt is Congolese cobalt, and it is coming from mines with child slave labor. And we have to be realistic, and understand what is happening. As we pour more money into an electrified economy, we are increasing the labor participation rate in Congo with forced labor, with child slave labor, and people forced to do jobs for as little as \$2 a day or less.

So, those are the challenges we face with Oversight. I look forward to the hearing, I look forward to additional hearings, and then I really look forward to taking what we learn from these hearings, putting it into substantive legislation, or else informing the Appropriations Committee what needs to happen on funding for these Federal agencies that are failing to do their job.

And with that, Chairman, I yield back.

Dr. GOSAR. The Ranking Member is on his way. So, when he gets here, we will go back to him. We will start with our witnesses.

Our first witness is Mr. Nick Loris, the Vice President of Public Policy, C3 Solutions from Arlington, Virginia.

Our second witness is Dr. Michael Moats, Professor of the Department of Materials Science and Engineering, Missouri University of Science and Technology, Rolla, Missouri.

Mr. Aaron Mintzes, Senior Policy Counsel of Earthworks, Baltimore, Maryland.

I now yield to Representative Pete Stauber for 30 seconds to introduce our final witness, Mr. Jason George, Business Manager for the International Union of Operating Engineers, Local 49.

Mr. STAUBER. Thank you, Mr. Chair. Today, I have the pleasure of introducing my friend, Jason George.

Jason serves as the Business Manager and Financial Secretary of the Operating Engineers Local 49, or 49ers, as they are known in Minnesota, North and South Dakota. There are few people that have the insight and leadership of Jason.

Our 49ers span Minnesota, North Dakota, and South Dakota, operating the heavy equipment and doing plant management at facilities across the upper Midwest. Whatever the project may be, you are likely to find one of Jason's 49er members putting in the hard work to build the infrastructure.

Thank you, Jason, and I look forward to your testimony today.

Dr. GOSAR. Let me remind the witnesses that, under Committee Rules, they must limit their oral statements to 5 minutes, but their entire statement will appear in the hearing record.

To begin your testimony, please press the talk button on the microphone.

We use timing lights here. When you begin, the light will turn green. When you have 1 minute left, it will turn yellow. And at the end of 5 minutes it will turn red. Then I will ask you to please complete your statement very shortly.

I will also allow all witnesses to testify before Member questioning.

The Chair now recognizes Mr. Loris for 5 minutes.

**STATEMENT OF NICK LORIS, VICE PRESIDENT OF PUBLIC
POLICY, C3 SOLUTIONS, ARLINGTON, VIRGINIA**

Mr. LORIS. Thank you, Chairman Gosar, Ranking Member Stansbury, and distinguished members of the Subcommittee. Thank you for this opportunity to testify this morning.

My name is Nick Loris, and I am the Vice President of Public Policy for C3 Solutions, which stands for the Conservative Coalition for Climate Solutions. With my time, I would like to make three brief points: first, the importance of critical minerals for the economy and the requirements necessary to meet clean energy demands; second, the adverse environmental and social impacts from mining and processing critical minerals in certain places abroad; and third, exploring opportunities to capitalize on domestic mineral abundance, to diversify the market, and to reduce dependence on foreign adversaries.

First, non-fuel critical minerals are essential for our quality of life, technological progress, national security, and environmental ambitions. Critical minerals are the foundation that empowers companies to build, manufacture, and innovate, and they are the foundation for the products that keep Americans and people around the world safe, healthy, and happy.

Critical minerals are also necessary for renewable and clean energy technologies. Most low-carbon and zero-emissions technologies require a moderate or high amount of at least two critical minerals. And several sources, including wind, batteries, and hydrogen, have moderate to high needs for four or more critical minerals.

Significant increases in critical mineral supplies will be necessary to address climate change. To meet the International Energy Agency's global net-zero targets by 2050, the agency estimates the world will need 43 million metric tons of critical minerals, a sixfold increase from 2020 levels.

Granted, we need to take those estimates with a large grain of humility. But even under much less ambitious scenarios, it is almost certain that future critical mineral needs will be substantial.

And to be clear, the massive critical mineral requirements are not by itself a reason to be pessimistic about the future of clean energy. Instead, policymakers must recognize the importance of these minerals, the realities of future demand, and the challenges and opportunities that lie ahead.

Second, addressing the human rights abuses of critical mineral development and processing in certain countries will be essential for having socially just growth in clean energy, in electric vehicles, and for the continued use of modern technologies.

The Democratic Republic of the Congo supplies nearly 75 percent of the world's cobalt, and the mining practices are appalling, to say the least. Having visited and researched the practices, Harvard fellow Siddarth Kara has extensively documented the horrors and abuses of artisanal mining in the DRC, where tens of thousands of child laborers are digging the cobalt out by hand, while breathing in toxic fumes and dust. Chinese ownership of most of these mines and Chinese dominance of cobalt refining exacerbate the supply chain concerns.

And speaking of China, the human rights exploitations of the Uyghur Muslim minorities and other Muslim minorities in the Xinjiang region of China has also been well documented, and is extremely concerning. A recent Breakthrough Institute report estimates that 42 percent of the global solar grade polysilicon production capacity was in that region in the year 2021.

In addition to the egregious human rights tragedies, there are also economic and environmental concerns of over-reliance on China for minerals and processing. Poor environmental standards and weak enforcement in China have resulted in contaminated groundwater and soil, and dangerous levels of air pollution.

Encouragingly, the rare earth market is diversifying worldwide to some extent, which will reduce the dependence on China, and promote more environmentally friendly ways to mine and process rare earths, which brings me to my third point.

Congress must continue to work with the private sector to open opportunities to capitalize on resource abundance, diversify supply chains, promote ethical mineral sourcing, and develop market alternatives. For instance, modernizing permitting processes should put America on par with countries like Canada and Australia that unlock mineral deposits, while maintaining rigorous environmental safeguards. The more the United States and other developed countries extract their resources, the fewer minerals we will need to import from countries that have lax environmental standards and use morally unconscionable labor practices.

At a bare minimum, agencies should conduct an environmental review, rather than place a mining area off limits before any such review is even conducted.

Further, Congress should continue to support research and development for critical minerals recycling, mining, and processing innovations. Collaboration among government labs, research universities, and the private sector could help unlock breakthrough technologies, improve efficiencies, and generate market viable alternatives.

With any subsidies, Congress should also maintain policy neutrality. To the extent that the government provides any subsidies, technology neutrality will generate more efficient outcomes.

In conclusion, rising prices for mineral commodities could slow the deployment of clean energy technologies moving forward. Alternatively, rising prices could be an opportunity, and should be the signal for markets to act, to increase supplies, to develop substitutes, to secure supply chains, diversify away from unethically sourced minerals, and reduce dependence on foreign adversaries where environmental standards are poor.

Congress can act by removing the barriers that prevent the private sector from providing clean, reliable energy choices at lower prices.

Thank you, and I look forward to your questions.

[The prepared statement of Mr. Loris follows:]

PREPARED STATEMENT OF NICK LORIS, VICE PRESIDENT OF PUBLIC POLICY,
CONSERVATIVE COALITION FOR CLIMATE SOLUTIONS (C3 SOLUTIONS)

My name is Nick Loris, and I am the Vice President of Public Policy at the Conservative Coalition for Climate Solutions (C3 Solutions). Thank you for this opportunity to appear before the subcommittee to discuss America's dependence on foreign adversaries with respect to critical minerals.

My written testimony consists of the following sections:

- **The importance of critical minerals for the quality of life, economic well-being and, national security**
- **The need for critical minerals to meet clean energy demands and climate ambitions**
- **The adverse environmental and social impacts from mining and processing in certain places abroad**
- **Opportunities to capitalize on domestic mineral abundance, diversify supply chains, promote ethical mineral sourcing, and develop market alternatives**

Section I. The importance of critical minerals to the economy and to climate objectives

Critical minerals are just that: *critical*. Non-fuel mineral commodities are essential for quality of life, technological progress, national security, and environmental ambitions. Nearly all the modern technologies Americans rely on such as cell phones, laptops, appliances, and vehicles require critical minerals. They are the foundation that empowers companies to build, manufacture and innovate. These minerals are necessary inputs to produce affordable energy, stable food supplies, defense technologies, and advancements in modern medicine. In short, critical minerals are the foundation for the products to keep Americans and people around the world safe, healthy, and happy.

More broadly, mineral development is an important source of jobs and economic activity in the United States. According to the U.S. Geological Survey's (USGS) 2021 Mineral Commodity Summaries report, the estimated value of nonfuel mineral production was \$82.3 billion in 2020.¹ While that figure represents all nonfuel mineral production (crushed stone account for 22 percent of that value), the value is nonetheless impressive. The USGS highlights just how essential minerals are to the overall economy, noting that: "These mineral materials as well as imports of processed mineral materials, which increased by 83% in 2020, were, in turn, consumed by downstream industries creating an estimated value of \$3.03 trillion in 2020, 3% decrease from that in 2019."² The United States supplied an additional 10,000 metric tons of rare earth concentrates, a 36 percent increase from 2019.³ The U.S. continues to be the second largest producer of rare earth concentrates, though well behind China.

As characterized by The Energy Act of 2020, the other factor which makes minerals "critical" is their susceptibility to supply chain disruptions. Russia's invasion of Ukraine exemplified the economic uncertainties, supply chain vulnerabilities and fundamental pitfalls of reliance on mineral producers that are hostile to the interests of the United States. As a major supplier of nickel, copper, and palladium (important inputs for batteries and semiconductors), Russia's invasion and subsequent sanctions drove up prices for these elements.⁴ Though not a critical mineral,

¹U.S. Geological Survey, "Mineral Commodities Summary," January 29, 2021, <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021.pdf>

²Ibid.

³U.S. Geological Survey, "Mineral Commodity Summary February 2021," February 2, 2021, <https://www.usgs.gov/media/images/mineral-commodity-summary-february-2021>

⁴Dr. Robert Johnson, "Supply of Critical Minerals amid the Russia-Ukraine War and Possible Sanctions," Columbia Center on Global Energy Policy, April 2022, <https://www.energypolicy.columbia.edu/publications/supply-critical-minerals-amid-russia-ukraine-war-and-possible-sanctions> and Emily Pickrell, "Russia-Ukraine War Helps Drive Nickel Prices, EV Headaches," Forbes, March 31, 2022, <https://www.forbes.com/sites/uhenery/2022/03/31/russia-ukraine-war-helps-drive-nickel-prices-ev-headaches/?sh=39a102357cd9>

the nuclear industry’s reliance on Russian for high-assay low-enriched uranium (HALEU) brought conversations about more domestic enrichment to the forefront.⁵ Disruptions around the world can threaten supplies of minerals necessary for modern technologies, including renewable, nuclear, and alternative energy technologies.

According to a recent report from the Citizens for Responsible Energy Solutions (CRES), the U.S. is completely import-dependent for 14 critical minerals and greater than 50 percent-dependent for 17 other mineral commodities.⁶

Section II. The need for critical minerals for clean energy and climate ambitions

As it stands today and for the foreseeable future, renewable and clean energy technologies are quite mineral dependent. A March 2022 report from the International Energy Agency (IEA) details the critical minerals necessary for low- and zero-carbon dioxide power generation and transportation.⁷ Whether it is wind, solar, hydro, nuclear, electric vehicles, battery storage, hydrogen, geothermal, or bio-energy, every one of these clean energy technologies requires a moderate or high amount of at least two critical minerals.⁸ Several technologies, most notably wind, batteries, and hydrogen, have moderate to high needs for four or more critical minerals.⁹

As indicted by the IEA charts below, clean energy technologies are much more mineral intensive than their conventional counterparts. When comparing electricity generating sources to a natural gas plant, offshore wind is 13 times more intensive, onshore wind is nearly 9 times more intensive, solar photovoltaics are nearly 6 times more intensive, and nuclear power is 4.5 times more intensive.¹⁰ Similarly, electric vehicles are 6 times more mineral intensive than vehicles powered by an internal combustion engine.¹¹

Included in list of critical minerals for various clean energy technologies is rare earth elements (REEs). The value of REEs lies in their unusual physical and chemical properties that give them unique magnetic and optical capabilities. Rare earth elements are essential for solar cells, batteries, wind turbine magnets and hydrogen electrolyzers.¹² They are critical to scaling up clean energy deployment and global decarbonization.

⁵Paul Day, “US urges haste on domestic HALEU plan as Russia faces isolation,” Reuters, March 22, 2022, <https://www.reutersevents.com/nuclear/us-urges-haste-domestic-haleu-plan-russia-faces-isolation>

⁶Phil Rossetti and George David Banks, “Foreign Mineral Supply Chain Dependence Threatens U.S. National Security,” CRES Forum, March 2022, <https://cresforum.org/wp-content/uploads/2022/03/CRES-WhitePaper-CriticalMinerals-03212022-v1.pdf>

⁷International Energy Agency, “The Role of Critical Minerals in Clean Energy Transitions: World Energy Outlook Special Report,” March 2022, <https://iea.blob.core.windows.net/assets/ffd2a83b-8c30-4e9d-980a-52b6d9a86fdc/TheRoleofCriticalMineralsinCleanEnergyTransitions.pdf>

⁸Ibid. See chart on page 45.

⁹Ibid.

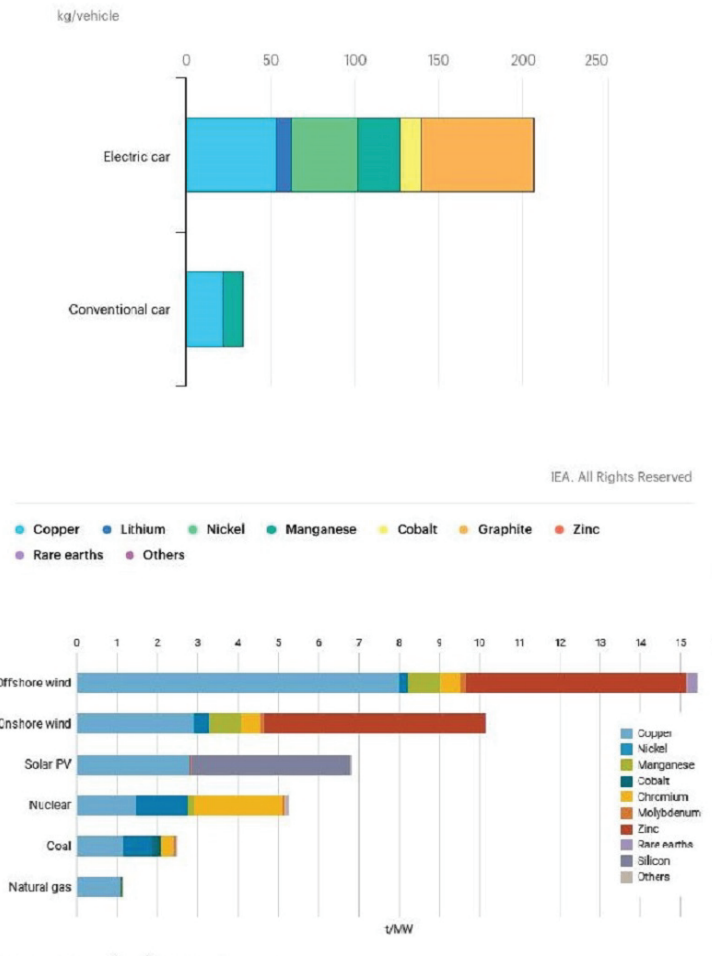
¹⁰International Energy Agency, “The Role of Critical Minerals in Clean Energy Transitions: Executive Summary,” March 2022, <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/executive-summary>

¹¹Ibid.

¹²International Energy Agency, “The Role of Critical Minerals in Clean Energy Transitions: World Energy Outlook Special Report,” March 2022, <https://iea.blob.core.windows.net/assets/ffd2a83b-8c30-4e9d-980a-52b6d9a86fdc/TheRoleofCriticalMineralsinCleanEnergyTransitions.pdf>

Minerals used in electric cars compared to conventional cars

Open

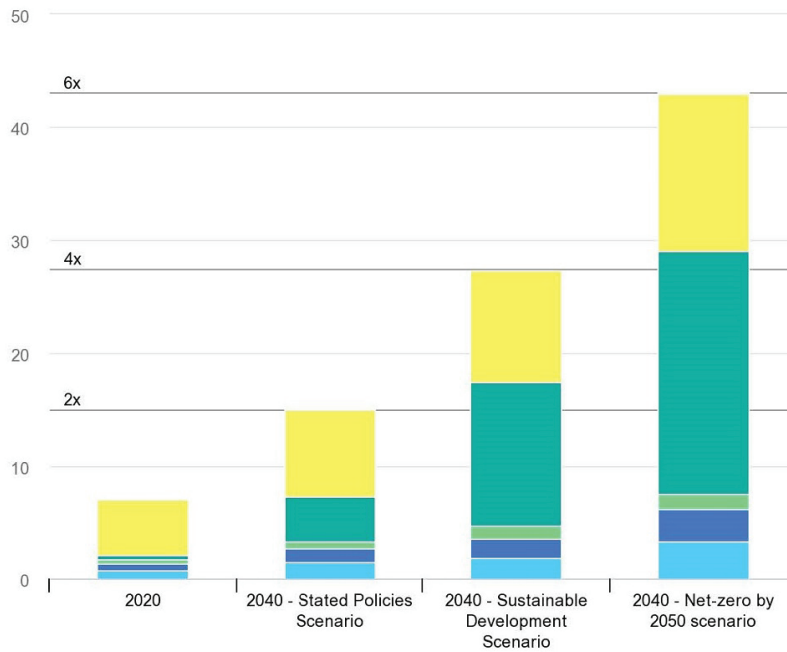


Source: International Energy Agency

Addressing climate change will require significant increases in the critical mineral supply. Setting aside the attainability and potential costs of net-zero targets (both necessary considerations), a substantial number of critical minerals will be needed to meet any emissions target. To meet the IEA's global net zero targets by 2050, the agency estimates the world will need 43 million metric tons of critical minerals, a sixfold increase from 2020 levels.¹³

¹³ International Energy Agency, "The Role of Critical Minerals in Clean Energy Transitions: Executive Summary," March 2022, <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/executive-summary>

In IEA's less ambitious Sustainable Development Scenario (SDS), which is the trajectory of clean energy needed to meet the Paris Climate Agreement targets, critical mineral growth would need to quadruple. IEA estimates that, "Lithium sees the fastest growth, with demand growing by over 40 times in the SDS by 2040, followed by graphite, cobalt and nickel (around 20–25 times). The expansion of electricity networks means that copper demand for grid lines more than doubles over the same period."¹⁴ Notably, these projections exclude the demand requirements for steel and aluminum.



Source: International Energy Agency

Regarding future critical mineral demand, IEA's sustainable development scenario and net-zero scenarios are very ambitious. Making these projections a reality would require "an unprecedented push in clean energy."¹⁵ That push includes electric vehicle sales increasing from 5 percent in 2020 to 60 percent in 2030 and for 90 percent of power generation to come from renewable sources, 70 percent being wind and solar.¹⁶

Nevertheless, even if the most ambitious net zero target is not met, it is very likely that critical mineral demand will be substantial. Energy analysts Philip Rossetti and George David Banks analyzed several studies that attempt to estimate the demand for critical minerals. Rossetti and Banks write, "there is a significant range in the estimates required across all three analyses, which can largely be attributed to varying assumptions as to the rates of improvement in the efficiency of materials utilization and in recycling, as well as the substitutability of minerals. *However, all three analyses estimate a non-trivial portion of the Earth's total critical minerals would be required to meet global clean energy demand [emphasis added].*"¹⁷

¹⁴ Ibid.

¹⁵ International Energy Agency, "Net Zero by 2050 A Roadmap for the Global Energy Sector," May 2021, https://iea.blob.core.windows.net/assets/7ebafc81-74ed-412b-9c60-5cc32c8396e4/NetZeroBy2050-ARoadmapfortheGlobalEnergySector-SummaryforPolicyMakers_CORR.pdf

¹⁶ Ibid.

¹⁷ Phil Rossetti and George David Banks, "Foreign Mineral Supply Chain Dependence Threatens U.S. National Security," CRES Forum, March 2022, https://cresforum.org/wp-content/uploads/2022/03/CRES_WhitePager_CriticalMinerals_03212022_v1.pdf

Certainly, projecting resource requirements across multiple decades is not a prediction but is instead an assessment of the potential demand for critical minerals. Expert projections of peak oil, food shortages, and resource exhaustion have come and gone, often with little accuracy. These projections often assume that past trends and the status quo will continue.¹⁸ However, markets change as innovators drive efficiency and technological progress. It is worth projecting future critical minerals needs with some humility and optimism that markets will find ways to responsibly meet consumers' needs, which may or may not include the use of these minerals.

Moreover, massive critical mineral requirements are not by itself a reason a reason to be pessimistic about the future of clean energy. Instead, policymakers must recognize the importance of these minerals, the economic and technological realities of future demand, and the challenges and opportunities that lie ahead.

Section III. The adverse environmental and social impacts from mining and processing in certain places abroad

When considering the environmental effects among all the energy sources and technologies available, policymakers must consider the broad range of environmental and social tradeoffs. Environmental impacts for one product may include impacts on: air quality, water quality, greenhouse gas emissions, land use, water use, and fish and wildlife habitat. There are direct, indirect, and cumulative effects to consider. Some risks are more well-known and others less known. Some environmental risks are immediate while others span decades or reach centuries into the future.

Making matters even more difficult is that people weigh environmental tradeoffs differently and often neglect opportunity costs and unintended consequences. Does an unobstructed river hold more environmental value than the air quality and climate benefits from hydroelectric power? Does blocking a pipeline lead to more environmental risk because companies shift the liquid fuels transport to rail, truck, or ship? The reality is that decision-making that properly weighs costs, benefits, and trade-offs—using sound, transparent science as a guiding tool—is not an easy task.

The ethics and environmental concerns regarding the sourcing of critical minerals have generated more public awareness and bipartisan concern. Addressing the human rights abuses and environmental harms of critical mineral development will be essential for ensuring socially just growth in clean energy and for reliance on many modern technologies.

Rechargeable lithium-ion batteries for smartphones, laptops, and electric vehicles require cobalt, which primarily comes from the Democratic Republic of the Congo (DRC). The DRC supplies nearly 75 percent of the world's cobalt, and the ethical and social problems from cobalt mining in the DRC are appalling, to say the least. Harvard fellow Siddharth Kara has extensively documented the horrors and abuses of artisanal mining, or digging by hand, in the DRC. Having visited and researched the practices, Kara reports that more than 35,000 child laborers are digging the cobalt out by hand while breathing in toxic fumes and dust. They risk being buried alive by a collapsing tunnel, yet earn only a dollar or two per day.¹⁹ In a recent interview with NPR, Kara said:

You have to imagine walking around some of these mining areas and dialing back our clock centuries. "People are working in subhuman, grinding, degrading conditions. They use pickaxes, shovels, stretches of rebar to hack and scrounge at the earth in trenches and pits and tunnels to gather cobalt and feed it up the formal supply chain. Cobalt is toxic to touch and breathe—and there are hundreds of thousands of poor Congolese people touching and breathing it day in and day out. Young mothers with babies strapped to their backs, all breathing in this toxic cobalt dust."²⁰

¹⁸ "Malthus, the false prophet," *The Economist*, May 15, 2008, <https://www.economist.com/finance-and-economics/2008/05/15/malthus-the-false-prophet>

¹⁹ Siddharth Kara, "Is your phone tainted by the misery of the 35,000 children in Congo's mines?" *The Guardian*, October 12, 2018, <https://www.theguardian.com/global-development/2018/oct/12/phone-misery-children-congo-cobalt-mines-drc> and Siddharth Kara, "I saw the unbearable grief inflicted on families by cobalt mining. I pray for change," *The Guardian*, December 16, 2019, <https://www.theguardian.com/global-development/commentisfree/2019/dec/16/i-saw-the-unbearable-grief-inflicted-on-families-by-cobalt-mining-i-pray-for-change>

²⁰ Terry Gross, "How 'modern-day slavery' in the Congo powers the rechargeable battery economy," *NPR*, February 1, 2023, <https://www.npr.org/sections/goatsandsoda/2023/02/01/1152893248/red-cobalt-congo-drc-mining-siddharth-kara>

Despite attempts to rely on ethical practices for cobalt, cross-contamination of cobalt from artisanal mines mixed with cobalt from industrial mining all but guarantees that unethically sourced cobalt is moving up through the supply chain.²¹ The rampant corruption in the DRC and the fact that the Chinese own most of the mines in the DRC exacerbate the problem.

Another extremely concerning region for sourcing of critical minerals and clean energy is China. The human rights exploitations of Uyghur Muslim minorities and other Muslim minorities in the Xinjiang region of China has also been well documented. The Department of Labor (DOL) has tracked and reported on forced labor connected to many products such as food, clothing, textiles, footwear, coal, thread/yarn, electronics, cotton, and coal.²²

DOL and many outside organizations have also reported on the Xinjiang region's connection to polysilicon, a key input for the production of solar panels.²³ A recent Breakthrough Institute report estimates that 42 percent of the global solar-grade polysilicon production capacity was in that region for 2021.²⁴ This percentage aligns closely with a May 2021 study from the Helena Kennedy Centre for International Justice at Sheffield Hallam University that found the Xinjiang region accounted for 45 percent of the polysilicon production capacity in 2020.²⁵ The same research team recently exposed a connection between supply chains (mining, processing, and manufacturing) in the auto sector and forced Uyghur labor.²⁶

Encouragingly, the federal government is ramping up its efforts to block imports of products made with forced labor. In December 2021, President Biden signed the Uyghur Forced Labor Prevention Act into law. Last November, the U.S. Customs and Border Protection seized 1,053 shipments of solar equipment from China over slave labor concerns.²⁷

In addition to the egregious human rights tragedies, there is also economic and environmental concerns of overreliance on China for minerals and processing. Currently, most rare earth minerals are mined and processed in China.²⁸ According to the U.S. Geological Service, China accounted for 80 percent of the rare earth minerals imported into the U.S. in 2020.²⁹ Poor environmental standards have resulted in contaminated water, air, and soil.³⁰ Weak enforcement regarding the storage of mining waste and wastewater has contaminated groundwater, grasslands, and livestock. A history of illegal mining operations has created legacy sites that pose human health and environmental risks with no clear financial liability. While there has been some progress in enforcing more stringent labor and environmental standards, concerns remain and efforts in China have not gone nearly far enough.³¹ Rossetti and Banks also comment that "it is estimated that mining and extraction of both energy and non-energy related products in China is 2.2 times as carbon

²¹ Ibid.

²² U.S. Department of Labor Bureau of International Affairs, "Against Their Will: The Situation in Xinjiang," <https://www.dol.gov/agencies/ilab/against-their-will-the-situation-in-xinjiang>

²³ Ibid

²⁴ Seaver Wang and Juzel Lloyd, "Sins of a Solar Empire: An Industry Imperative to Address Unethical Solar Photovoltaic Manufacturing in Xinjiang," Breakthrough Institute, November 15, 2022, https://thebreakthrough.imgix.net/Sins-of-Solar-Report_v5.pdf

²⁵ Murphy, L. and Elimä, N., "In Broad Daylight: Uyghur Forced Labour and Global Solar Supply Chains." Sheffield, UK: Sheffield Hallam University Helena Kennedy Centre for International Justice. <https://acrobat.adobe.com/link/track?uri=urn%3Aaaid%3Aascds%3AUS%3Ad360ffab-40cc-4d83-8b8b-a8bd503286a3&viewer%21megaVerb=group-discover>

²⁶ Murphy, L., Salcito, K., Uluyol, Y., Rabkin, M., et al, "Driving Force: Automotive Supply Chains and Forced Labor in the Uyghur Region." Sheffield, UK: Sheffield Hallam University Helena Kennedy Centre for International Justice, December 2022, <https://acrobat.adobe.com/link/track?uri=urn%3Aaaid%3Aascds%3AUS%3A69ce4867-d7e7-4a6a-a98b-6c8350ceb714&viewer%21megaVerb=group-discover>

²⁷ Nichola Groom, "Exclusive: U.S. blocks more than 1,000 solar shipments over Chinese slave labor concerns," *Reuters*, November 11, 2022, <https://www.reuters.com/world/china/exclusive-us-blocks-more-than-1000-solar-shipments-over-chinese-slave-labor-2022-11-11/>

²⁸ International Energy Agency, "The Role of Critical World Energy Outlook Special Report Minerals in Clean Energy Transitions," March 2022, <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions/executive-summary>

²⁹ U.S. Geological Survey, "Mineral commodity summaries 2021: U.S. Geological Survey," U.S. Department of Interior, 2021, <https://doi.org/10.3133/mcs2021>

³⁰ Jaya Nayar, "Not So 'Green' Technology: The Complicated Legacy of Rare Earth Mining," *Harvard International Review*, August 12, 2021, <https://hir.harvard.edu/not-so-green-technology-the-complicated-legacy-of-rare-earth-mining/>

³¹ Rodrigo Castillo and Caitlin Purdy, "China's Role in Supplying Critical Minerals for the Global Energy Transition," *The Brookings Institute*, July 2022, <https://www.brookings.edu/wp-content/uploads/2022/08/LTRC-ChinaSupplyChain.pdf>

intensive as the United States, and mining support services are 5.2 times as carbon-intensive.”³²

While policymakers should take steps to diversify the market and prohibit the import of products using slave labor, fully decoupling from China is also likely unrealistic. One reason is that U.S. companies are not solely importing the rare earth elements or oxides but products that contain them. The processed rare earths are sent to another country for assembly and exported to the U.S. so China would have to restrict rare earths trade to all those countries. In many cases, the company making the final product also resides in China. Eugene Gholz, professor of political science at Notre Dame, writes:

In some cases, like the rare-earth content of Apple’s iPhones, the final assembly of the consumer product takes place in China; to stop those rare earths from getting to U.S. consumers, China would have to ban consumer product exports. Perhaps the Chinese government would contemplate banning iPhone sales in a huge trade conflagration, but at that point, access to rare earths would be the least of America’s concerns.³³

An encouraging data point worth mentioning is that China tried to cut off rare earths to Japan a decade ago, and the rare earths markets diversified. Prices increased, and mines opened in other countries including Australia, Brazil, Malaysia, and Vietnam. The rare earths mining and processing market continues to diversify. Canada’s rare earth mining project began shipping concentrated ore in May of last year and is functioning without any tailings ponds, making it much more environmentally friendly.³⁴ Japan, through state backing, is investing to extract an abundance of rare earths off its coast.

Mountain Pass mine in California re-opened, and it has a processing facility. MP Materials, which owns Mountain Pass, “is one of 3 percent of mining operations—the only one in the global rare earth industry—that recycles the water used for the process and produces dry tailings.”³⁵ Several other mining projects and processing facilities opened in the U.S., and many non-Chinese rare earth processing facilities opened around the world. Market diversification is helping to reduce dependence on China and demonstrate more environmentally friendly ways to mine and process REEs.

IV. Opportunities to capitalize on domestic mineral abundance, diversify supply chains, promote ethical mineral sourcing, and develop market alternatives

Many factors affect the current and future price of various clean energy technologies such as input costs, technological innovation, the availability of lower cost substitutes, and market efficiencies through economies of scale—just to name a few. Cost will be a predominant factor for the pace and scope of clean energy adoption in the United States and around the world. For instance, electric vehicles are more popular, and demand is up, but more than half the respondents of a recent poll said lack of affordability was, unsurprisingly, the biggest concern.³⁶

Liberating the abundance of resources domestically and improving efficiencies for private investment and research, development, and demonstration programs will help combat rising prices for mineral commodities, establish more secure supply chains, and diversify away from unethically sourced minerals. American leadership in critical mineral development and on climate change should empower innovators to provide cleaner choices at lower prices.

Thus far, the Biden administration has taken a frustratingly contradictory approach to procuring the minerals necessary for an energy transition. A lithium mine project in Nevada and nickel mine project in Minnesota, for example have

³² Phil Rossetti and George David Banks, “Foreign Mineral Supply Chain Dependence Threatens U.S. National Security,” CRES Forum, March 2022, https://cresforum.org/wp-content/uploads/2022/03/CRES-WhitePaper-CriticalMinerals-03212022_v1.pdf

³³ Eugene Gholz, “Here’s the dirty truth about China’s rare-earths threat,” *The Washington Post*, May 31, 2019, <https://www.washingtonpost.com/opinions/2019/05/31/heres-dirty-truth-about-chinas-rare-earths-threat/>

³⁴ The Canadian Press, “First Canadian rare earth mine starts shipping concentrate from N.W.T.,” CBC, May 23, 2022, <https://www.cbc.ca/news/canada/north/nechalacho-starts-shipping-from-nwt-1.6462745>

³⁵ Laura Seligman, “China Dominates the Rare Earths Market. This U.S. Mine Is Trying to Change That,” *Politico*, December 14, 2022, <https://www.politico.com/news/magazine/2022/12/14/rare-earth-mines-00071102>

³⁶ “More U.S. consumers want EVs but prices are a concern—Deloitte survey,” *Reuters*, January 4, 2023, <https://www.reuters.com/technology/more-us-consumers-want-evs-prices-are-concern-deloitte-survey-2023-01-04/>

faced permitting hurdles. Julie Padilla, the chief regulatory officer for Twin Metals Minnesota testified, “We can mine here better than anywhere else in the world. But the United States will not be able to do that under the current regulatory process that is unpredictable, subject to political manipulation with changing rules in each administration, and in conflict with the priorities of our nation.”³⁷ The more the U.S. and other developed countries extract their own resources, the fewer minerals they will need to import from countries that have lax environmental standards and use morally unconscionable labor practices. At a minimum, domestic mining proposals should be granted a rigorous environmental review process rather than be placed off limits before any review is conducted.

In addition to adding layers of red tape and blocking projects, President Biden’s use of the Defense Production Act (DPA) is also misguided. Using the DPA not only sidesteps the necessary system reforms but sets a dangerous precedent to have the government usurp the role of competitive markets.³⁸ Eugene Gholz also warns that, “US government investments using the Defense Production Act to create still more rare earth production capacity would add to this glut.

The government investment could even drive the privately funded, already-operating US mine out of business again.”³⁹

Upstream mining and refining have been identified as a challenge to meet the objectives targeted in the infrastructure bill and the Biden administration’s climate targets.⁴⁰ Several private sector-led initiatives are at various stages of development to increase resource development, processing, and recycling.⁴¹ Companies and investors are also exploring substitutes and alternatives to critical minerals. Easing supply chain constraints and securing processed minerals will best be achieved by opening domestic and international markets to extraction, processing, and trade. Modernizing permitting processes should put America on par with countries like Canada and Australia that unleash energy abundance while maintaining rigorous environmental safeguards and input from communities.⁴²

Policymakers should:

- Strengthen partnerships with the private sector and with allied countries to ensure that critical minerals are ethically and responsibly sourced. While challenging, more stringent verification of ethically sourced minerals is imperative and should help reduce human rights abuses, reduce dependence on corrupt, unethical actors, and develop a more responsibly sourced critical mineral supply chain.
- Expedite permitting for natural resource extraction and energy projects and infrastructure. Modernizing the National Environmental Policy Act would significantly improve the permitting process for energy security, capitalizing on America’s abundance of natural resources and diversifying America’s energy sources. Importantly, sensible resource development in the U.S. and in allied countries would have a smaller environmental and climate footprint. Congress should also Prohibit both pre-emptive and retroactive vetoes under Section 404 of the Clean Water Act.

³⁷ Press release, “Twin Metals Testifies at U.S. Senate Committee on Energy and Natural Resources Hearing on Urgency of expanding Domestic Mining,” Twin Metals Minnesota, March 31, 2022, <https://www.twin-metals.com/press-release/twin-metals-testifies-at-u-s-senate-committee-on-energy-and-natural-resources-hearing-on-urgency-of-expanding-domestic-mining/>

³⁸ Eli Lehrer, “President Biden’s Defense Production Act power grab,” *The Hill*, April 9, 2022, <https://thehill.com/opinion/national-security/3262612-president-bidens-defense-production-act-power-grab/>

³⁹ Eugene Gholz, “The rare earths industry can weather any Chinese trade battle,” *CNN*, July 23, 2019, <https://www.cnn.com/2019/07/23/perspectives/rare-earths-china-argentina-trade-war/index.html>

⁴⁰ Camille Erickson, “Infrastructure bill challenged by dearth of US upstream mining, refining,” *S&P Global Market Intelligence*, November 10, 2021, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/infrastructurebill-challenged-by-dearth-of-us-upstream-mining-refining-67508084>

⁴¹ Alex Fitzsimmons, “Time to Build a Domestic Critical Minerals Supply Chain,” ClearPath, October 21, 2021, https://clearpath.org/our-take/time-to-build-a-domestic-critical-minerals-supply-chain/?gclid=CjwKCAiAuOieBhAIEiwAgjCvcqsyySUdaKtCmZeOMjwNGyJSeYSgN2M9kDgoSFYX_cyCK5H70krRoCOLIQAvD_BwE

⁴² Minerals Make Life, “Delays in the U.S. Mine Permitting Process Impair and Discourage Mining at Home,” National Mining Association, May 2021, https://nma.org/wp-content/uploads/2021/05/Infographic_SNL_minerals_permitting_5.7_updated.pdf

- Open opportunities for state-led environmental reviews and permits. Empowering states to conduct the environmental review and permits could create more efficient and localized reviews that better address the needs of local communities. State regulators could acquire technical expertise from the Federal Energy Regulatory Commission, the Bureau of Land Management, and the Environmental Protection Agency as necessary.
- Work with the private sector to maximize the efficiency of money allocated for research, development, and demonstration included in the Infrastructure Investment and Jobs Act (IIJA). IIJA includes National Science Foundation grants for basic research on domestic critical minerals mining and recycling, \$320 million for the U.S. Geological Survey for its Earth Mapping Resources Initiative, and \$140 million to build a Rare Earth Demonstration Facility.
- Continue research and development for critical minerals recycling that can turn mine waste into useful products and provide research and development support for developing substitutes for critical minerals. For instance, the Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E) Mining Innovations for Negative Emissions Resource Recovery (MINER) program could help unlock breakthrough technologies that supply economically feasible alternatives to critical minerals.⁴³
- Maintain openness to alternative mining sources. The ocean floor contains nodules that are rich in minerals that can be used for batteries, renewable energy and defense technologies. The nodules can effectively be scooped up from the ocean floor and the deep ocean (down to 20,000 feet). There is no actual mining, extraction, or tailings associated with deep seabed mining, and studies have shown the climate and environmental impact is far smaller than the conventional mining of minerals. While it is critical to understand the ecological and environmental risks and impacts of deep seabed mining, it is also important to evaluate the trade-offs between the various ways to extract and refine minerals. More collaboration among companies, coastal countries, and scientists should establish a transparent, science-based assessment of seabed mining.⁴⁴
- Maintain energy source and technology neutrality. The critical minerals that the economy relies on today may look much different in 20 or 30 years. Breakthrough technologies could make certain critical minerals much less valuable if companies develop an economically competitive alternative. If government policy tips the scale toward specific mature technologies, it will be that much more difficult for innovators to disrupt the market. To the extent government provides any subsidies, technology neutrality will generate more efficient outcomes. Congress should also narrow government procurement and purchase of rare earth elements to Department of Defense and national security needs.

Dr. GOSAR. Thank you, Mr. Loris.

We have been joined by the Ranking Member for the Full Committee. He is now recognized.

⁴³ Press release, "DOE Announces \$39 Million for Technology to Grow the Domestic Critical Minerals Supply Chain and Strengthen National Security," The Department of Energy, October 27, 2022, <https://www.energy.gov/articles/doe-announces-39-million-technology-grow-domestic-critical-minerals-supply-chain-and>

⁴⁴ Cecilia Jamasmie, "Extracting battery metals from seafloor may beat traditional mining—study," Mining.com, April 22, 2020, <https://www.mining.com/extracting-battery-metals-from-seafloor-beats-traditional-mining-study/> and Daina Paulikas, "Life cycle climate change impacts of producing battery metals from land ores versus deep-sea polymetallic nodules," *Journal of Cleaner Production*, Vol. 275, No. 123822, December 1, 2020, <https://www.sciencedirect.com/science/article/pii/S0959652620338671?via%3Dihub> and Christina Jovanovic, "Precious and Few: Solving Renewable Energy's Critical Minerals Problem," *LSU Journal of Energy Law and Resources*, Vol. 9, Issue 1, Winter 2021, <https://digitalcommons.law.lsu.edu/cgi/viewcontent.cgi?article=1204&context=jelr>

STATEMENT OF THE HON. RAÚL M. GRIJALVA, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF ARIZONA

Mr. GRIJALVA. Thank you, Mr. Chairman, and other than to congratulate you and the Ranking Member on the positions, a very important Committee, and associate myself with the Ranking Member's opening remarks—I thought you said it much better than I could—and to just put in the hopper that I don't think we can look at this regulatory side and permitting side in terms of what needs to be done there, relative to mining and critical minerals without overlapping on that 1872 mining law, which many of the controversies that are occurring, not only in my state but across the country, are in relationship to how that law is not working for these times.

With that, let me yield back, and thank you very much.

Dr. GOSAR. I thank the gentleman from Arizona. The Chair now recognizes Dr. Moats for 5 minutes.

STATEMENT OF MICHAEL MOATS, PROFESSOR AND DEPARTMENT CHAIR OF MATERIALS SCIENCE AND ENGINEERING, MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY, ROLLA, MISSOURI

Dr. MOATS. Thank you, Chairman Gosar, Ranking Member Stansbury, and distinguished members of the Subcommittee. I thank you for the opportunity to speak before you today on this important topic related to critical minerals.

My name is Mike Moats, and I am a Professor of Metallurgical Engineering, the Chair of Materials Science and Engineering at Missouri University of Science and Technology. I have 30 years of experience as an extractive metallurgist. I have worked with many of the mining companies and metal producers in our country and abroad, and I offer you my experience and my observations from how to actually produce metals.

As you know, critical minerals are very important to modern lives. We have already talked about the importance of what it is in the cell phone. We often focus on the battery minerals and the rare earths, but if you don't have gallium, you don't have WiFi; if you don't have indium, you don't have the touch screen; if you don't have tellurium, you don't have your solar panels. There is a lot more to it than just the battery minerals and the rare earths that are often talked about in the news.

USGS produced their updated list in 2022. There are 50 critical minerals. We use 87 elements on the periodic table for manufacturing; 50 of them are on a critical mineral list. This shows you the dire straits that our country is facing because of our lack of production.

I appreciate Ranking Member Stansbury's comments this morning because, over my career, over my lifetime, I have watched the United States decline. We were once a metal mining powerhouse, and now we are not. I work with a lot of mining companies, and I have watched smelters and refineries close down. And we need to reverse course.

Over the last 30 years, China has built 40 copper smelters. They will build another four in the next few years, and this is only to

meet internal demand. They now produce 11 million tons of copper every year; the United States produces 2.

If you produce the copper, if you refine the copper, you control the tellurium. Many of our critical minerals are by-products. If you control the zinc production, you control the germanium which is needed for integrated circuits for satellites and the indium. If you control the aluminum—which they now control 40 percent of the world's production, and they produce over 40 million tons of aluminum, relative to our less than 1 million—you control gallium.

It is not even on the critical mineral list, but steel production is essential for all of modern life. We produce about 82 million tons in the United States. Over two-thirds of that comes from recycling. The Chinese now produce 990 million tons of steel every year. That is enough to produce 14,000 Nimitz-class aircraft carriers every year.

While not all steel goes into aircraft carriers, what I am very concerned about is the fact that all of those plants that produce lead, zinc, copper, and steel, that are not on our critical mineral lists—some are—they are going to come out of their country. And when they do that, they are going to flood the world. And are we, as a country, going to do things to protect the plants that we need to produce the raw materials for our feedstocks?

As we look at what has happened around the world, our plants, our mines, our facilities have declined, and the companies are trying the best they can. And again, as Ranking Member Stansbury—I think you had excellent comments—they are just not economical. Why? Because other countries are not playing on the same playing field as we are.

We need to level the playing field for our corporations to make money and do the right thing. And they will. I work with many of them. They are on the cutting forefront of environmental responsibility. They live in the same communities that they produce in, and they want to do the right things. It is just hard to make money in this environment.

So, with that, I would also like to point out that, if you are going to build these plants, if you are going to build these mines, if you are going to build these recycling facilities, you need the workforce. Just like the plants have been under-funded, so have the universities and some of the community colleges.

We need not only really talented engineers, which, of course, I would be happy to produce for you, but we also need the tradesmen. I can tell you that most plants and most mines are mostly concerned about who is going to run the haul truck, who is going to put the pipe on, who is going to do the welding. We need to focus on the trades, as well as the engineers who are going to develop all of these things that you want to innovate.

We need to look at how to create more value out of our existing operations in the short term, while looking at new deposits and new opportunities to expand our production of these critical minerals and all minerals and all metals in the United States. Thank you.

[The prepared statement of Dr. Moats follows:]

PREPARED STATEMENT OF DR. MICHAEL S. MOATS, PROFESSOR AND CHAIR OF
MATERIALS SCIENCE AND ENGINEERING, THOMAS J. O'KEEFE INSTITUTE FOR THE
SUSTAINABLE SUPPLY OF STRATEGIC MINERALS, MISSOURI UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Chairman Gosar, Ranking Member Stansbury, and distinguished members of the Subcommittee. Thank you for the opportunity to appear before you today for this important hearing, "Dependence on Foreign Adversaries: America's Critical Minerals Crisis."

My name is Michael Moats, and I am a professor of metallurgical engineering and chair of the Materials Science and Engineering department at Missouri University of Science and Technology. I have dedicated my career to the production of metals, developing technology to improve these processes and educating engineers. I offer my insights gained over 30 years in industry and academia. I have worked in industry for public and private corporations that serve the mining and metal production industries. In academia, I have worked for the University of Utah and now am a faculty/administrator at Missouri University Science and Technology. Today, I offer my own opinion and views, and not those of past or current employers.

Importance of Critical Minerals

Critical minerals are elements or compounds that have been deemed by the United States government to pose a significant risk in terms of supply and impact on our country. The United States Geological Survey (USGS) has been tasked with maintaining the critical mineral list which was last published in 2022.¹ The critical mineral list is created through an analysis of three criteria: (1) the likelihood of a supply disruption, (2) the impact to the nation's economy and defense if a supply disruption occurs, and (3) if there is a significant supply risk existing. **Of the 87 elements that are used for manufacturing, 50 are on the list!** This fact alone reveals the dire situation that our country faces in terms of raw material supply as we are dependent on foreign countries, some of which are adversaries.

The importance of critical minerals can be seen in the modern devices that are important to all Americans. Gallium in the form of gallium arsenide phosphide and gallium nitride are essential for integrated circuits (semiconductor chips), laser diodes, light emitting diodes (LED)s, and radio frequency (RF) cellular used in smartphones. Tellurium is used in cadmium telluride, which is a high-efficiency solar collector utilized on 50% of the grid scale solar arrays in the United States and is combined with bismuth to produce thermal imaging night vision optics for civilian and military use. Indium is principally used as indium tin oxide in most flat panel displays and is growing in use in 5th generation (5G) fiber optic communications. Each of these critical minerals is captured during the processing of base metals. They are not mined and produced for their value alone. Therefore, the country that dominates base metal production controls the market for these minor tonnage elements.

Chinese Dominance in Base Metal Production

I was born in 1970. In that year, the United States was a mining and metal producing powerhouse. The nation produced the majority of its metal needs. We produced 31% of the world's alumina, 35% of the lead, 23% of the copper, and 17% of the world's zinc.² While the 1970s was a time of energy crises and concerns over foreign oil dependence, metal production did not worry our nation. A snapshot of U.S. non-ferrous mining and metal production is provided in Figure 1.

¹ "2022 Final List of Critical Minerals", Federal Register, pp. 10381-10382, 02/24/2022.

² Bureau of Mines/Minerals yearbook: Metals, minerals, and fuels, Volume 1 (1970)

Figure 1.—U.S. copper, zinc, lead and alumina/aluminum production in 1970



Bureau of Mines/Minerals yearbook: Metals, minerals, and fuels, Volume 1 (1970)

However, the seeds of decline were sown during that decade which would impact domestic metal production for years to come and eventually result in American dependence on the world to supply many of the metals needed for modern living. Many countries invested in new or upgraded metal production facilities that met heightened environmental standards. This did not occur in the United States. Many U.S. smelters and refiners could not compete economically against these newer facilities due to pressures to upgrade their plants to meet tighter environmental standards and declining ore grades at local mines. The 1980s and 1990s witnessed the closure of primary and secondary smelters leading to consolidation within the industry, which resulted in few companies willing to invest in their operations to potentially meet domestic demand. By 1995, the U.S. was producing 33% less alumina and 33% less zinc as compared to 1970. Due to a significant technology advancement pioneered in Arizona, copper production increased by 44% from 1970 to 1995.³ That advancement was an outcome of research on separation processes developed for uranium production with funding from the Department of Energy.

While the United States seemed content to outsource its metal production, China executed a different plan. This resulted in significantly different outcomes between 1995 and 2022. Figures 2–6 offer visual comparisons of mining and metal production for copper, zinc, lead, aluminum and steel in 1995 and 2022 for the United States and China.⁴

Over the past 27 years, the United States lost 30% of its copper mining capacity and 57% of its copper metal production (Figure 2). Meanwhile, China built 40 copper smelters and is presently planning to build four more to meet its internal demand.⁵ **This resulted in Chinese copper production increasing by 1570 percent!** While Chinese copper mining has increased, most of China's copper is mined elsewhere (e.g., Chile and Peru) and shipped as mineral concentrate. The Chinese mineral demand to feed its smelters and refineries occurs in several metal supply chains resulting in a “Mine for China” phenomenon that has swept through developing countries with mineral resources. China now produces 42% of the world's refined copper, while the United States produces only 4%.

In 1995, the United States and China mined and smelted similar tonnages of zinc (Figure 3). During the past 27 years, China has increased its zinc production by 580% and now produces 45% of the world's zinc. Meanwhile, U.S. production has declined 63% and only accounts for 2% of the world's zinc. Zinc was added to the 2022 Critical Mineral list by the USGS.

³ USGS National Minerals Information Center's Mineral Commodity 1996 Yearbook

⁴ USGS National Minerals Information Center's Mineral Commodity Summaries and Yearbooks, 1995 and 2023.

⁵ Based on information made by Wang Wei (NFSoc) during his presentation “Development of copper metallurgy technology in China” on November 16, 2022, at the Copper 2022 Conference in Santiago, Chile.

Lead mining and metal production declined in the United States by 28% and 21% from 1995 to 2022 (Figure 4). Domestic lead metal production has shifted completely to recycling with the last primary smelter in Herculaneum, Missouri, closing in 2013. Lead mining, smelting and battery production provides a \$2.3 billion impact on the Missouri economy⁶ and is still critical for all automobiles including EVs.⁷ Again, while the U.S. lead production declined, Chinese production expanded dramatically. **Between 1995 and 2022, China expanded in lead mine and metal production by 465% and 1210%, respectively!** China now produces 44% of the world's lead.

Figure 2.—Changes in copper mine and metal production from 1995 to 2022 for the United States and China

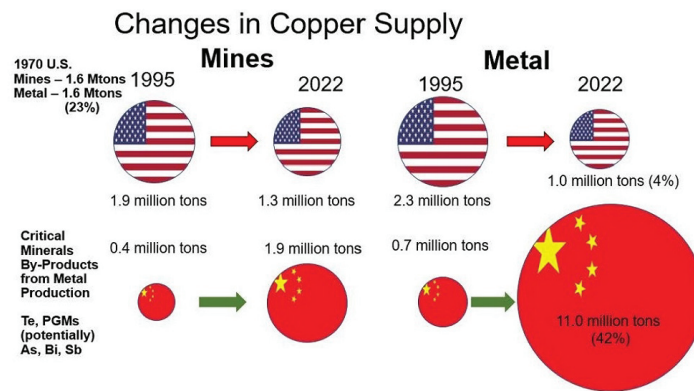
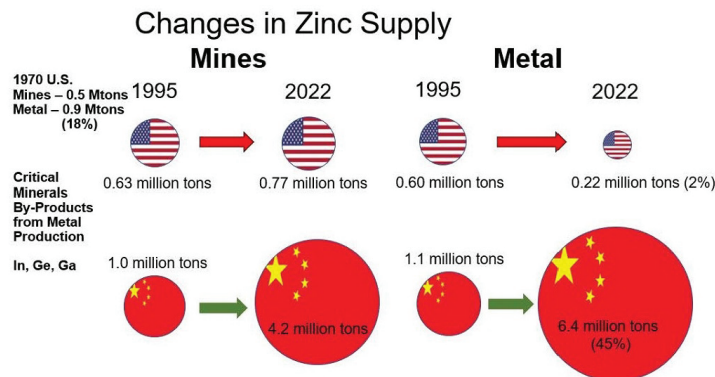


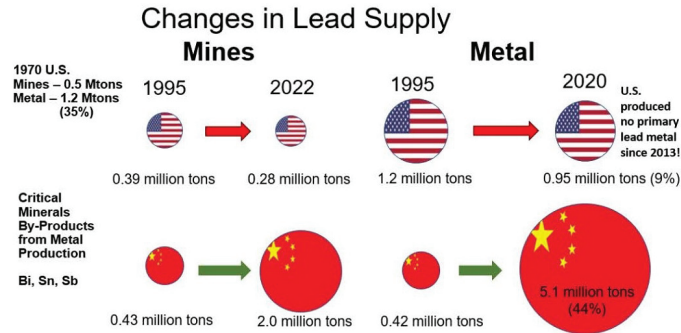
Figure 3.—Changes in zinc mine and metal production from 1995 to 2022 for the United States and China



⁶Doe Run Company Fact Sheet. Downloaded on 1/31/2023 from https://doerun.com/wp-content/uploads/2021/03/2021_Doe_Run-Economic_Impact-Fact_Sheet-08.pdf

⁷“How lead batteries could make EVs safer”, World Economic Forum, Aug 9, 2021.

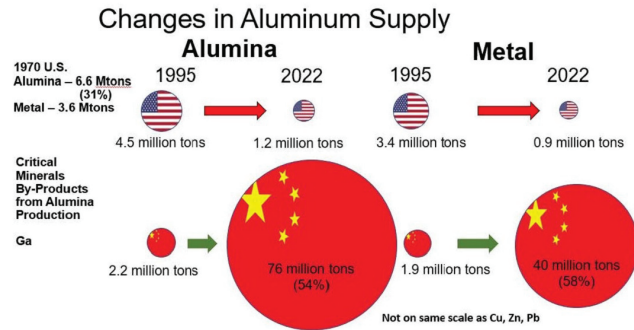
Figure 4.—Changes in lead mine and metal production from 1995 to 2022 for the United States and China



Similar expansions and dominance in Chinese production of aluminum and steel also occurred (Figures 5 and 6). Steel and aluminum are two of the major building materials for human civilization. They are critical for infrastructure, transportation, and defense. While “critical minerals” like rare-earths and battery metals have garnered headlines and grabbed the attention of many, the astonishing production increases by the Chinese in alumina, aluminum and steel have completely re-shaped the world’s metal markets.

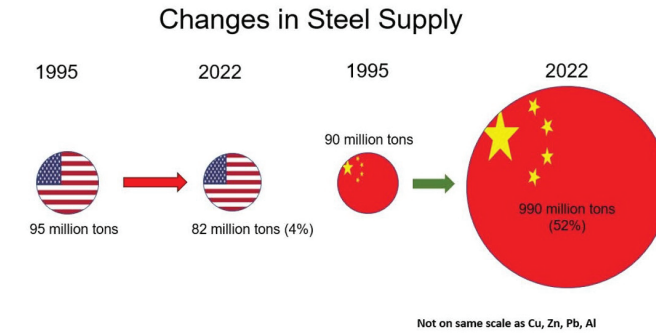
In alumina and aluminum, the Chinese have increased their production by 3450% and 2100% in the past 27 years! They now produce 54% and 58% of these materials needed for lightweight transportation, construction, consumer goods and military applications. At the same time, the U.S. production has decreased by 74% in both alumina and aluminum. Aluminum is considered a critical mineral by the United States.

Figure 5.—Changes in alumina and aluminum production from 1995 to 2022 for the United States and China



China dominates the world’s steel production with a staggering 990 million metric tons produced in 2022 (54% of the world’s total). **China’s steelmakers have increased their outputs by 1100% from 1995 to 2022.** China now produces enough steel each year to produce 14,000 Nimitz class aircraft carriers. Again, while China expanded, the United States struggled to maintain its steel mills and declined by 14% over the same period.

Figure 6.—Changes in steel production from 1995 to 2022 for the United States and China



Chinese Dominance in Critical Minerals from Base Metal Production

A consequence of Chinese base metal dominance is its control of minor by-products that are captured during refining. Many of these by-products populate the U.S. Critical Mineral list.⁸ Gallium, needed for advanced electronics, is recovered from alumina production. Tellurium, used in high efficiency solar panels and military grade night vision optics, is collected during copper refining. Indium, used in touch screens, is produced from zinc refining. Chinese dominance in several non-rare earth critical elements captured during base metal processing and refining are summarized in Table 1.

Table 1.—Chinese Percentage of the World's Primary Production for Gallium, Tellurium, Indium and Germanium

Critical Mineral	Chinese Portion of World Production, 2022
Gallium (Ga)	98%
Tellurium (Te)	53%
Indium (In)	59%
Antimony (Sb)	55%
Bismuth (Bi)	80%

United States Metal Needs Examined

Inherent to analyses and discussions related to metal production is what are the needs of the United States. Using data from the USGS (2018–2021), a comparison of mining and metal production that occurs in United States, Canada and Mexico to U.S. Consumption for aluminum, copper, zinc, lead and nickel is presented in Table 2.

⁸ “2022 Final List of Critical Minerals”, Federal Register, pp. 10381-10382, 02/24/2022.

Table 2.—Mining and metal production of five metals compared to U.S. consumption (1000s metric tons)

Base Metal	Mining			Smelting – Primary (Secondary)				U.S. Consumption
	U.S.	Canada	Mexico	U.S.	Canada	Mexico	N.A.	
Aluminum	0	0	0	880 (3160)	3100	0	3980	4300
Copper	1200	590	720	950 (50)	300	470	1720	2000
Zinc	740	260	720	240	680	110 (170)	1283	960
Lead	300	20	270	0 (990)	110 (140)	140 (330)	(1710)	1600
Nickel	18	130	0	0	133	0	133	210

Values are 1000's metric tons. Data are values reported by USGS (2018-2021).

Nickel is undefined product. Zinc data modified based on author knowledge.

These data indicate that through recycling (secondary), the U.S. can produce most of the aluminum it consumes and Canada with its “aluminum valley” can supply higher purity metal as needed. The United States is completely dependent on mining of bauxite (aluminum ore) that occurs in other countries. There appears to be a deficit in copper, zinc and lead metal production in the United States as compared to our mining. The country exports mineral concentrates of copper, zinc and lead and then imports refined metal. This results in losses in jobs and critical mineral production. Existing smelters could be expanded, or new ones constructed. The United States relies on its allies for copper, zinc, and lead metal production.

I have tried to avoid a discussion of battery metals and rare earths to this point because these elements seem to dominate the news and government focus. In short, the data shown in Table 2 reveal that the U.S. produces zero tons of primary nickel metal. The same is true for cobalt metal and rare earths. The U.S. is entirely dependent on other countries for these refined metals. Rare-earth, nickel and cobalt mining does occur in the United States, but not to the level needed for our consumption. Rare-earth mining and production including magnets is controlled by China and the U.S. has no refining capacity. Chinese companies have acquired many of the cobalt mines in Central Africa and refined the materials in China, so they control this critical element as well.

Closing Remarks

When I chose to pursue a Ph.D. in extractive metallurgy in 1995, I was warned by senior colleagues to select a different field of study. They warned I would chase ever decreasing research budgets and opportunities. For most of the past 27 years, this has been true. In the past few years, the U.S. federal government has awoken to the problems we face in metal production. The difficulties caused by the global pandemic and heightened geopolitical tensions have only increased federal concerns.

Federal funding is needed to overcome the uneven playing field caused by China's massive build-up of its metal producing capacity. Funding is also needed to ensure all existing smelters, refineries and mills are updated to maintain their international competitiveness. If the United States does not reverse the trends in metal production, we will continue to depend on others for our economy and defense which has increasing become controlled by current or potential adversaries.

In the past few years, I have studied critical minerals in base metal supply chains and have been helping domestic metal producers to develop processes to capture critical minerals. Projects to recover more tellurium, gallium, germanium, indium, nickel, and cobalt from U.S. resources are on-going. I have provided input into federal policy discussions and project selection. I have participated in the annual critical minerals workshop at Missouri S&T sponsored by the National Science Foundation to connect and engage researchers and industry. There is still significant work to be done to create process to recover critical minerals from domestic sources.

Universities focused on mining and metallurgy are doing our part, but we have suffered from underfunding for decades like the U.S. metal production facilities. As the country looks to onshore mining and metal production, highly trained personnel will be needed to design, build and operate these mines, smelters and refineries. Federal assistance to support the remaining mining and metallurgy schools is much needed.

In closing, I wish to thank the subcommittee for this opportunity to present information on the implications of depending on our foreign adversaries for critical minerals, and why it is imperative that we work to solve America's critical minerals crisis. I hope the data and analysis that I presented before you today will help to inform policy discussions regarding the importance of critical minerals. Thank you for the opportunity to testify and I look forward to any questions you may have.

Dr. GOSAR. Thank you, Dr. Moats.
The Chair now recognizes Mr. Mintzes for 5 minutes.

**STATEMENT OF AARON MINTZES, SENIOR POLICY COUNSEL,
EARTHWORKS, WASHINGTON, DC**

Mr. MINTZES. Thank you, Mr. Chairman.

Chairman Gosar, Ranking Member Stansbury, members of the Subcommittee, thank you for the opportunity to testify before you on reducing America's dependence on irresponsibly sourced minerals.

My name is Aaron Mintzes. I am with Earthworks, a non-profit organization dedicated to protecting communities and the environment from mineral impacts, while supporting the just, equitable, and rapid transition to renewable energy.

I would like to just adopt the Westerman-Stansbury approach about we can't permit or mine our way out of this crisis. Improving minerals supply chains means fixing the weaker links. The common misconception is that mining is the weaker link. Instead, we need to build stronger links of circular economy infrastructure in the midstream and end of life management for battery materials, cell phone materials, as well.

The best way to meet this demand is to invest in facilities and methods to recycle, refurbish, reuse, and substitute the minerals we already have. The President's supply chain Executive Order, the Infrastructure Law, and the Inflation Reduction Act are making important strides toward opening access to recycled materials and reducing our dependence on mined minerals.

Currently, the circular economies for mostly allied nations produce and help supply the markets for recycled materials. The United States remains years behind Asia's and Europe's circular economy infrastructure.

Last month, the European Union finalized their battery directive. Soon, batteries of the EU will come with a traceable QR code known as a battery passport: recycled content requirements, producer responsibility, and supply chain due diligence. Research indicates that, with the right policies in place like these, we can create a more circular economy that may approximately have global demand for certain mined minerals like cobalt, lithium, nickel, key to the clean energy transition.

Even greater reductions, up to 90 percent for lithium, are achievable through investments in mass transit and better battery design.

As the market for secondary use of these materials matures, this further reduces the pressure to source from new mines. Government procurement and consumer pressure both play important roles in driving innovation, driving incentives toward more responsible material sourcing.

Major consumers, including automakers and electronics companies, have directed their suppliers to source more responsibly by committing to the Initiative for Responsible Mining Assurance, or IRMA, which independently audits and certifies environmental and social performance at mines.

We acknowledge the importance of supply chain security in certain minerals. However, we challenge the notion that our public lands agencies could or even should resolve the geopolitics of highly specialized internationally-traded commodities. While domestic mines will source some raw materials, the task of managing supply chains has almost nothing to do with mining.

Congress designated that task to the agencies of the Critical Minerals Consortium, with well-established tools for managing that task. Those include authorities to stockpile minerals, impose trade restrictions, negotiate agreements, promote research development workforces, discover alternatives. They blend tradecraft and statecraft with engineering, R&D, all to reduce risk of supply disruptions and improve environmental outcomes.

As the U.S. Government pursues these strategies, we urge agencies to require operators perform due diligence across their supply chains in accordance with internationally accepted standards. In particular, we call on the Biden administration to uphold Indigenous people's rights to self-determination and right to free, prior, and informed consent.

No solution is perfect. Even with more robust material re-use and collection, new hardrock mines on public lands will provide materials. However, mining public lands under a law explicitly designed for settler colonialism only furthers environmental injustice, and puts inequitable transition out of reach. Legislative and regulatory reform can create more responsible domestic mining policies that put protections for communities at the forefront.

In conclusion, Earthworks strongly supports immediately transitioning to a justly-sourced renewable energy economy to prevent further disruption from the climate crisis. Thank you very much.

[The prepared statement of Mr. Mintzes follows:]

PREPARED STATEMENT OF AARON MINTZES, SENIOR POLICY COUNSEL, EARTHWORKS

Chairman Gosar, Ranking Member Stansbury, and Members of the Subcommittee:

Thank you for the opportunity to testify before you on reducing America's dependence on irresponsibly sourced materials. Please accept this testimony on behalf of Earthworks, a nonprofit organization dedicated to protecting communities and the environment from mineral impacts, while supporting the clean, just, equitable, and rapid transition to renewable energy.

Building Domestic Circular Economy Infrastructure to Responsibly Secure Energy Transition Materials

Improving supply chains for energy transition materials means fixing the weaker links. The common misconception is that mining is the weak supply chain link. Instead, we need to build stronger links of circular economy infrastructure in the midstream and end-of-life management of energy transition materials. The best way to meet demand is to vest in facilities and methods to recycle, refurbish, reuse, and substitute the materials we already have.

The President's America's Supply Chains Executive Order, the Infrastructure Investment in Jobs Act (IIJA), and the Inflation Reduction Act are making important strides toward opening access to recycled materials and reducing our dependence on mined minerals. Currently, the circular economies from mostly allied

nations produce and help supply markets for recycled materials. The United States remains years behind Asia's and Europe's circular economy infrastructure to supply our demands for responsibly sourced energy transition materials.

Last month, the European Union finalized their Battery Directive.¹ This regulation establishes the key suite of standards to responsibly secure supplies for energy transition materials. Batteries sold in the EU market will come with a traceable QR code/label known as a battery passport and requirements for recycled content, extended producer responsibility, and supply chain due diligence. These are similar to the standards a California state working group recommended to their legislature² as well as what IIJA directed the Department of Energy grants to consider.³

Research indicates that with the right policies in place, we can create a more circular economy that may approximately halve global demand for certain minerals, like cobalt, lithium, and nickel, key to the clean energy transition.⁴ As the market for secondary use of materials from electric vehicle batteries matures, this further reduces pressure to source from new mines.

In addition to policy fixes, the US Government has several tools available to enhance material supply chain security and reduce pressure to source from irresponsible mines. Government procurement and consumer pressure both play important roles driving incentives and innovation in more responsible material sourcing. Major consumers, including automakers and electronics companies, have also directed their suppliers to source more responsibly. Some have committed to the Initiative for Responsible Mining Assurance (IRMA), which independently audits and certifies environmental and social performance at mines.⁵

America's Critical Mineral Industrial Complex Designed to Reduce Supply Chain Disruption

We acknowledge the importance of supply chain security in certain materials. However, we challenge the notion that our public lands agencies should, or even could, resolve the geopolitics and economics of specialized, internationally-traded commodities. While domestic mines will source some raw materials, the task of managing supply chains has almost nothing to do with mining. Congress designated that task to other agencies, aside from those managing public lands, with well-established tools to reduce supply chain risk, including for energy transition materials.

The Energy Policy Act of 2020 and IIJA directed the Departments of Commerce (DOC), Defense (DOD), Energy (DOE), State (DOS), Interior's United States Geological Survey (USGS), and other agencies to build a vast critical minerals consortium.⁶ Congress has repeatedly provided these agencies with broad authorities to stockpile minerals, impose trade restrictions, negotiate agreements, promote research, develop workforces, and discover alternatives. They blend tradecraft and statcraft with engineering, research, and development to reduce a material's criticality. Often, this means finding substitutes, diversifying supply, imposing trade restrictions, or increasing recycling, reuse, and collection. President Biden's America's Supply Chains Executive Order, with support from the 117th Congress, uses three main strategies to manage supply chain risks in energy transition materials.⁷

1. Lowering geopolitical risk of a supply chain disruption by diversifying sources;
2. Secondary recovery of materials from oil, gas, and mine waste; and
3. Materials recycling, reuse, design, substitution, and building a circular economy

¹Please see <https://data.consilium.europa.eu/doc/document/ST-5469-2023-INIT/en/pdf>

²Please see Lithium-ion Car Battery Recycling Advisory Group Final Report. Prepared by CalEPA and UC Davis, March 16, 2022. Available at: https://calepa.ca.gov/wp-content/uploads/sites/6/2022/05/2022_AB-2832_Lithium-Ion-Car-Battery-Recycling-Advisory-Goup-Final-Report.pdf

³Please see IIJA, Public Law 117-58, Sections 40207, 40208, and 40209.

⁴Please see Dominish, E., Florin, N., Wakefield-Rann, R., (2021). Reducing new mining for electric vehicle battery metals: responsible sourcing through demand reduction strategies and recycling. Report prepared for Earthworks by the Institute for Sustainable Futures, University of Technology Sydney.

⁵Please see responsiblemining.net

⁶See Consolidated Appropriations Act of 2021, Public law 116-260 Sections 7001 IIJA Public law 117-169 Sections 40201-40211

⁷Please see White House's 100 Day Reviews under Executive Order 14017 (June 2021). Available at: <https://www.whitehouse.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf>

To diversify sources, in March 2022, the Biden Administration invoked the Defense Production Act to secure a reliable supply chain for five minerals used in batteries that power electric vehicles and other clean energy infrastructure.⁸ The Defense Department has also vested in mining and mineral processing projects in California,⁹ Texas,¹⁰ and Idaho.¹¹ Last year, Congress provided DOD \$1 billion in the FY 23 NDAA for their National Defense Stockpile.¹² The State Department has engaged in diversifying sources through their Mineral Security Partnership,¹³ Energy Resources Governance Initiative,¹⁴ Clean Energy Resources Advisory Committee,¹⁵ and USAID’s “Green Minerals” Challenge,¹⁶ to name a few.

As the US Government diversifies supply chains for energy transition materials, we urge agencies to require due diligence in accordance with internationally accepted standards. In particular, we call on the State Department and other agencies to uphold Indigenous Peoples’ rights with explicit mention of their right to self-determination and right to Free Prior and Informed Consent (FPIC), as described in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP)¹⁷ and the International Labour Organization Convention 169 (ILO 169).¹⁸ While voluntary standards do not substitute for required due diligence, multi-stakeholder certification standards like IRMA can help some mining-impacted communities verify compliance.

For mine waste recovery, ILJA provided a huge boost to the United States Geological Survey’s new Earth MRI to, among other things, map and characterize the concentrations of energy transition materials in existing mine waste.¹⁹ USGS established pilot projects in Colorado and New Mexico for this purpose. USGS has also partnered with the DOE’s National Energy Technology Laboratories (NETL) on promising research and development in recovering materials by dissolving magnets with copper-salt solutions, microbial bioleaching, phytomining, and other mine waste processing techniques that reduce carbon footprint and adverse environmental impact.²⁰

For the circular economy, the Department of Energy announced the American Battery Minerals Initiative providing \$2.8 billion in ILJA funds for domestic mineral

⁸ Please see Presidential Determination No. 2022-11 of March 31, 2022. (87 Fed. Reg. 19775, April 6, 2022). The order refers to lithium, cobalt, nickel, graphite, and manganese.

⁹ Please see Press Release (February 22, 2022) DoD awards \$35 million to MP Materials to Build U.S. Heavy Rare Earth Separation Capacity. Available at: <https://www.defense.gov/News/Releases/Article/2941793/dod-awards-35-million-to-mp-materials-to-build-us-heavy-rare-earth-separation-c/>

¹⁰ Please see Press Release (February 1, 2021) DOD Announces Rare Earth Element Award to Strengthen Domestic Industrial Base. Available at: <https://www.defense.gov/News/Releases/Article/2488672/dod-announces-rare-earth-element-award-to-strengthen-domestic-industrial-base/>

¹¹ Please see Press Release (December 19, 2022) DoD Issues \$24.8M Critical Minerals Award to Perpetua Resources. Available at: <https://www.defense.gov/News/Releases/Article/3249350/dod-issues-248m-critical-minerals-award-to-perpetua-resources/>

¹² Please see Congressional Research Service: FY 2023 NDAA National Defense Stockpile. Available at: <https://crsreports.congress.gov/product/pdf/IN/IN12041>

¹³ Please see Media Note (September 22, 2022): Minerals Security Partnership Convening Supports Robust Supply Chains for Clean Energy Technologies. Available at: <https://www.state.gov/minerals-security-partnership-convening-supports-robust-supply-chains-for-clean-energy-technologies/>

¹⁴ Please see State Department ERGI fact sheet, available at: <https://www.state.gov/wp-content/uploads/2019/06/Energy-Resource-Governance-Initiative-ERGI-Fact-Sheet.pdf>

¹⁵ Please see Media Note (March 18, 2022) Inaugural Meeting of the Clean Energy Resources Advisory Committee. Available at: <https://www.state.gov/inaugural-meeting-of-the-clean-energy-resources-advisory-committee/>

¹⁶ Please see Press Release (November 15, 2022) USAID Calls for Innovators to Counter Corruption in the Green Minerals Industry. Available at: <https://www.usaid.gov/news-information/press-releases/nov-15-2022-usaid-calls-for-innovators-to-counter-corruption-in-the-green-minerals-industry>

¹⁷ Please see Resolution Adopted by the U.N. General Assembly September 13, 2007, Article 19. Available at: https://www.un.org/development/desa/Indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf

¹⁸ Please see International Labour Organization C169—Indigenous and Tribal Peoples Convention (1989) (No. 169). Available at: https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:12100:0::NO::P12100_ILO_CODE:C169

¹⁹ Please see <https://www.usgs.gov/special-topics/earth-mri>

²⁰ Please see Science News (Jan. 20, 2023): Recycling rare earth elements is hard. Science is trying to make it easier. By Erin Wayman

processing and battery manufacturing.²¹ DOE also announced a subsequent award of about \$73.9 million devoted to battery recycling.²² These DOE Loan Program Office awards should be subject to the same due diligence standards as support from other federal agencies (i.e. State Department), where applicable.²³ DOE's partnerships with the Critical Materials Institute, NETL, USGS and the West Virginia University Water Resources Institute offer exciting opportunities to strengthen supply chains for energy transition materials and stimulate domestic circular economy infrastructure.²⁴

Providing the right blend of incentives and mandates will drive more investment where it is actually needed: in battery manufacturing, collection facilities, and related midstream green infrastructure. Transitioning the minerals we already mined once, to build what we now need, will drive the circular economy forward. These alternatives to mining may help source the materials we need with fewer adverse impacts to climate, sacred and cultural sites, wildlife, and water.

No alternative is perfect. Even with more robust material reuse and collection, new hardrock mines on public lands will still provide minerals. However, sourcing minerals from public lands under a law explicitly designed to further settler-colonialism only furthers environmental injustice and puts an equitable transition out of reach. Legislative and regulatory reform can create responsible mining policies that put protection for communities at the forefront, to ensure that any new mines are built with the best standards in place.

Policy Developments and Resources Devoted to Domestic Mine Permitting

Even though domestic mining is not the weak supply chain link, Congress has already invested significant time and resources into mine permitting. The Inflation Reduction Act (IRA) included \$1 billion to support timely and effective environmental reviews across federal agencies, which should lead to better, more equitable outcomes, and help avoid litigation.²⁵ Additionally, the Fiscal 2023 budget will help fund public lands management agencies to perform more thorough mining reviews.

These mine permitting developments build upon those in the Infrastructure Investment in Jobs Act (IIJA). IIJA made permanent the Fixing America's Surface Transportation Act Permitting Council (Permitting Council), which, in January 2021, added hardrock mining as a covered sector.²⁶ In November 2022, the Administration announced the Permitting Council will devote \$5 million to support consultations with federally recognized Tribes in hardrock mine permitting.²⁷

IIJA also required the Interior Department to identify process improvements to hardrock mine permitting.²⁸ A coalition of Tribes, Indigenous-led organizations, and conservation groups have also petitioned Interior for rules that, if finalized, would result in more timely, efficient decisions for hardrock mine permits without sacrificing necessary public input.²⁹ In response to both, the administration convened the mining reform Interagency Working Group, which we hope recommend mining rule improvements consistent with the petition.³⁰ These updates would also help lead to a fair hardrock mine permitting process, delivering more certainty to both the mining industry and impacted communities.

The IRA also created an advanced manufacturing production tax credit (45X) for mining companies to receive an additional handout equal to 10% of their production costs for the value of the 50 metals listed in the IRA.³¹ The law also allows tax-

²¹ Please see DOE IIJA Battery FOA-2678 Fact sheet Available at: https://www.energy.gov/sites/default/files/2022-10/DOE%20BIL%20Battery%20FOA-2678%20Selectee%20Fact%20Sheets%20-%201_2.pdf

²² Please see DOE IIJA Electric Drive Vehicle Battery Recycling and Second-Life Applications FOA-2680. Available at: <https://www.energy.gov/sites/default/files/2022-11/Recycling%20and%20Second-Use%20Selections%20Factsheets%2011-16.pdf>

²³ Please see DOE's LPO RFI at 87 Fed Reg. 33141 (June 1, 2022) See also DOE's 2022 Unified Regulatory Agenda at: <https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202210&RIN=1901-AB54>

²⁴ Please see note 20.

²⁵ Please see IRA, §§ 23001, 40003, 50301-03, 60402, 60116, 60505.

²⁶ Please see 86 Fed. Reg. 1281 (January 8, 2021).

²⁷ Please see DOI Press Release (December 1, 2022) Departments of Interior, Agriculture Advance Mining Reforms Aimed at Protecting and Empowering Tribal Communities. Available at: <https://www.doi.gov/pressreleases/departments-interior-agriculture-advance-mining-reforms-aimed-protecting-and>

²⁸ Please see IIJA Section 40206 Critical minerals supply chains and reliability

²⁹ Please see <https://www.regulations.gov/document/DOI-2022-0003-14647>

³⁰ Please see 87 Fed Reg. 18811 (March 31, 2022)

³¹ Please see Public Law 117-269 IRA Section 13502 Advanced Manufacturing Production Credit 45X(b)(1)(M) "in the case of any applicable critical mineral, an amount equal to 10 percent of the costs incurred by the taxpayer with respect to production of such mineral."

payers who buy an eligible clean vehicle to receive a credit of up to \$7,500 (30D). The IRA's 30D mineral sourcing requirements will likely spur more mining and mineral processing, both within the United States and in free trade agreement countries. These same sourcing requirements could also spur most needed investment, innovation, and development in circular economy infrastructure to refurbish or recycle these cars' batteries.³²

Today, it is possible to make some clean vehicles with the IRA's sourcing requirements. But to truly benefit from this credit, the United States and our allies need better circular economy infrastructure to supply demands for energy transition materials. Congress and the Treasury should view the mineral sourcing provision as an opportunity to allow more taxpayers to claim the credit and build domestic supply chain strength within the circular economy links.

The European Union Battery Directive already contains recycled content requirements similar to the IRA's optional recycling provision. The Treasury Secretary should issue 30D mineral sourcing rules that allow constituent materials from the EU to qualify for the credit in order stimulate investment and help supply meet demand for recycled battery materials.³³

Conclusion

Earthworks strongly supports immediately transitioning to a justly-sourced renewable energy economy to prevent further destruction from the climate crisis. The climate crisis has disproportionately harmed, and continues to harm, those who have contributed to it the least. We also share serious concerns about mining's impacts to communities under the current laws and rules.

Rather than rely on extraction, we urge Congress and the Administration to drive innovation and development of circular economy infrastructure to collect, recycle, reuse, substitute, and reduce minerals used in existing clean energy technologies, thereby lowering overall demand for new mining. Where mining is absolutely necessary, it must occur in a more sustainable, just, and equitable way.

For companies, this means accountability to human rights and environmental due diligence standards, and only operating with the full consent of the communities they impact. IRMA is the only voluntary standard that helps achieve this goal.

For Congress, this means passing circular economy legislation and the Clean Energy Minerals Reform Act. Converting to a leasing system for hardrock minerals—just like the one that oil and gas companies use today—would help provide certainty to the permitting process and result in more timely and socially acceptable decisions.

For public lands agencies, this means modernizing their mining rules to deliver a more fair, just, and equitable hardrock mine permitting process for mining-impacted communities.

For other federal agencies, this means forming the linear supply chain links for minerals into a circle, and requiring companies perform gender-responsive human rights and environmental due diligence across their supply chains.

The renewable energy transition must not touch off the kind of mining rush that has historically killed or displaced untold numbers of Indigenous and other marginalized peoples, destroyed sacred and cultural resources, stolen lands, scarred landscapes, and polluted water and climate. Building a sustainable economy based on clean energy gives us an historic opportunity to confront the legacy of injustice to Indigenous communities and damage to the public lands held in trust for future generations. Seizing that opportunity requires policies prioritizing recycling and reuse over new mining. Where new mining is acceptable, the mining industry must undertake the most responsible methods. Thank you for your consideration.

³²Please see IRA Section 13401(e). By January 1, 2024, 40% of the value of the battery's critical minerals must be mined in the United States or free trade agreement countries. Or recycled within North America. The percentage increases annually until 2028 when the threshold reaches 80%.

³³See Treasury Department Revenue Procedure 2022-42 December 12, 2022. Available at: <https://www.irs.gov/pub/irs-drop/rp-22-42.pdf>

QUESTIONS SUBMITTED FOR THE RECORD TO AARON MINTZES, SENIOR POLICY
COUNSEL, EARTHWORKS

Questions Submitted by Representative Grijalva

Question 1. Can you expand on the policies that the U.S. should put in place to develop the circular economy? How does the U.S. compare to its international competitors in developing a circular economy?

Answer. Ranking Member Grijalva, thank you for these thoughtful questions. Circular economy policy for energy transition minerals has the following main components: 1) labeling 2) producer responsibility 3) battery design for recycled content with high environmental standards 4) supply chain due diligence.

The 117th Congress began to develop the right policies to create a more circular economy for energy transition minerals. The Investment in Infrastructure and Jobs Act (IIJA, Public law 117-58, Sections 40207, 40208, and 40209) provided grants and directed the Department of Energy and Environmental Protection Agency to recommend effective battery design, labeling, recycling, and producer responsibility models. The Inflation Reduction Act also provided electric vehicle tax credits for batteries made from recycled minerals in North America (IRA, Public Law 117-269, Section 13401(e)).

The United States should, where appropriate, open our circular economy markets to European and Asian investment. If we can responsibly source more refurbished battery materials from allied nations, the United States can grow our circular economy and help secure supply chains. The European Union recently finalized their Battery Directive. Soon, almost all batteries (in most vehicles with exceptions) sold in the EU market will come with a QR label (battery passport), recycled content, producer responsibility, and supply chain due diligence. The European Parliament begins debate soon on their response to our IRA, the EU Raw Critical Materials Act. Both continents appear to support circular economy subsidies.

Congress and the Biden Administration could benefit the domestic circular economy by adapting the IRA's electric vehicle tax credit (30D mineral sourcing provisions) to take advantage of the market created by the EU Battery Directive. In addition, applicable free trade agreements or other State, Treasury, and Commerce Department financing mechanisms must reinforce our strengths and maintain our global due diligence commitments, especially to free, prior, and informed consent.

Question 2. During your testimony you spoke about the importance free, prior, and informed consent in ensuring that any mining in the U.S. and abroad is respecting the rights of local and Indigenous communities. Can you describe what free, prior, and informed consent means and describe specific ways that the U.S. can implement that practice domestically and throughout the international supply chain?

Answer. Thank you for this question. Free, prior, and informed consent (FPIC) is a right derived from the United Nations Declaration on the Rights of Indigenous Peoples (Article 19 of UNDRIP) and International Labour Organization C169 (Indigenous and Tribal Peoples Convention No. 169). The U.S. can help operationalize FPIC by requiring recipients of U.S. Government financial, diplomatic, or technical support (especially original equipment manufacturers OEMs) to perform ongoing due diligence across their supply chains, in accordance with the U.N. Guiding Principles on Business and Human Rights.

In practice this means, as an express condition of government support, OEMs must receive FPIC as they develop, review, publish, enforce, and periodically revise their supply chain due diligence plans. Those plans must also create effective grievance and remedy mechanisms for compliance failures.

In the domestic context, the same FPIC principle applies to Government support through the Defense Production Act (DPA), Department of Energy's Loan Program Office, or other mechanisms. On public lands, the Interior and Agriculture Departments must also update their mining rules to respect treaty reserved rights and clarify the Secretary's authority to deny mines impacting sacred sites and other Indigenous resources (43 USC 3809 and 36 CFR part 228).

Question 3. In your testimony you talked about the need for due diligence at all stages of the critical mineral supply chain. Can you please elaborate on the responsibilities of the U.S., as well as private companies, in performing due diligence? What policies should the U.S. be pursuing to improve due diligence standards at home and abroad?

Answer. Due diligence is an ongoing obligation companies must perform across their supply chains. Those companies receiving federal support through an IIJA

grant, DOE loan guarantee, or DPA investment, (or various State Department financing mechanisms) must do more than merely consult with Tribes. They must receive free, prior, and informed consent. For instance, DOE loan guarantee terms for domestic lithium, nickel, or graphite mineral processing facilities should require OEMs certify ongoing FPIC, specify community benefits, conduct third party audits, publish audit results, and provide impartial dispute resolution and effective remedies throughout all phases of the project.

Question 4. Under current mining laws, how much do mining companies pay in royalties for extracting on federal lands? How does that compare with other countries that allow companies to mine on public land, such as Canada and Australia?

Answer. Under the 1872 mining law, companies pay zero royalty to the Federal Government. Every other nation charges a federal royalty for mineral extraction. Most other nations, like Canada and Australia, charge federal royalties through a leasing system. Canada's provincial governments in British Columbia, Ontario, and Quebec have each passed leasing statutes that, in principle, require FPIC.

Question 5. Please elaborate on any additional points you would like to make for the record.

Answer. Mining is not the weak link in energy transition mineral supply chains. While public lands mines will source some minerals for the energy transition, Congress designated the task of managing mineral supply chains to the Departments of Commerce, Defense, Energy, State, Interior's U.S. Geological Survey, and the Environmental Protection Agency via the Critical Materials Consortium (Consolidated Appropriations Act of 2021, Public law 116-260 Section 7001, and IIJA Public law 117-169 Sections 40201–40211). Public lands agencies can play an important role by updating their mining regulations to provide more fairness and certainty to the permitting process.

Congress should reform our mining laws and provide EPA and DOE authorities to grow the circular economy, joining our allies in opening our markets to responsibly sourced energy transition materials. In particular, Congress should pass legislation modeled after the EU's Battery Directive and IIJA's recommendations on battery design, labeling, recycled content, and due diligence, while maintaining high environmental standards.

Leading researchers at the Institute for Sustainable Futures at the University of Technology Sydney estimate that the right mix of circular economy policies can reduce demand for new lithium mines by 25% and new nickel and cobalt mines by half. As the 21st century rush for energy transition minerals unfolds, we must avoid the tragic mistakes of the 19th century rush for precious metals and 20th century rush for uranium. Seizing this historic opportunity to confront this legacy of injustice means reforming our mining laws and advancing a more circular economy to more responsibly secure supplies for energy transition minerals. Thank you again for your consideration.

Dr. GOSAR. Thank you, Mr. Mintzes.

I now recognize Mr. George for 5 minutes.

**STATEMENT OF JASON GEORGE, BUSINESS MANAGER,
INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL
49, MINNEAPOLIS, MINNESOTA**

Mr. GEORGE. Thank you, Mr. Chairman, Members. I want to thank my friend, Congressman Stauber, for the introduction, as well. There is no greater champion for workers in their district than my friend, Pete. And thank you for that.

My name is Jason George. I am the elected leader of Minnesota's largest construction union, the Operating Engineers Local 49. Our members operate and repair the heavy equipment that builds every aspect of our region. Thank you for inviting me here today to discuss this very serious issue facing our nation and members I represent.

The mining of critical minerals—specifically, where they are mined—will have a profound impact on our collective future. I was

born, raised, and currently live in Minnesota. The vast majority of our nearly 15,000 members live and work in Minnesota.

Our state has a long, proud history of mining. We like to remind people that our state mined the ore that produced the steel that won two world wars. The mining industry has been and remains the lifeblood of northern Minnesota.

Today, we are at a precipice of a generational opportunity that could launch another 100 years of prosperity through mining. Our nation and the world are in desperate need of critical minerals such as nickel, cobalt, and copper. These minerals are necessary to build the batteries, wind turbines, solar panels, and other products the world needs in order to transition to a clean energy economy.

Ninety-five percent of our domestic nickel resources, a vast majority of our cobalt, and about a third of our copper deposits are beneath the ground in northern Minnesota. The only question before us is whether or not we will be allowed to mine them. And that, really, is the only question, whether we will be allowed to do this or not. There really is no debate about whether we can. We have been doing it for 100 years or more.

We have the technological know-how to extract these minerals safely. The people who live near the potential mines want the opportunity. I don't believe—and Congressman Stauber can correct me—that there is an elected body anywhere where these minerals are located that does not support these projects being explored. Not one. They all support it. Everyone who lives there wants this opportunity. It is people that don't live there that are preventing that.

What we also don't have is a fair process for permitting mines that is based on science and reason, from my experience. Instead, we have a hyper-political process that has been hijacked by a combination of wealthy cabin owners, wealthy tourists, business owners who supply their outfitting needs, and anti-development extremists. This small group of people is highly influential within the Democratic Party structure in my home state. They are loud, they give a lot of money, and too many Democrats in my area and my state are advancing their own narrow political agenda at the expense of Minnesota and the American people, in my opinion.

The latest example is a decision by the Department of the Interior to ban mining on more than 225,000 acres of northern Minnesota land that contain the vast majority of our mineral resources. The Department did so without studying any specific mine plan. It is purely based on hypothetical scenarios and not specific data. It issued a blanket ban based on hypothetical scenarios. The decision had nothing to do with science, and everything to do with Democratic politics, in my opinion.

Too much is at stake to allow this to happen. Good-paying union jobs are on the line. Members of my union and others will build these projects, earn family-sustaining wages, world-class health care, and pensions that ensure a dignity of good life and retirement. Unlike the data used to ban mining, these jobs aren't hypotheticals.

Like any good union representative and union leader, we have it in writing. We have project labor agreements with all the mining companies that are proposing mines in this area. They will be built

by my members, and they will be good-paying jobs, and we have it in writing.

As a Labor leader, I would be remiss if I didn't point out also what happens if we don't mine it in Minnesota. And you see the pictures behind the gentleman up there about where these products and where these minerals will be mined if we don't do it here.

I am running out of time. I will just sum up by saying that we are extremely frustrated back home. We know how to do this. We have the minerals in our backyard. The people that live there want these jobs and want to explore these opportunities. We absolutely have the know-how to do it safely.

The cleanest water in Minnesota exists where mines have existed for more than 100 years. The dirtiest water in Minnesota exists in the districts where the people are trying to stop us from mining, in the Twin Cities. And that is a fact. And that is something that is extremely frustrating to everybody that I represent. And most people in Minnesota, especially the people that are trying to raise families and have these good-paying job opportunities in northern Minnesota.

So, I thank you for your time, and I will end with that.

[The prepared statement of Mr. George follows:]

PREPARED STATEMENT OF JASON GEORGE, INTERNATIONAL UNION OF OPERATING ENGINEERS, LOCAL NO. 49

I submit the following written testimony in advance of my appearance at the House Committee on Natural Resources, Subcommittee on Oversight and Investigations hearing titled, "Dependence on Foreign Adversaries: America's Critical Minerals Crisis."

My name is Jason George, and I am the elected leader of Minnesota's largest construction union, the International Union of Operating Engineers, Local 49. Our members operate and repair the heavy equipment that builds every aspect of our region. Thank you for the invitation to be here today to discuss a very serious issue facing our nation and the members I represent. The mining of critical minerals—specifically, where they are mined—will have a profound impact on our collective future.

I was born, raised and currently live in Minnesota. The vast majority of our nearly 15,000 members live and work there. Our state has a long and proud history of mining. We like to remind people that our state mined the ore that produced the steel that won two world wars. The mining industry has been and remains the lifeblood of northern Minnesota.

Today, we are at the precipice of a generational opportunity that could launch another 100 years of prosperity through mining. Our nation, and the world, are in desperate need of critical minerals such as nickel, cobalt, and copper. These minerals are necessary to build the batteries, wind turbines, solar panels, and other products the world needs in order to transition to clean energy.

95% of our domestic nickel resources, a vast majority of our cobalt, and about a third of our copper deposits are beneath the ground in northern Minnesota. The only question before us is whether or not we will be allowed to mine them. There is no other question.

We have the technological knowhow to extract these minerals safely. The people who live near potential mines want the opportunity. We have the skilled union workforce to build the projects, and a productive, hard-working population ready to operate the mines once they are built.

What we don't have is a fair process for permitting mines that is based on science and reason. Instead, we have a hyper-political process that has been hijacked by a combination of wealthy cabin owners, wealthy tourists, business owners who supply their outfitting needs, and anti-development extremists. This small group of people is highly influential within the Democratic Party structure. They are loud. They give a lot of money. And too many Democrats, including in my home state, are advancing their own narrow political agenda at the expense of Minnesota and the American people.

The latest example is a decision by the Department of the Interior to ban mining on more than 225,000 acres of northern Minnesota land that contain the vast majority of our mineral resources. The department did so without studying any plan for a specific project. In fact, it refused to study a mine plan submitted in this area. Instead, it issued a blanket ban based on hypothetical scenarios. This decision had nothing to do with science and everything to do with Democratic politics.

Too much is at stake to allow this to happen. Good-paying union jobs are on the line. Members of my union and the others that will build these projects earn family-sustaining wages, world-class health care, and pensions that ensure the dignity of a good life in retirement. Unlike the data used to ban mining, these jobs aren't hypotheticals. Like any good union representative, we have a signed contract. All of the companies that have or will soon produce mine plans in this area have signed project labor agreements with the local trade unions ensuring we will build their mines.

Our members aren't the only workers with a lot at stake. Mining plant operation jobs are among the highest paid in the region. The number of jobs generated by businesses that will pop up to support the mines is limitless and will pay well. As I said, the opportunity for workers is generational.

As a labor leader, I would be remiss if I didn't point out what is happening now and will continue to happen to workers if we don't mine these minerals in America. Many news sources have documented the working conditions in mines around the globe where these minerals are currently produced. A recent program on NPR titled, "How 'Modern-Day Slavery' in the Congo Powers the Rechargeable Battery Economy," is worth listening to.

It details the conditions people face mining cobalt in the Congo. This mineral is toxic to touch and breathe in raw form if not mined properly. Right now, hundreds of thousands of Congolese people, including many women and children, are mining it with their bare hands, being poisoned every day.

Siddharth Kara, a fellow at Harvard's T.H. Chan School of Public Health who has researched modern-day slavery for two decades, said this on the program:

"We shouldn't be transitioning to the use of electric vehicles at the cost of the people and environment of one of the most downtrodden and impoverished corners of the world. The bottom of the supply chain, where almost all of the world's cobalt is coming from, is a horror show."

The Biden administration has agreed these conditions are abhorrent and must not be supported. Just last year the Department of Labor said it would add lithium-ion batteries to a list of goods made with materials known to be produced with child or forced labor under a 2006 human trafficking law. It was widely reported that this decision was based on the batteries containing cobalt, a mineral largely mined in the Congo.

I simply cannot understand how our government can rightly acknowledge the human atrocities in countries like the Congo that mine our minerals, while the same administration moves to ban the mining of these minerals in America, where we can ensure such atrocities do not happen.

This is a shameful position. It is rife with hypocrisy, and it is an embarrassing example of partisan politics at its worst.

You can't say you are for human rights and then be OK with the metals in your Tesla batteries being mined in the Congo by women and children poisoning themselves because you don't want these mines in your backyard, where they might obstruct your view.

You can't say you are serious about a clean-energy future, knowing that recycling won't produce an adequate supply of minerals to get the job done, and yet oppose domestic mining to meet our needs.

You can't say you are serious about protecting our national security when you are banning mining in America while China buys up mineral mines in the rest of the world.

Enough is enough. We as a nation must stand up to this small but vocal class of elite obstructionists. Mining technology has advanced. We can do this safely here. We have the best-trained union construction workers in the world ready to build our mines. We have workers hungry for family-sustaining jobs in operations right here at home. We have businesses chomping at the bit to support a domestic mining industry.

I will repeat what I said a few minutes ago. The only question is whether or not the U.S. government will allow us to mine.

A lot is at stake. Opportunities for workers. The lives of poor people in foreign lands. Our energy future. Our national security. We must find the will to do the right thing.

Thank you, Mr. Chairman and committee members, for your time today, and for drawing attention to this critical issue.

Dr. GOSAR. Thank you, Mr. George. It is always great to have somebody coming from the ground level to give us some reality checks.

I am now going to recognize Members for 5 minutes. We are going to go to Mr. Lamborn first this morning. The gentleman from Colorado is recognized.

Mr. LAMBORN. Thank you, Mr. Gosar, for having this meeting. Thank you for the witnesses for being here.

And besides being on Natural Resources, Representative Gosar, I am also on the Armed Services Committee, so I am going to ask questions that have to do with both of the Committees. In other words, the connection between critical minerals and national security. And that is something I think we should all be aware of.

The balloon incident with China shows us that there are countries out there that are not seeking to really help us out.

Dr. Moats, that leads to my first question: What country or countries does the United States source many of its critical minerals from?

Dr. MOATS. Thank you, gentleman. Of course, the answer for all metallurgical answers, "It depends."

So many of the—like the rare earths for the magnets mostly come out of China. The nickel and cobalt is mined. Cobalt is mostly mined in Central Africa, and then processed in China to make the lithium ion batteries that we need.

There are other elements that come from allied countries. Like, aluminum mostly comes from the Aluminum Valley in Quebec. And that is probably an OK thing, from a geopolitical standpoint.

So, it is a very broad answer to a question.

Mr. LAMBORN. I am going to probe a little more on the China connection. We know that China supplies 26 different minerals, of which the United States is over 50 percent import reliant. That is far more than from any other country. And some of those minerals, the United States is 100 percent reliant on China.

So, what implications does this have on our national security, when a country like China, who is—I won't go into all the threats that they are posing to our national security, but what does our dependence do to our national security?

Dr. MOATS. One of the critical minerals is tellurium. Tellurium is added with bismuth to make—

Mr. LAMBORN. Could you speak into the microphone a little better?

Dr. MOATS. Sure. Tellurium comes from copper refining. China dominates copper refining, so most of the tellurium in the world comes out of China.

From a military standpoint, tellurium is mixed with bismuth to make thermoelectric night vision materials. So, whoever controls

the tellurium—we do produce some tellurium in the United States, but it is exported, and then refined, and brought back into the United States.

But right now, the tellurium that is needed for night vision goggles and for solar panels—over 50 percent of the grid storage solar panel uses cadmium telluride—we are heavily dependent on China for that.

Mr. LAMBORN. Yes, and thank you for focusing on those military applications.

There are tremendous economic applications the Ranking Member talked about: cell phones, things like that, computers. We know that there are chip making, there are tremendous needs there for critical minerals that only come out of China, either mining or refining.

How can the United States increase its national security, though, by securing new materials higher up in the supply chain?

What should we do to make our situation not so precarious?

Dr. MOATS. In the short term, I think we need to look at every mine and every processing plant that is here currently in the United States, and we need to look at where can we get critical minerals that we are already processing, and we are working at that at our university.

I personally work with companies looking at evaluating where they can get gallium, which is important for WiFi and all the semiconductor chips that we have. Gallium, right now, could be—at least a large chunk of it could come out of our two zinc plants in Tennessee and North Carolina, specifically the one in Tennessee. Currently, gallium is not recovered. The germanium is shipped to Europe for refining and brought back.

So, there are lots of opportunities. Cobalt and nickel could be recovered from the Missouri mines, could be recovered from cobalt. There is a new cobalt mine that is opening up in Idaho. There are companies that are looking at their existing plants right now to determine if they can recover, and what innovations.

And I am a member of the Critical Materials Institute, which is funded by the Department of Energy. We specifically have a project looking at gallium, germanium, and indium recovery from our zinc plants.

Mr. LAMBORN. Are some of our environmental regulations too stringent to currently allow the productive use of raw or by-products for these critical minerals?

Dr. MOATS. I am not a policy person, so I am not going to say what is stringent or not stringent. That is for—

Mr. LAMBORN. We will say that.

Dr. MOATS. Yes, you can say that. I will say that the need to require—the needs of the policies have shut down plants. So, there are no primary lead smelters in the United States anymore because of the requirements that are put on by the EPA and the local states. The last lead smelter was shut down in Herculaneum, Missouri in 2013.

We recycle a lot of lead, but any new lead that comes into the country has to be imported, and most of that comes from China.

Mr. LAMBORN. Thank you very much.

I yield back, Mr. Chairman.

Dr. GOSAR. I thank the gentleman. I now recognize Ranking Member Stansbury for her 5 minutes.

Ms. STANSBURY. Thank you, Mr. Chairman. I would like to start by welcoming Mr. George first.

My mother was an operating engineer, and I come from a union-strong family, so I really appreciate you being here with us, and representing the workers of your Local and, of course, all the operating engineers.

And I wanted to also use this opportunity to say—I shared this with the Committee yesterday as we were talking about both mining and oil and gas issues—that I was born while my parents were actually working. My mom was a machine oiler that worked at a coal-fired power plant in Farmington, New Mexico, and my dad was a welder in the oil and gas fields. And it was because of the fallout of the oil and gas industry in the early 80s that my family actually had to leave that community and, ultimately, why I grew up in the biggest city in New Mexico.

So, I understand very intimately, because of my own family history, how big, international, global issues around our domestic production of minerals and fossil fuel production really affects the families and workers of this country. And we take those issues very, very seriously. And I think, obviously, your testimony highlights that.

But I also think that it is important to recognize that much of what has happened around mining in the United States and its decline is not because of domestic policy, but because, as we heard here from Mr. Moats and others, it really has to do with international trade and commodity prices at the international level.

And I think Mr. Mintzes highlighted this in his testimony, but it is important to recognize in this hearing that this is not only an issue of strategic and national security for the United States, this is a problem for every major country in the world who is our ally, who depends on these resources for manufacturing, for national security purposes, and for just general economic development. This is not just a U.S. problem.

In fact, there are dozens of countries in Europe, Asia, Africa, and others that are dependent on these resources, and are unable to source them through the global supply chain right now. And we are not just talking about one mineral. We are talking about dozens of minerals, right?

So, just opening a mine in a place is not going to solve this problem, because we are talking about dozens of minerals that would have to be sourced from many different geologic formations from all over the world, as they currently are. But the problem is that we cannot responsibly source these materials right now because they are in places where we do not have ally relationships, there are human rights abuses happening, and because we do not have responsible practices happening.

So, there is not a simple solution here. That is one of the things that I really want to highlight. We need a multi-pronged approach. We are going to have to work with our allies who are also seeking these minerals to ensure that we are doing responsible sourcing, especially if that is abroad. It doesn't mean we just open a mine to do it here in the United States. It means that we have to

actually utilize and help use our international support systems and policies to help ensure that we are holding accountable those multinational corporations, some of which are based in the United States and elsewhere, to the highest possible human rights and environmental standards, whether they are operating here in the United States and employing our operating engineers and all of our miners, or whether they are operating abroad. So, we really need to use every possible tool at our disposal.

But I want to take the rest of my time to really focus on the circular economy that Mr. Mintzes brought up here. We know that recycling, re-use, and design is not going to be the only solution. It is only part of the solution. But it represents a significant portion of the supply chain that is under-developed right now in the United States and, as Mr. Mintzes stated, is under-developed from a policy standpoint with respect to other countries.

So, Mr. Mintzes, could you please share more? What exactly is the circular economy? What is entailed in it? And what does the United States need to do to really advance its circular economy?

Mr. MINTZES. Thank you, Ms. Stansbury, for that question.

Some of us may remember bottle bills, or deposits when you could turn in a can or a bottle and receive a nickel or a dime back. That is effectively what we are talking about.

In Europe, it really boils down to four things: you have a producer responsibility, you have supply chain due diligence, you have recycled content standards. And the state of California is looking at some of these ideas, because they have a large EV market, too, as you indicated. And the nations of Japan and South Korea have really good markets for this.

I want to make one other quick point. In response to the trade dispute that you spoke about in 2010 between China and, really, the rest of the world, what happened was Japan and South Korea did, in fact, begin to build a more circular economy to recycle there, because they don't have as many mines as we do, right? So, they are building it, Europe is building it. And I think that we can do it here, too. We can do it with union jobs, as well.

Dr. GOSAR. I thank the gentlewoman. The Chairman of the Full Committee, Mr. Westerman, is recognized.

Mr. WESTERMAN. Thank you, Chairman Gosar. Thank you to the witnesses.

Mr. Mintzes, I know you stated in your opening remarks that you agreed with the Ranking Member and my position on you can't mine and permit your way out of it. But I also added to my remarks you have to permit, mine, refine, and manufacturing. And under mining you could put recycling in there. So, I just want to make sure you are in agreement with the whole statement I said, not just the part about mining and permitting.

Mr. MINTZES. Thank you, Mr. Westerman. Yes, we need to mine and permit the whole supply chain. We need to do it more responsibly.

And I appreciate the tenor of bipartisanship that you are setting for this Committee already.

Mr. WESTERMAN. And going back to Ms. Stansbury's comments, there is a whole lot we agree on on this.

And we have been taking advantage of foreign countries through our trade program. I have testified in these trade disputes before, and the Chinese Government, they don't care about price fixing, they don't care about playing fair. They exploit our system of free markets and rule of law to gain market share. They will use low labor, they will use slave labor. They will use no environmental regulations to produce commodities to get them into the U.S. market, to drive our producers out of business, to capture that market share, and they do it in many different industries.

So, we do need to work on trade. We do need to make American, not only mining, but processing and manufacturing, stronger than ever before. And we have the ability to do that, because we are blessed with the resources.

And Mr. George, I have been to northern Minnesota, I have seen the taconite mining, and talking about steel, Arkansas has become one of the largest producers of steel, and it is all recycled steel.

But as I think, Mr. Moats, you mentioned in your testimony, we are like one-tenth or less of the steel production of China.

Dr. MOATS. Yes, we are one-tenth of the steel, and about two-thirds of our recycled. And yes, I was recently in Mississippi County visiting—which, if you didn't know, more steel is produced in Mississippi County than any county in the United States.

Mr. WESTERMAN. Right. But is there any way that recycling meets the future demands?

Dr. MOATS. Obviously, with growth, we can't have a circular economy to supply all of our new needs. I think any reasonable person would say we need to recycle. And for lithium ion batteries, we already have redwood materials, we have life cycle. People are already building plants in the United States to recycle the lithium ion batteries.

Mr. WESTERMAN. So, we talk about an all-of-the-above energy approach. We also need an all-of-the-above minerals approach: new mining, recycling, and being as efficient and effective as we can.

And I want to go back to Mr. George. An interesting thing that I think we fail to take into account all the time is the mining in northern Minnesota is huge for that area. But when that taconite is shipped off to the refineries, there is a value added part to that. And then, if that steel out of those refineries goes into automobile manufacturing or building construction, there is even more value added to that.

And I talked yesterday about how we produce about \$90 or \$120 billion worth of raw materials through recycling and mining in the United States, that when that gets processed, it becomes a value of about \$900 billion, but when that process material gets manufactured, it adds about \$3.6 trillion to the U.S. GDP. And this is about much more than mining, it is about national security, it is about supply chains, but it is also about creating incredible jobs for union workers and non-union workers alike, and being able to grow our economy and prosper here. But it starts with mining. If you don't have the raw materials, you can't do the other part of it.

And Mr. Moats, I am a little biased to your testimony because we are fellow engineers, and I know Missouri Rolla has one of the best mining engineering programs that is out there. But I also know that there seems to be a shortage of mining engineers. And

you so aptly talked about the shortage of workers in these mines and in America. We have to automate and make things more efficient, safer.

I just used all my time, but—thank you all for your testimony. It is something we need to really follow up on more.

And if we will work on the real issues and the real problems, we can really do great things for our country and for the world, and prevent situations like are represented in these posters behind me.

Thank you, Chairman. I yield back.

Dr. GOSAR. I thank the gentleman, the Chairman of the Full Committee. I now recognize the Ranking Member, Mr. Grijalva for 5 minutes.

Mr. GRIJALVA. Thank you, Mr. Chairman.

Dr. Moats, during your testimony, the reference that you made—and I apologize for the way I ask questions, I am not a linear thinker like Mr. Westerman, so sometimes I—

[Laughter.]

Mr. GRIJALVA. I got a liberal arts education. It has messed me up, I guess.

[Laughter.]

Mr. GRIJALVA. Anyway, Dr. Moats, the history of decline on the critical mineral extraction, production, where does regulatory, environmental standards, clean air, clean water, for example, and the permitting, where does that fall into that percentage decline? What part of the cause is that, if that is what we are talking about here?

Dr. MOATS. Yes, I have thought a lot about why our smelters and mines have closed.

Some of it is just the natural resources. Our smelters and refineries were built near mines, and as the mines played out, they were not set up to bring in concentrates from other parts of the country and other parts of the world. So, economically, it was not viable.

There are other places where the smelters have shut down because of the implementation of more stringent environmental policy. I think we can all acknowledge the history of our mining and metallurgy was dirty, but that is before my lifetime. The plants now all operate within the standards that are set by the local, the state, and the Federal Government. They do so willingly. But because plants were built before that, it took money to upgrade and improve them, and the United States was very happy to shut down plants and outsource that production to other countries.

So, there is some that is policy, there is some that is just economics. And I think, like, again, Ranking Member Stansbury, I think it is a complex situation, and there is no one answer fits all, but policy is definitely part of it. And permitting for getting new mines on just takes forever.

Mr. GRIJALVA. And the 1872 mining law, what role does that play in the—

Dr. MOATS. I am going to defer to that, because I know of the law, but I am not a mining engineer by trade, and I don't feel like I know the law well enough to offer an opinion on that.

Mr. GRIJALVA. See, so linear thinkers do so well, they could just kind of defer.

Mr. Mintzes, in your testimony, I think one of the things that—and I back-referenced to the 1872 mining law—I have said that many of the controversies that we confront in terms of siting, and permitting, extraction have to do with the public's right to know and the public's involvement in it, in particular, Indigenous communities that have become much more active, involved, and assertive about sacred sites, cultural, and historic resources. 1872 does not address that, and yet we have the conflict that is going on now in terms of consultation and trust responsibility to these Nations.

Talk a little bit more about that role that you referenced in your testimony, in particular.

Mr. MINTZES. Thank you, Mr. Grijalva. I really appreciate that. I also appreciate your long-standing support for reform of the 1872 mining law. And we are urging Congress to pass the Clean Energy Minerals Reform Act again this Congress.

Let me just highlight the Hualapai Nation, just for example.

Mr. GRIJALVA. OK.

Mr. MINTZES. If you have an exploratory mine and it is fewer than 5 acres, which many of them are going to be. Under the law what happens is you stake your claim, you go to the local BLM office, you file a piece of paperwork and a fee. The way that the government interprets the law is that they have no discretion to deny that exploratory project.

Now, the Hualapai have no idea that the exploration is going to happen until the drills hit the ground, because the notice that the mining company needs to provide is only to the government, but not to any of the people. So, Mr. Grijalva, that is actually part of the real source of most of the conflict in mine permitting. It is because we are operating under a 19th century statute, where we could stake claims, and then those minerals go wherever the claim owner wants them to go, unlike a leasing system, which the rest of the world does.

Mr. GRIJALVA. OK.

Mr. MINTZES. Thank you.

Mr. GRIJALVA. I appreciate it. And I think royalties is an issue, as well. If we are going to fund dealing with the due diligence on the chain, expediting permitting processes, a source of revenue should come from those that are profiting from that extraction. And since we have no royalties at all on mining except for coal, I think that is open for discussion, as well, going forward in this overall discussion about permitting and critical minerals, and accessing those.

And I yield back, Mr. Chairman, and thank you.

Dr. GOSAR. I thank the gentleman from Arizona. The gentleman from Montana, Mr. Rosendale, is recognized for 5 minutes.

Mr. ROSENDALE. Thank you very much, Mr. Chair.

Everyone on this Committee is extremely interested in protecting our land, air, and water quality across the nation and, quite frankly, around the world. And most of us, as Chairman Westerman said, have extremely close ties to the land ourselves.

We also recognize the need and the benefits realized by utilizing our natural resources, in most cases, rendering the land more productive after the extraction or harvesting of timber, making the

land actually more productive than it was prior to any of that activity taking place.

Mr. Mintzes, I would like to ask a couple just real basic questions.

If the raw materials that are necessary to, literally, support civilization have not even been produced yet, they haven't been, as we have heard, permitted, mined, and refined, we just can't recycle our way out of this situation, either. We need some more materials.

Do you believe that we should produce them in the most environmentally friendly methods that are available?

Mr. MINTZES. Thank you, Mr. Rosendale, for that question. Yes.

Mr. ROSENDALE. OK. Do you believe that they should utilize the safest and most advanced labor standards as they mine these materials?

Mr. MINTZES. Yes, thank you.

Mr. ROSENDALE. Thank you. And do you believe that China uses the most advanced and friendly environmental standards and labor standards?

Mr. MINTZES. Thank you, Mr. Rosendale, for that question. My understanding from the State Department is no, at least in some regions they are in, yes.

Mr. ROSENDALE. OK. I appreciate that. I don't know why we would continue to allow them to take on all these activities, as we see on the posters behind us, and not take over some of this production ourselves.

Mr. Moats, I have a couple of questions here for you. Yesterday, we heard testimony about the refining process, and that the United States has dramatic limitations on the processing itself. So, it is not just the need to mine these materials, but, obviously, they have to be smelted, they have to be processed, all of the above.

What, in your opinion, is the primary reason that we don't have these facilities in the United States?

You mentioned it a little bit earlier, but, if you could, expand on that some.

Dr. MOATS. Yes. So, we export minerals and many of the metals that I have referred to. We don't have the smelting capacities we used to. They, again, shut down for both economic reasons, because of the lack of a level playing field, because when you sell into a commodity market, everybody sells into the same commodity market. And if you are subsidized, if your competition is subsidized, then you are in an economic disadvantage.

Additionally, the environmental regulations that have been put into place created more costs to operate in the United States, and so, therefore, it became more difficult.

Mr. ROSENDALE. So, as many people around the room continue to raise the questions about colonialism and the management of our resources, and accusing us of that, by exporting all of our raw materials to another country, having them process it, and then us having to purchase the finished product back, doesn't that sort of relegate the United States to be acting like a colony of yet one of these other powers?

You don't have to answer that. That would just be it.

We did learn a lot during COVID that the supply chains are completely disruptable, and that it presents major problems with

us, whether we are talking about medications or other finished products that are necessary for our life.

I have another avenue. The Northern Crow, the Northern Cheyenne and the Crow in Montana, they rely heavily on the coal resources that they mine in Montana. And while I know coal hasn't been the top of the subject today, I want to go down a different little road.

The regulatory conditions that have been imposed on the power industry has caused the closure of 50 percent of the Colstrip Electric plant that the Crow and Northern Cheyenne depend on completely for jobs and for revenue. Without it, they would have 65, 70 percent unemployment rates. It is a mine-to-mouth operation, so they mine it and then it goes directly to this power plant.

If we don't have the baseload electricity, what challenges does that present for processing, and manufacturing, and things like that?

As we talk about trying to electrify the nation for not only the electric cars, but also to the processing of the very materials.

Dr. MOATS. Am I allowed to answer the question?

Mr. ROSENDALE. Mr. Chair, I have expired all my time, but—

Dr. GOSAR. The gentleman can answer the question.

Mr. ROSENDALE. Thank you very much, Mr. Chair.

Dr. MOATS. Obviously, you have identified the ability to generate electricity is going to be substantial if we are going to electrify our vehicles, and then the raw materials that we need to do that.

Obviously, the United States sits on 250 years of coal reserves to supply all of our electrical needs. We have chosen not to do that. We have a lot of natural gas reserves because of fracking and other things. So, they are there. And the opportunity to use those energy resources responsibly, I think, are still available.

Mr. ROSENDALE. Thank you very much, Mr. Chair, and I would yield back. Thank you for your—

Dr. GOSAR. I thank the gentleman from Montana. The gentleman from Arizona, Mr. Gallego, is recognized.

Mr. GALLEGO. Thank you, Chair Gosar and Ranking Member Stansbury.

As a member of both the Natural Resources and Armed Services Committee, I agree that securing our supply of critical minerals is a national security concern. That is why we need to look seriously at all possible solutions for sourcing and securing responsibly produced minerals.

My first question is to Mr. Mintzes.

In your testimony, you describe the actions this Administration and the 117th Congress took to manage supply chain risks for critical minerals. Could you please elaborate on why this diversified approach is strategic for national security?

Mr. MINTZES. Thank you, Mr. Gallego, for that question.

The Biden administration and Congress have really taken three major approaches: diversifying supply, pursuing recycling, and also looking at mine waste. The steps that the Administration and the Congress last took, I wanted to just disclaim I don't necessarily support all of them.

But I just wanted to share that the infrastructure law made the FAST Act permanent. The FAST Act has included hardrock mining

as a covered sector therein. The IRA funded \$1 billion to our agencies to help speed permitting. The infrastructure law also created a working group designed to help speed permitting. We will be seeing those reports coming out soon.

So, when you think about the infrastructure law, the funding for the agencies through Fiscal Year 2023 budget, making the FAST Act permanent, and also the tax cuts for mining in the Inflation Reduction Act, and the mineral sourcing provisions of the electric vehicle battery tax credit, we have a lot of incentives to go mine, and also to responsibly source materials that we need.

So, we have already taken a lot of steps through the IRA IJJA in that respect.

Mr. GALLEG0. Thank you. To make our nation secure, we must proactively plan also for the future.

Mr. Loris, in your testimony you note that the critical minerals that the economy relies on today may look much different in 20 or 30 years. Could you please elaborate on the importance of investing in research and development to reduce our critical mineral dependency?

Mr. LORIS. Yes, sure. I think we have heard a lot of different predictions over the years about peak oil, about running out of food. A lot of them have not come true. And in terms of research and development, our national labs have been critical in exploring ways to recycle, ways to extract alternative resources. And I think the more we can have flexibility in those processes so that they can shift in case of national security needs shift or economic shift, the better off they are going to be, and I think the better off the private sector, working with the national labs, will be able to pivot.

So, I view the national labs, I view our research universities, as fundamental in the solution to this all-of-the-above approach that we need to take.

Mr. GALLEG0. Right. And again, all of the above.

So, taking this kind of long-term, all-of-the-above approach to national security, it is clear that our critical mineral needs and sources will also change. Mr. Mintzes, you have spoken about the benefits of a circular economy. Why is a circular economy an effective, long-term national security solution?

Mr. MINTZES. Thank you, I appreciate that. The reason is we are not really sure, Mr. Gallego, today what mineral we will need tomorrow. So, if we build the infrastructure to recycle it now, we will already have it.

Let's speak about cobalt for a second. Cobalt is not going to be around in batteries in 5 or 10 years, I don't imagine. It will be a different metal, won't it? So, why don't we recycle the batteries now, and the materials we have now, so that if we make it to the 22nd century, and we are on the verge of another minerals rush, by then we have reformed the law, surely. But by then, at least we will have the circular economy infrastructure we need to actually source the material that we are looking for at the time.

Mr. GALLEG0. OK. Thank you. I am not going to ask about your if we make it to the 22nd century thesis, but I appreciate everyone's testimony here. And I think to, at least to re-emphasize, I think both sides have actually had some very valid claims, and we do need to look at this, but at least I look at it from a national

security perspective. Let's have an all above, all methods to get that approach.

And I appreciate everyone's testimony. Thank you.

Dr. GOSAR. I thank the gentleman from Arizona. The gentleman from Georgia, Mr. Collins, is recognized, the Vice Chair of the Committee.

Mr. COLLINS. Thank you, Mr. Chair, and before I get started with my questions, I just want to thank you, Mr. Chairman, for the honor of serving as Vice Chair for this very important Subcommittee. I am looking forward to serving under you as we look to unleash American energy and hold the Biden administration accountable for the America-last policies that have caused energy prices to rise as high as Chinese spy balloons.

Now for my questions. Mr. Loris, the Chairman mentioned in his opening statement that permitting a new hardrock mine in the United States can take more than a decade. Can you or any of the other witnesses tell us why this is, and what exactly causes this process to take so long?

And how has the Biden administration made this even more difficult?

Mr. LORIS. Yes, I am happy to start, and welcome input from others.

If you look at some of our bedrock environmental laws, chiefly the National Environmental Policy Act, it has gotten much harder to permit processes for everything from clean energy projects to conventional fuel projects. And that, in conjunction with the seemingly endless litigation for a lot of these projects, just holds up any type of investment and any type of development for years in the courts.

And Congressman Lamborn said our environmental regulation is too stringent, and I think that is the wrong way to look at it. I think it is that they are incredibly inefficient. We should welcome strong, stringent environmental safeguards that protect air quality and water quality. But we can't have processes where they are just held up for years by certain agencies.

There is a lot of overlap, there is a lot of duplication, and then there are a lot of lawsuits from public interest groups, too. I think sometimes public interest groups can be helpful for people who don't have the resources to bring forth litigation, but a lot of times they are doing it because they just don't want the project being built, which is something I think Mr. George commented on in his oral testimony.

So, if you look at some of the data, the private landowners and tribal groups from the years, I think, 2001 to 2013 brought only 3 percent of the litigation for filing NEPA lawsuits; over 50 percent was from public interest groups. So, we just need a much more efficient process to get an up-or-down vote on whether these projects should move forward.

And I think a lot of the private sector in the United States welcomes stringent environmental safeguards. They just want some regulatory certainty, more than anything else.

Mr. COLLINS. Good, thank you.

Would anybody else like to comment on that?

Yes, sir, Mr. George.

Mr. GEORGE. Thank you. Yes, I would just add that, in my experience working on projects that need these types of permits, whether it be—we just replaced an old oil pipeline in Minnesota with a brand new one and that took 8 years to permit and get done—lawsuits, process.

We have a mine right now in Minnesota that has gone through a process for 20 years. They had their permits, lawsuits. Some of them were taken back. Now they have been repealed. It is in the Supreme Court. And that is on an existing mine site, where they have mined before.

So, the frustration is real. I think certainty is exactly—what Mr. Loris is talking about—is what is critical.

What I have seen—you asked about what has been done—banning mining in 225,000 acres where you have these minerals is a chilling impact on business and exploration and on companies' willingness to put up money to explore these projects. There was a particular project in that area that is now banned, and it has spent hundreds of millions of dollars already, just to see their leases pulled and mining banned in the region arbitrarily.

So, I think all of these things are troubling. I think what you all can do is provide certainty, and not allow government agencies to bypass a process. Hold them accountable to that, because right now they are just doing whatever they want, from my experience.

Mr. COLLINS. Yes, sir. And I don't want to cut anybody else off, but I want to go to a quick question that really plays into that, Mr. George, because there is a lot of talk about mining and jobs versus tourism jobs in certain parts of the country. And it seems as though some opponents of domestic mining like to pit these industries against each other.

As someone in the mining industry, and based on your experience, how much do tourism jobs pay in comparison to what mining jobs pay?

Mr. GEORGE. Thank you for the question. I can tell you, our members that will build these mines make, on average, \$40 an hour on the check, in addition to world-class health care, where there is no family coverage, where there are no premiums, low deductibles, in addition to a defined benefit pension, defined contribution plan.

And I can tell you that the tourism jobs—I actually went on one of the outfitters' websites to see exactly how much they are paying. They don't advertise how much they pay, but we know how much they pay, and it is about \$15,000 a year with no benefits.

So, when people in northern Minnesota are told, well, we just need to innovate our economy and have more tourism jobs, people up there know exactly what that means. It means a lower standard of living, period.

Mr. COLLINS. Thank you.

Mr. Chairman, I had one more question, but—

Dr. GOSAR. You will get another chance.

Mr. COLLINS. Thank you.

Dr. GOSAR. I thank the gentleman from Georgia. The next one is a young lady from Florida, Mrs. Luna.

Mrs. LUNA. Thank you, Chairman Gosar. If I can just ask for unanimous consent to enter this into the record?

Dr. GOSAR. So ordered.
[The information follows:]

China's Child Labor



The Chinese Communist Party has exploited over **40,000 children** to work in unregulated & dangerous cobalt mines in the Democratic Republic of Congo, often **only using their hands** as tools.



Child miners are not provided with any protective equipment and work over **12 hours a day, 7 days a week**. They are exposed to toxic radiation and explosives. Miners earn less than **\$2.00** a day.



Children who work in the mines are **frequently drugged**, to suppress extreme hunger and the fatigue of working in such harsh conditions.



The Congo produces more than **70%** of the world's cobalt for use in batteries, solar panels & electronics like cell phones. China is the world's leading consumer of cobalt, at around **80%**.

Sources: House Hearing on China's Exploitation of Child Labor, "The Dark Side of Congo's Cobalt Rush," The DRC Mining Industry: Child Labor and Formalization of Small-Scale Mining," & National Defense.Org

Mrs. LUNA. Thank you. I can't stop thinking about, Mr. Loris, what you told us earlier about some of this stuff that you had witnessed with some of the human rights abuses.

Real quickly, what is the youngest age of some of the children that you have heard have been working in these mines?

Mr. LORIS. Ranging from 5 to 6 years old. And sometimes teens will have babies strapped to them while they are digging out the cobalt by hand. So, I mean, you are literally talking about infants at these mindsets.

Mrs. LUNA. I just want to share a stat with everyone on the panel. Children who work in these mines are frequently drugged to suppress extreme hunger and fatigue of working in such harsh conditions.

If you can, just pass it that way.

From our perspective, I think everyone on this panel would agree that if there is a way to move our industry away from China, it is probably the best thing, from a human rights perspective.

But my question is, Mr. George, because I am not from a mining community, I am from a fishing community—how does the United States' mining standards differ from countries, specifically in the Congo, or where China is operating to conduct some of these mineral mining processes?

Mr. GEORGE. Well, I can talk about labor standards in the terms of our rights here in this country to organize unions, which we have done. And the standards, the people that have done that, and people have literally died for those rights here in this country to obtain those rights. And when people organize and they have unions, that lifts everybody up.

So, whether you are union or non-union, you benefit from those standards that we set. And——

Mrs. LUNA. And sorry to interrupt you. Is it in your opinion that this Administration's policies have put a hindrance on domestic mining operations?

Mr. GEORGE. One hundred percent, yes. When you ban 225,000 acres of land where these minerals exist, I don't see how you could argue otherwise.

Mrs. LUNA. So, I guess this would bring me to my next question, Mr. Mintzes.

I had heard your perspective, and I understand what you are saying about respecting the rights of Indigenous peoples in regards to mining. However, this Committee has the ability to recognize that, and I think it is in, again, our opinion, to do the least harm possible, not just to the environment, but to other people, as well, right, the human rights perspective.

And if we have the ability in the United States to bring in these resources, and then export them and ensure that people are not only being respected, but also, too, that we are protecting the environment in the process, don't you think that that would be an opportunity for us to responsibly harvest these minerals, even if it is on Indigenous lands?

Mr. MINTZES. Thank you, Mrs. Luna, for that thoughtful question. I think that there are a lot of really great opportunities for us——

Mrs. LUNA. Sorry, can you pause for a second?

I didn't know if that was funny, but I was asking a question, and so I am just asking for you guys to be respectful while I am asking the question, thank you.

Go ahead.

Mr. MINTZES. Thank you, Mrs. Luna. I do think that there are opportunities for us to be able to onshore the stronger links of the circular economy infrastructure here in the United States, and that we ought to be able to raise standards here, labor standards, environmental standards here and everywhere around the world, which is why, in particular, when the Biden administration is going to the Mining Indaba in Cape Town, we are urging real due diligence standards.

And part of the bipartisanship, I think, of this Committee is we all want oversight. We all want accountability from the Biden administration. I want to know what those due diligence standards really are. I want to know.

So, Mrs. Luna, I think we can work together in trying to figure out how we can raise the standards here and abroad.

Mrs. LUNA. Then my final question for you would be, right now the United States has re-entered the Paris Climate Accord, and that has enabled places like China to not only go forward and economically just completely dominate us, but also, too, from an energy perspective and a mining perspective, they are not only complicit in human rights abuses, but they are also destroying the environment.

If we have the opportunity to pull back, would you say that that would be in the best interest of our country to do so?

Mr. MINTZES. Thank you, Mrs. Luna. That is a really good question.

I would actually like to associate myself with Mr. Loris' comments with respect to China's position vis-à-vis rare earth elements and their position in the market. It is my view that they have actually lost market share since the recent 2010 trade dispute. So, there are, I think, as we have discussed, some trade options available to sort of reduce our dependency that way.

Notably, Senator Wyden, earlier this week, just sent several letters to a number of original equipment manufacturers, mostly domestic ones, who were sourcing materials from the Xinjiang region of China, allegedly. So, what they are saying, what Senator Wyden is asking, same thing I am asking, "Where is your due diligence plan?"

So, we are asking the Administration, we are asking OEMs to show us how it is that we are making sure that slave labor isn't happening within their supply chains, so that we can all responsibly source the materials that we need.

Mrs. LUNA. Thank you.

Dr. GOSAR. Does the gentlelady yield back?

Mrs. LUNA. Yes, sir.

Dr. GOSAR. Thank you very much. The gentleman from Minnesota, Mr. Stauber.

Mr. STAUBER. Thank you, Mr. Chair. And Mr. Chair, I ask unanimous consent to enter into the record an E&E News article titled, "Biden admin looks to overseas mining for EV, renewable needs," and it was dated January 23, 2023.

Dr. GOSAR. No objection. So ordered.

[The information follows:]

GREENWIRE**Biden admin looks to overseas mining for EV, renewable needs**

A State Department official says the Minerals Security Partnership with allied nations has zeroed in on projects to support around the world and will require a host of environmental and social governance standards.

By: HANNAH NORTHEY / 01/23/2023 01:46 PM EST
 Politicopro.com/eenews

GREENWIRE — The Biden administration plans to back as many as 16 overseas projects to mine, refine and recycle minerals for electric vehicle batteries and other renewable technology, while moving forward with requirements to ensure those deals don't result in environmental degradation and human rights violations.

Jose Fernandez, the undersecretary of for economic growth, energy and the environment at the State Department, said during a wide-ranging interview that the United States and other members of the so-called Minerals Security Partnership are carefully vetting "critical" minerals projects across the globe to support—either through advocacy or funding.

In doing so, the White House is threading a needle, pushing to advance climate goals and wrest more control over foreign-produced minerals and supply chains, even as questions loom about labor abuses and pollution at mines in some countries. Meanwhile, House Republicans are gearing up to probe Biden's climate and mineral agenda (*E&E Daily*, Dec. 13, 2022).

In addition to addressing a massive vulnerability for the U.S. given skyrocketing demand for battery and green-tech minerals, Fernandez said the partnership is zeroing in on a host of environmental and social governance, or ESG, standards that companies and foreign governments will need to abide by.

"It may be it's not every country will want to adhere to those principles, in which case, simply, that's been part of what we've had to do in winnowing out from 170 projects to 16," said Fernandez. "It's our business model, and it's a conviction, but it's also an understanding that if it gets to see who can extract the most while doing the least for communities, we're not going to win that game."

The Biden administration is touting the partnership investments as complementary to a surge of cash-flowing into the domestic market from the newly minted Inflation Reduction Act, a climate law that promises a financial boost for the mining industry in this country given its mineral sourcing requirements for EVs (*Greenwire*, Aug. 18, 2022).

Members of the partnership include the U.S., Australia, Canada, Finland, France, Germany, Japan, Korea, Sweden, the United Kingdom and the European Union.

House Republicans in recent days have launched a legislative effort to limit environmental reviews and curb lawsuits to bolster domestic mining (*E&E Daily*, Jan. 10). They also want to restrict any business relationship with the Democratic Republic of Congo, where the Labor Department last year said a large share of cobalt is mined at facilities "where thousands of children work in hazardous conditions" (*Energywire*, Oct. 5, 2022).

But Fernandez said any support overseas, should it be done responsibly, would complement the initiatives in the 2021 bipartisan infrastructure law and the Inflation Reduction Act, noting that the U.S. is already seeing more domestic manufacturing.

The partnership, he said, will offer up everything from political backing to technical guidance, loans, financing through the Export-Import Bank or International Development Finance Corp., and political risk insurance, as well as imposing high environmental and social standards. The potential funding of about a dozen projects was first reported by *Axios*.

Federal studies, he said, show demand for minerals that the U.S. Geological Survey has been deemed "critical" to the economy, and national security will increase five-fold by 2040 as the clean energy transition unfolds, as well as a forty-two-fold increase in demand for lithium.

“You cannot leave, no pun intended, any stone unturned,” he said. “We have to look at domestic supply chain projects, and we also have to look abroad, and that’s what we’re trying to do.”

‘It is not about China’

The national focus on critical minerals spiked during the Trump administration amid a trade war with China and has carried over, with fervor, under President Joe Biden, said Simon Moores, founder and CEO of the U.K. mining data firm Benchmark Mineral Intelligence.

Minerals have taken on an urgency for the Biden administration as officials seek to jump-start the energy transition away from fossil fuels, which will require materials needed to build turbines for offshore wind farms or EV battery components, as well as other technology.

“All of this started with the Trump administration . . . they kicked off the concept . . . they put critical minerals back on the map because of the trade war with China, and that’s been carried through to the Biden administration with some intensity,” Moores said.

Fernandez said the focus today goes beyond China, emphasizing that the goal is to diversify and create a more resilient supply chain both domestically and abroad given how little of the needed minerals are produced in the U.S.

“It is not about China. If we’ve learned anything from the Covid pandemic, it’s that we cannot depend on single-point supply chains,” he said. “If you look at rare earths and critical minerals, the U.S. produces very little. We’ve got to be able to secure supplies, and the [Minerals Security Partnership] is intended to be one of the means through which we do that.”

A recent International Energy Agency echoes that point, noting that the market for clean energy technology could more than triple in size by 2030 as countries push to fulfill their climate and energy pledges while also facing supply chain pitfalls (*Energywire*, Jan. 13).

“As we have seen with Europe’s reliance on Russian gas, when you depend too much on one company, one country or one trade route, you risk paying a heavy price if there is disruption,” IEA Executive Director Fatih Birol said in a release.

China, according to IEA, currently dominates the solar and wind energy supply chain, while critical minerals are mined in only a small number of countries. Australia, Chile and China, for example, produce more than 90 percent of the world’s lithium.

The report concludes that international collaboration will be key to preventing supply chain bottlenecks, a point Fernandez also emphasized, calling it a challenge that the U.S. and private market cannot solve alone, but instead a “vulnerability we’re trying to solve with our partners.”

Each member country of the partnership, he explained, submitted projects that had company interest, and the coalition winnowed more than 170 proposals down to 16 “pilot” projects—based on factors like demand for the mineral and investment potential. Once a final lot of projects is selected for support, the partnership will reach out to private companies to attract investments, financing or offtake agreements, he said.

“We’ve got to get some deals in the door,” he said, “but obstacles, actually, have been surprisingly few.”

‘Race to the top’

The partnership spent months discussing what’s meant by ESG, said Fernandez, and is now zeroing in on existing standards that companies and countries will need to meet in order to receive assistance.

“It will not be a new standard,” he said. “I think you will see that there’ll be a choice of different standards, and any of those will suffice, but they will be standards that will be and that are well-known and respected in the industry.”

The Organisation for Economic Co-operation and Development, or OECD, for example, provides so-called due diligence guidance for responsibly sourcing of minerals in conflict-affected and high-risk areas, while the Extractive Industries

Transparency Initiative, or EITI, is a global standard for the good governance of oil, gas and mineral resources.

Environmental groups have for months been calling for more accountability both here in the U.S. and abroad, namely through requiring companies supplying minerals to commit to obtaining “free, prior and informed consent” from nearby communities and relying on the use of third-party verification and certification for any voluntary industry standards.

The Biden administration has already made moves overseas, some of which have raised eyebrows. The Energy Department, for example, has provided a \$102 million loan to build out a refinery in Louisiana that will process raw graphite from a mine in the Cabo Delgado region of Mozambique, where militant insurgents have a history of attacking resource projects owned by Western companies (*Greenwire*, May 11, 2022).

Fernandez said countries seeking help from the partnership will need to display transparency around any bidding process, for example, and ensure local communities and Indigenous populations are consulted. “You will see that all around the world, mining projects often run into local community opposition because they don’t take the time to develop support, and they don’t take the time to explain the benefits,” he said.

While a recent memorandum of understanding the State Department inked with Congo and Zambia—two countries rich in cobalt and nickel—did not stem from the Minerals Security Partnership, Fernandez said it’s a good example of the collaboration that can happen in what he calls a “race to the top.”

The State Department pledged to help establish battery processing and manufacturing facilities in the two African nations, which currently send most of their raw materials to China—and have been criticized for child labor in various sectors (*Energywire*, Jan. 20).

The agreement, Fernandez said, shows how the U.S. can offer its financial institutions, technical assistance and some of the best environmental practices in the world to help countries develop supply chains for battery minerals while meeting high ESG standards.

“We can’t compete in a race to the bottom,” he continued. “We can only [succeed] if we . . . follow higher standards and bring more benefits to local communities.”

Mr. STAUBER. Mr. Gosar, again, thanks for allowing me, for waiving me on, and allowing me to question some of our witnesses.

Mr. George, thank you once again for coming here. I think this is three Congresses in a row that you have testified on behalf of mining and your membership in Minnesota. Your testimony speaks for itself. Banning mining in 225,000 acres of a working national forest—Superior National Forest is a working industrial forest.

And guess what? They banned 225,000 acres without any environmental impact statement, without looking at the specific mine plan. It was purely political. The biggest copper nickel find in the world, and this Administration, not only did they pull the leases and ban mining, including taconite mining, what they did was take union jobs away because there was a project labor agreement in place, the best labor standards and best environmental standards, and this Administration turned a blind eye.

Yet, the article that I just entered, Biden administration goes to foreign overseas mining that used child slave labor. It is unacceptable and immoral that this Administration is using child slave labor to mine the critical minerals to get to the green economy.

Meanwhile, many anti-mining lawmakers and advocates look down on union jobs building our mines, saying they are not lifetime employment. They are lifetime employment. They are multi-generational jobs with project labor agreements.

Mr. George, can you explain real quick the importance of these jobs, and the project labor agreements, the union membership, and what it does for our communities?

Mr. GEORGE. Thank you, Congressman, happy to. These jobs are dignity. These jobs are respect. These jobs allow people to raise families. These jobs, those mining jobs in northern Minnesota are the only reason people are there. And they spin off. Every industry is related to the mines, as was pointed out earlier.

So, these jobs could not be more important. And they are that quality because the standard of living and the labor standards in our area have been raised by unions like mine.

Mr. STAUBER. Mining is our past, our present, and our future. This Administration banned mining in northern Minnesota to include taconite mining.

The union members, they have children, they go to our hospitals, they go to our grocery stores, they recreate up there. It is simply unacceptable.

Mr. Moats, it is great to see you again, and thank you for joining us today. And I appreciate you mentioning China's already enormous and growing percentage of global steel. As you know, we have been mining iron for steelmaking in my district for over 135 years. And, as Mr. George says, we have the cleanest water in the state of Minnesota in the heart of our mining region.

The mineral withdrawal we discussed earlier includes a ban on taconite in the 225,000 acres of the Superior National Forest, which is an industrial working forest. As the United States loses its steel supply to China, how damaging would it be to take known and possible taconite reserves off-line to our production?

Dr. MOATS. Thank you for the question. While we recycle a lot of steel, it always gets degraded. Copper is a bad element, so we always need a certain amount of virgin material coming from our iron ore mines.

Therefore, if you want the lightweight steels that are needed for cars, for tank armor, those types of things, we need to have mining capabilities in the United States to produce it. And, of course, your state produces most of our mine from taconite mines.

Mr. STAUBER. Eighty percent of it.

Dr. MOATS. Yes.

Mr. STAUBER. Thank you.

Mr. Loris, thank you for joining us in the last 30 seconds.

I introduced the Permit for Mining Needs Act, which provides needed updates to our broken permitting process. It is supported by the National Association of Building Trades Unions, energy groups, mining trades, and more. Can you please discuss quickly how permitting reform and the provisions to improve mining permitting in my bill will actually lead to lower emissions in the long run?

Mr. LORIS. Yes, as several members and witnesses have mentioned, if we are not doing the permitting, and processing, and extraction here in the United States and other developed countries, it is going to happen elsewhere, especially with a lot of policies, government-induced demand that is going to increase the demand for these minerals, and therefore the prices are going to increase,

and that is only going to increase supplies in other parts of the world.

So, if we don't do it here, where those emissions standards are the most stringent, emissions worldwide are going to be likely higher.

Mr. STAUBER. Thank you.

Mr. Chair, I yield back, and again thank you for waiving me—

Dr. GOSAR. I thank the gentleman. I am going to recognize myself.

Mr. George, I want to come back to you. Trust is a series of promises kept. So, I would look at it that, when we make agreements in regards to national forests or multiple use of public lands, you are forming an internal treaty.

On the forest we are talking about, the national forest, there is something very unusual about this agreement, because it actually had a buffer system enclosed. Right?

Mr. GEORGE. I am not an expert on—are you talking about the boundary waters, and—

Dr. GOSAR. Absolutely.

Mr. GEORGE. Yes. Yes, there was. When the boundary waters were created—and I am not an expert in that policy, but my understanding is—and we have all come to understand that mining was an activity that was supposed to happen in the region.

Dr. GOSAR. Right, there were areas set aside for logging and for mining.

Mr. GEORGE. Correct.

Dr. GOSAR. So, we have to start looking at this.

And Dr. Moats, actually, one of my other points, you just can't recycle. You have to add virgin material into almost all the stuff.

Mr. Mintzes, have we started really any of the recycling for the solar cells right now?

Mr. MINTZES. Thank you, Mr. Gosar. Thank you for that question.

Yes, recycling of the solar products is fairly robust. It is a growing industry. And, in fact, the truth is that, with respect to the solar industry, I don't think we will need to do much mining to source the minerals we need for the solar technologies. We do have weak links in other areas of the solar supply chain. It is just not in mining.

Dr. GOSAR. Dr. Moats, you are shaking your head. Do you want to respond to that question?

Dr. MOATS. So, I agree with him that most solar panels are already recycled here in the United States. I am very familiar with some of the processes. They are very robust.

But if you look at—and there have been multiple studies done that the growth of solar energy that is being projected, there is no way we are going to be able to recycle to supply all of the silicon panels and the tellurium that is needed. I have written several research papers on this, looking at where we can get more tellurium in the world. And the simple answer is we need to produce more from our existing operations and future mines. Thank you.

Dr. GOSAR. And you made a statement, I think several of you made statements in regards to we don't know what the needs are

for the future. And when you start looking that way, you have to inventory these minerals as we go.

So, are you familiar with some of the new technology, and actually the smelting process in regards to extraction of some of these metals, or minerals? In fact, all of the minerals out of the ore body, Dr. Moats?

Dr. MOATS. Yes, we have several research projects ongoing at the university, and I am aware of other ones, as well, where we are looking at advanced technologies to really analyze why are we not recovering more.

The current research believes that about—again, we will go to tellurium, because that is what I have been looking at most recently—60 to 90 percent of the tellurium that is mined is not being recovered. Why is that? Why are we not doing that? So, we are using advanced technologies and looking at why that is, and that can be applied across the board to all of our mining operations, all of our processing plants. And that is what I would encourage you to look at.

Dr. GOSAR. Thank you.

Mr. Mintzes, again, why would it be a problem that we have existing mine sites—for example, a manganese mine site—in my district?

Why would the Federal Government, because of technology that we have today that we can extract almost all the manganese from those tailings that are sitting there, why would the Federal Government resist and say no to that?

Mr. MINTZES. Thank you, Mr. Gosar, for that question. The Federal Government has said yes, resoundingly has said yes. The infrastructure law funded \$320 million to the United States—I think that is right—to USGS to do exactly what you just described.

And it is my understanding, it is my belief—and I am not a geologist, but I think the geologists are pretty excited right now, because there are real opportunities to, for example, look at mine waste as a potential source of some of these materials. I think it is really important.

There are some places where that actually may—I am going to just speak for some of Earthworks' constituents. We have had some people come to us and say, "Under some circumstances that could be a good idea, that could work." Others have said, "No, no, no, we are already an EPA Superfund site. Please don't come back here and start mucking around in the metals already."

So, the answer is yes, Mr. Gosar, at least in some areas, under some circumstances, that is a viable opportunity.

Dr. GOSAR. Well, I would agree. But we need to make it uniform all the way across the board. If these are sites that have had previous mining, yes, we ought to make sure that those areas are prioritized. And that has not been the case in Arizona, with the manganese.

My time has expired. We have votes any time now, if I am not mistaken.

Do we want to do a second round?

OK, you are up.

Ms. STANSBURY. Well, thank you, Mr. Chairman. I appreciate it, and I am trying not to talk with my mouth full, so I apologize.

But I do want to take this opportunity as we are closing out this hearing to just revisit some of the discussion today. And I really want to frame this conversation around the urgency of this issue. I think some of that got lost in the details today.

This is not only a national security emergency for the United States. This is about making sure that we can make good on our responsibility to ensure that we are not passing a global tipping point in climate change over the next decade. If we do not address these supply chain issues, we will not be able to implement the technologies and changes to our energy systems that will enable us to cut carbon emissions so that we can hit our carbon emissions standards to prevent catastrophic climate change.

So, this is an urgent issue. It is a national security issue. It is an economic issue for the United States, and it is a global issue. But in the pursuit of addressing these global and national security issues, we cannot return to this. We cannot mine and permit our way to a solution, I think as we have heard here today.

And I don't think anyone in this room—obviously, those of us who serve on this Committee care deeply about nature, the environment, the outdoors—I don't think anyone in this room wants to return to the past, where corporations went into communities, made mining claims, and then strip-mined them. I bet we have a lot of outdoors people here, a lot of fishermen, a lot of people who are hikers and spend time outside. Can you imagine?

What I am hearing in this hearing—and I think oftentimes the false equivalency that gets put forward—is the idea that if we just gutted our environmental laws, if we just took away the Clean Water Act, if we just took away the Clean Air Act, if we just got rid of NEPA, we could just open up all these mines and solve this problem.

Well, first of all, that is not true. That is not going to solve the problem. And I don't think that anyone in this room wants to return to an era when we had rivers on fire, when smelters were poisoning children and communities across the country, and where, when people went to their favorite fishing spot or a tribal community went to pray in one of their most sacred sites, they found that a mining claim had been laid and strip-mined. I don't think anyone wants to return that to that era. And, certainly, I don't think American workers want to return to that era.

So, what we need to do is really take an approach that is smart, that is science-based, that is a human-rights-based approach that really addresses this issue from all aspects.

Of course, we have to address the international security and trade issues. Of course, we have to address the human rights abuses that are happening from the sourcing of some of these minerals.

And I want to be clear. This is a mine with cobalt. We are talking about dozens of different minerals across the world. There are mines that are doing responsible sourcing that do have good labor practices. But what we need is to make sure that we have a multi-pronged approach that addresses these issues.

Finally, I just want to say that this body has already taken significant action to help address these issues. This last Congress we passed a Bipartisan Infrastructure Law. It makes some of the

largest investments in infrastructure in the history of our country in certain sectors, particularly in natural resources, and it includes a number of provisions that will help to build out a sustainable supply chain for our critical minerals.

We also passed the Inflation Reduction Act in August. And while we did not have bipartisan support for that bill here in the House, what I can tell you is that it is the largest single investment in climate action, not only in the history of the United States, but the history of the world. And it sets us on a path not only to clean energy for the United States, but energy dependence and the ability to address the catastrophic change that will happen from global climate change.

The future of our country, of our communities, and of our children depends on bipartisan action on this issue. And, Mr. Chairman, I deeply appreciate your bipartisanship this morning, and truly look forward to working with my colleagues across the aisle, because the urgency of this issue demands that we do.

Thank you, Mr. Chairman, and I yield back.

Dr. GOSAR. I will take the liberty of making one comment.

If we are worried, really worried, about climate change, we ought to be looking at bringing the smelting process back to the United States. Think about this. This is heavy material. It is being transported out, transported back. That is an unnecessary type of a process. So, we need to start looking differently, and that is what Einstein said. Don't think more, think differently. And I think we can make this all work.

The gentleman from Montana is recognized for 5 minutes.

Mr. ROSENDALE. Thank you, Mr. Chair. We have been hearing a lot of discussions about the mining law of 1872, and that is the only thing that groups act like that we are relying upon in order to authorize, permit, and open a mining facility. And I just really, really think that that premise needs to be clarified here.

There is an awful lot of additional regulation, and the problem is that this body has allowed those regulations to be drafted and created by outside agencies, thereby granting them the ability to impose those just like they are the rule of law. Well, we are supposed to be the lawmakers, and we need to make sure that we provide that clarity for industry.

We need to provide that clarity for the agencies, and it hasn't happened. And because of that, there are groups that have emerged across the nation that have financially benefited from the different laws that are put in place, making sure that they are able to get their legal fees back again once they tie up many of the mines, and extractive industries, and harvesting of timber, things that, again, would not only benefit the nation economically, financially, and from a national security standpoint, but actually help the environment, as well, because it is just good management of the land.

So, Mr. Moats, I would like to ask you, it is clear that we don't rely just upon the mining laws of 1872. Could you tell me just a few of the things that an organization would have to go through, and the permitting that they would have to achieve in order to open up one of these facilities?

Dr. MOATS. Thank you for the question. Again, I am not sure, as I am not a mining engineer, and I am not sure that I know the depth of the knowledge that I would like to have to answer your question.

I do know that the 1872 law is one of the laws. There were, again laws in 1970, and a revision in 1977, and another one in the 1990s. And then every state and every local community can have their own laws.

I think before the House, the National Mining Committee, or National Mining Association, brought before you, and it is in your minutes from the last Congress where they brought forth the poster that they made to permit a mine in the state of Nevada. And it started over there, and it went all the way around the room, and it is quite extensive. And there are now mines in Minnesota and Arizona that have been trying to be permitted for 13 to 15 years.

And I would just echo what has already been said by my fellow witness, which is I don't think we are asking to get away and gut existing laws. I think the mining industry and the processing industry just wants certainty.

If you look at the Australians and the Canadians, they have a 2-, 3-year permitting turnaround. You can make business decisions. Right now, with the uncertainty, open-endedness of whether or not, who is in the administration that is in charge, and whether or not licenses will be pulled and so forth, it is the uncertainty.

I can give you numerous examples over my career where people have brought in—we could have a copper smelter in Texas right now, except for that a company from, we will say an Asian country, not an allied Asian country was going to put one in in Japan. I mean, Japan was going to put in a smelter in Texas. And after having to deal with the permits for 10 years, they said, no, we are not going to do that. So, it is a real problem.

Mr. ROSENDALE. Thank you very much. And, again, if none of us are sure what minerals and elements are going to be utilized and most efficient in 10 years from now, it certainly makes it difficult to drive permitting today for something that is unknown.

Once we determine what we need, if it is going to take another 10 years or 20 years before you can actually refine it, mine it, and utilize it, by then it very well could be replaced by yet another mineral.

And I can tell you that, in the state of Montana, which is known as the Treasure State because of all of the minerals that we produce, we have not issued a new mining permit in 20 years, in 20 years, and that is a shame.

Mr. Chair, I yield back.

Dr. GOSAR. I thank the gentleman from Montana. The gentleman from Arizona is recognized, the Ranking Member.

Mr. GRIJALVA. Thank you, Mr. Chairman, and I am one that, in my time on this Committee, I have hated this second round of questions, but I am going to take advantage of it today.

[Laughter.]

Mr. GRIJALVA. Dr. Moats, this time sequence issue. We are dealing today—the urgency is that, as my colleagues across the aisle have made pointedly clear today, and yesterday, and the day

before, is that the Biden administration is effectively not only standing in the way, but making it impossible for the kind of critical mineral extraction in this topic to get done. That is the timeline that we are dealing with right now, politically and, I guess, in terms of a reaction to a policy. It is the Democrats, it is this, and that, and that is the timeline, 2 years.

Things were much rosier for the previous administration during those 4 years? Everything was fine? The regulatory demand wasn't there? NEPA wasn't there? Litigation wasn't there?

Dr. MOATS. Thank you for the question. No, this has been a problem for 20, 30 years.

Mr. GRIJALVA. And the root of the issue is still, in my mind and your reaction, an antiquated mining law that has not been reformed, updated to this particular century we are in?

Dr. MOATS. I would not classify my comments that way. I think the mining law has been modified, maybe the mining law has not, but there has been additional legislation that has been passed that all the mining companies and processing companies have to adhere to.

Mr. GRIJALVA. And it was around issues of public health, primarily, where they started to get generated in the 70s, when health issues became the critical question.

So, that is the root of why this discussion is going on, the practices and abuses of the past. And that legacy is not something that people want to repeat. The processes that are being put in place and being talked about now are—in terms of permitting reform—to begin to eliminate some of those protections. And as the Ranking Member said, the complexity of this issue doesn't mean that you leave something behind that was put in place in order to protect public health and communities.

I think this question is not simplistic, and this question is not going to be solved by just talking about permitting reform and the poor mining companies.

The other question I would like to ask, Mr. Mintzes, is ownership. I mean, this isn't the guy that was putting things on his boot and going up the mountain to look for gold and silver, 1872 kind of style. We are talking about multi-national, foreign-owned companies across the whole area.

One of the things I have been promoting, if we are serious about, is that those mining companies that have those horrendous human, environmental, and labor abuses, and are doing businesses in other parts of the world, wouldn't it be prudent for the United States to ban them from doing business on our public lands and waters, as a consequence to those practices, as a deterrent to those practices, as an incentive to stop those practices?

Mr. MINTZES. Forgive me, Mr. Grijalva. Do you mean as an—go ahead.

Mr. GRIJALVA. We keep talking about this as an American issue, and it is. But the ownership and the exploitation of most of these minerals is foreign, including Chinese. Even some of the mines in Arizona have a percentage of which are Chinese-owned. So, should they be banned? Because they are the bad guys.

Mr. MINTZES. Thank you, Mr. Grijalva. You illustrate a really important point about the way the 1872 mining law functions. And

I am going to defer to you and to your colleagues who serve on Armed Services to make decisions about what is in our national security.

What I am suggesting, though, is that if anybody, foreign or domestic, friendly or not, can stake a claim to American minerals, and then they own those by virtue of this statute, I am suggesting that makes me feel insecure, so that is why we are urging your reform, so that we have a leasing system for public lands minerals, where we can have an upfront suitability determination, and know who is going to be leasing these things, and other reforms, too.

Mr. GRIJALVA. And apply and provide assurity to the private sector and assurity to the workers at that level. I think that is why this law works against that assurity, I think.

Anyway, I yield back.

Dr. GOSAR. I love the gentleman's—where he is going with this. But you never do treaties from a weak point, you do it from a power of strength. So, in the aspect of trying to say no to China, we actually make it worse for us and better for them.

Look what we did with Russia, with oil. We said we were barring them. Oil shot up. They had more profits. They had more tanks. They had more things to buy with that money.

So, once again, this goes back to what Einstein said: Don't think more. Think differently. I will give you an example.

What if I told you about oil sands, and the gentlemen, the three chemists who figured out how to extract oil sands, want to give it to the American people? They don't want to give it to a company, they want to give it to the United States. It is very profitable. They can produce a barrel of oil, sweet crude that we have very little of, for \$11 a barrel. Wow. Wow. So, we have to think creatively here, and we can't pick one aspect.

The gentleman from Georgia is recognized for 5 minutes.

Mr. COLLINS. Thank you, Mr. Chairman.

Before I get into some other comments, Mr. Moats, or Dr. Moats, I think your comment on 20 to 30 years is exactly why I am here today. We are sick and tired of the agencies in this Federal Government regulating and pushing people out of business. It is one of the reasons we have an oversight in every Committee that we have up here. They act like they are a fourth branch of government, and they need to be brought under control. So, I appreciate your comment.

The Chairman was talking about solar panels. As someone that is in the transportation industry, you may not realize this, but we utilize solar panels. And, today, we can't hardly get them because there is such a backorder on them. So, they are being utilized more and more, and we really don't know what the potential for solar panels are. So, that is just another added example of how we need to be mining, instead of just recycling.

Mr. George, I wanted to follow up on something real quick. You were talking about replacing a pipeline that took 8 years, an old mine that was trying to get re-permitted, and it took over 20 years. I understand there are regulations and then there is Federal Government just dragging their feet.

Do you have percentages of how much of that was litigation versus just the Federal Government dragging their feet?

Mr. GEORGE. I probably can't give you a percentage, but it is both. It is local, state government dragging its feet, those agencies, it is the Federal Government permits dragging their feet or just ignoring permit requests. It is lawsuits. It is litigation. It is all of it.

And I would just add real quickly, my friends here who are talking about recycling, I don't know if you have ever been around a metal recycling plant, but good luck getting those permitted.

Mr. COLLINS. Thank you.

Mr. Loris, I had a question at the very beginning. We didn't get to it. You referenced a decline in metal smelters and refineries in the United States. And why have we lost our domestic facilities, and how do we compare with competitors like China?

I think we are down to, what, two, maybe three copper smelters in the United States? Three? Versus what, 50 in China?

Mr. LORIS. That might be more for Dr. Moats. I think he has more information on that.

I will just say I think it is a combination of factors. I think regulations certainly play a part. I think the flooding of markets and competition abroad certainly play a part and certainly render some of these things uneconomical.

But Dr. Moats is more of an expert on that than I am.

Dr. MOATS. We currently have three copper smelters and two copper refineries in the United States. There is a German company who is looking to install a secondary or a recycling smelter in Georgia. Aurubis is getting the permits and, I believe, is starting to break ground.

Why did we used to have 13 to 14 smelters when I started my career and have shut down? It is because of (1) the mining grades have declined; (2) because it is more profitable for mining companies to export the minerals than to upgrade their existing smelters, so they shut them down from an economic standpoint.

Mr. COLLINS. Is that due to regulations?

Dr. MOATS. That is part of it. I mean, they have to adhere to the Clean Air Act, and the Clean Water Act, and all the other acts, and all the local things. So, they made an economic decision that it was more profitable to ship the minerals elsewhere. It is not just copper, it is lead, it is zinc. It is many.

Mr. COLLINS. Thank you.

Thank you, Mr. Chairman. I will yield back.

Dr. GOSAR. The gentleman from Minnesota is recognized.

Mr. STAUBER. Thank you, Mr. Chair, and I just want to reiterate some comments from Chairman Westerman, and this is to our Ranking Member.

We have to reform our permitting process in order for us to mine, bring processing and manufacturing back to our country. That is a great start. That is going to help secure our strategic national security.

I have a question for Mr. Moats, and the question is this: If today China and Russia stopped selling us rare earths and critical minerals, what would it do to our national security?

Dr. MOATS. It would be devastating. I mean, we can't survive. Not just us, but the entire world is dependent on China, specifically. But the Russians produce some nickel and some platinum

group metals, so we are also dependent on them. It is an interconnected world economy. And if you take off the China, specifically, because they produce 40 to 50, to 80 to 90 percent of each of these things, it would be devastating.

Mr. STAUBER. I just want everyone to understand his answer to my question. If today the Communist country of China and Russia stopped selling us their rare earths and critical minerals, his response, it would be devastating to the United States.

How can we allow that to happen, the strategic national security, when we have these natural resources in the palm of our own hand, in our country, using our environmental and labor standards? How did we get this way? Why?

And then I entered into the record the E&E News article, where this Administration goes to foreign nations to process these. Give me a break.

I want to just reiterate something that was the question my friend from Georgia asked. The Boundary Waters Canoe Area Wilderness was incorporated in 1978. The Democrat Member of Congress who sat in this position, James Oberstar from Minnesota, did not support that. He did not support the wilderness, taking that off-line.

But the fact of the matter is the wilderness was made, and then a buffer zone around the wilderness was put forth. And I want everybody to know there will be no mining in the Boundary Waters Canoe Area Wilderness, and there will be no mining in the buffer zone around it. But like my colleague way back in the late 70s said, "If you are going to make this wilderness on that outside, do not take our livelihood away," and he was referring to timber, harvesting, and mining. He was so far ahead of us in his thinking, because he knew today we would be fighting for these jobs and these minerals. That is how far Congressman Oberstar was ahead of the thinking.

And it really, really pains me to hear your answer that it would devastate the United States of America. We need to have permitting reform to mine in our country, to process, and manufacture. We, for strategic reasons, need to do this, and I am looking forward to a healthy debate on how we can do that, how we can bring back our manufacturing, and our mining, and our processing to the shores of this country.

If we didn't learn anything from COVID, shame on us. Shame on us. The dependency that we have allowed this nation to go forward and depend on adversarial nations for our strategic national security, we can't allow that. We have to change course today.

And I yield back.

Dr. GOSAR. I thank the gentleman. I am going to recognize myself, and then I want to prepare the witnesses. One of the things I have always done in the past is ask you, after I am done with questions, what was the one question you wanted to have been asked? What is its answer, but it was never asked?

So, I thank the gentleman from Minnesota. I want to enter into a colloquy with him, if he will stay behind.

Are mining and enjoying the wilderness and the environment mutually exclusive?

Mr. STAUBER. We can do both. We have proved we can do both, because we have been mining for 135 years in northern Minnesota, and northern Minnesota is a great recreational area to live, work, raise a family, and make a good wage.

Dr. GOSAR. I also would ask him, who is more stringent on things in our backyard, the Federal Government or the people of the towns, counties, and cities of Minnesota?

Mr. STAUBER. The towns, counties, and cities have their pulse on these issues. And as Mr. George said, they support mining on the Iron Range.

Dr. GOSAR. Do they also believe in the same principle that I brought up of Einstein, think differently, not more, particularly with the re-purposing of the taconite mines?

Mr. STAUBER. That is correct.

Dr. GOSAR. Great fishing there, right?

Mr. STAUBER. Very. I would say, Chair Gosar, would you yield to me for 20 seconds?

Dr. GOSAR. Sure.

Mr. STAUBER. You came up to northern Minnesota several years ago with my predecessor in the Western Caucus. The same issues that we were dealing with back then, the same two major mines, it has been how many, 7, 8 years ago. And the permitting for one of the mines is in its 20th year, and another going into its 10th year.

And the biggest copper nickel find in the world, 95 percent of the nickel, 88 percent of the cobalt, over a third of the copper and other platinum group metals are sitting in a beautiful reserve in northern Minnesota.

Dr. GOSAR. I am going to take it from there.

Dr. Moats, there were comments made today in regards to the permitting process. Part of the problem that I have found—and I am the one responsible to getting the Resolution Copper through Congress, but we still haven't mined a damn thing—is the bureaucracy. The bureaucracy, you have people inserted that believe that they are there to stop something. That is not what I understand. My understanding is they are here to facilitate the implementation of the laws that Congress passes. Are you in agreement with that?

Dr. MOATS. Having done my degree at University of Arizona, bear down.

I have listened to Rio Tinto talk a lot about the Resolution Copper project over the years and, of course, they are very politically sensitive, and don't really say anything. But it seems very clear that, when they make a step forward, it is two steps back for many years. And we are now over 13, 15 years trying to permit that, and I know there are lots of problems with that. There are tribal lands, there are deep, deep mines, there are lots of issues related to that.

So, I think, again, what my colleague next to me said, I think the mining companies are just looking for clarity on—there is a fixed time, and if we don't make it through, then we don't make it through, so we can make an investment somewhere else, as opposed to just the uncertainty of if we will ever be allowed to do this.

Dr. GOSAR. And I also want to set the record straight.

So, royalties. There are royalties that are paid for this, right? They just go to the state.

Dr. MOATS. Yes, there are royalties.

Dr. GOSAR. Yes, that is what I thought.

I agree with the certainty. And one of the things that I have been very poignant with Resolution Copper is trust is a series of promises kept. Everything you do, go for transparency and go above the grade.

They have done more than their fair share. They have invested over \$1 billion to reclaim the mine that was there before, \$1 billion. No one talks about that. None, notsoever.

So, now I am going to go to Mr. Loris. And what was the question you wanted to ask that wasn't asked, and what is its answer?

Mr. LORIS. Just quickly, one, I think, is just a lot of these conversations are about trade-offs, and those trade-offs can be very difficult conversations from an environmental standpoint. Some people might like an unobstructed river, some people might like a dammed-up river, because it provides clean electricity. So, having those conversations about environmental trade-offs is often complicated, and we should acknowledge those complications.

I would also add that we have talked a lot about community engagement and respecting the rights of tribes, which I think is critically important for any process moving forward.

I think we also need to be cognizant of when tribes are supportive of these projects. The Thacker Pass mine in Nevada, the McDermitt Tribe is supportive of that. Indigenous groups have been supportive of oil and gas development in Alaska. So, I think it cuts both ways.

Dr. GOSAR. Thank you.

Dr. Moats?

Dr. MOATS. Thank you. I feel like I have been asked a lot of questions. I think the question that I would like to have been asked is why don't we do rare earths in the United States? And the short answer is we know where they are. We know how to get them. We know how to make the metal. So, why aren't we?

And that resides to—many of the questions that we have here is whenever we are doing this, we will always produce waste. And that waste that comes out of rare earths is radioactive. It is the thorium, it is the elephant in the room. So, until we come up with a policy and a plan to deal with thorium, we are going to be beholden to other countries, and we are going to export our wastes somewhere else. Thank you.

Dr. GOSAR. I am very aware of that. In fact, in La Paz County we have a deposit of Scandium that has no association with thorium. So, why aren't we mining? Just FYI.

Mr. Mintzes, your question?

Mr. MINTZES. Thank you, Mr. Gosar, I appreciate this. I actually want to take a shot at the permitting question.

Dr. GOSAR. OK.

Mr. MINTZES. Is that OK? OK. I disagree with my dear friends here sitting next to me.

I believe that the average time it takes the BLM and the Forest Service to permit a large hardrock mine on public lands is 2 years, according to the Government Accountability Office. And when you

look at the mining company's own data that they annually supply to the Fraser Institute, which is a Canadian think tank that is supported by the mining industry, for exploration permits the amount of time is 11 to 14 months here in the United States, 8 to 10 sometimes, OK?

And just quickly noting that, as we discussed, under the 1872 mining law, if you explore, you discover the valuable minerals, that is kind of the ball game. So, 8 to 10 months, maybe 14 months to get an exploration permit, then it is ball game under the 1872 mining law. So, that is my two cents on mine permitting reform, besides what the Congress did last time.

Thank you, Mr. Gosar.

Dr. GOSAR. Thank you, Mr. Mintzes.

The gentleman from Minnesota is recognized for his question.

Mr. GEORGE. Mr. Chairman, you touched on this briefly. The question that I was hoping would be asked is, and I touched on it briefly, too, what do the people that live where the resources are think? They want to mine the resources, is the answer to that question.

And why don't we trust them? Because they want to mine them responsibly. It is their back yard. They are the ones that are going to hold the mining companies accountable to labor standards, to environmental standards. They are never going to support a mine that would not follow those. I wouldn't. Why aren't we allowed to do what we know we can do, and why doesn't anybody trust the people that live in these areas is the question that I have.

Dr. GOSAR. That is a great, great question. And one of the things that I will tell you, and particularly on the way that Arizona was admitted into the country, they were forced to take the Federal Doctrine, but they were actually guaranteed the multiple-use doctrine aspects of public lands for the maximum to be shared.

So, in that aspect, it implies contract. And in that contract, it is not the Federal Government as a last resort, it is the State. So, we have to start looking at this creatively. The Federal Government has been given way too much power. That was the exercise that happened earlier this year. We had made a speaker much too powerful. It wasn't the person, it was the position. And the correcting aspect is the 10th Amendment.

Folks, this has been a great meeting, great conversation. And with that, I adjourn this meeting.

[Whereupon, at 11:13 a.m., the Subcommittee was adjourned.]

[ADDITIONAL MATERIALS SUBMITTED FOR THE RECORD]

Submission for the Record by Rep. Grijalva

COBALT INSTITUTE

Hon. Bruce Westerman, Chairman
Hon. Raul Grijalva, Ranking Member
Natural Resources Committee
1324 Longworth House Office Building
Washington, DC 20515

Hon. Paul Gosar, Chairman
Hon. Melanie Stansbury, Ranking Member
Oversight and Investigations Subcommittee
Natural Resources Committee
1324 Longworth House Office Building
Washington, DC 20515

Dear Chairman Westerman, Ranking Member Grijalva, Chairman Gosar, and Ranking Member Stansbury:

I write on behalf of the Cobalt Institute noting that your Committee conducted hearings last week to examine the critical minerals supply chain. The Cobalt Institute is a global trade association composed of producers, users, recyclers, and traders of cobalt, and our members include companies in the US and North America.

Cobalt is vital for lithium-ion batteries as used in our phones, computers, and electric vehicles. It is also essential for defense and aerospace applications, for example through the production of corrosion-resistant super alloys, and well as in magnets, wear-resistant tools, high-strength steel, pigments and coatings, and as a catalyst for the desulfurization of oil.

Summary

In the coming decade, the cobalt value chain, batteries and green technologies will be a major driver of growth and job creation in the United States. With the right conditions for industry, the US has the potential to be a leader, securing market share and creating resilient supply chains based on successful home-grown businesses. This will only happen with early, decisive actions, taken in cooperation with international partners. Areas and regions that are first movers will be well-placed to benefit from the industry's growth. The Cobalt Institute is a leading authority on the cobalt industry and can support understanding of the industry and the opportunities that exist.

In terms of the topics being explored by the Committee.

On diversification, the Democratic Republic of the Congo (DRC) will remain an important source of cobalt. Its government has indicated its eagerness to work closely with the United States and develop “win-win” partnerships on the supply of critical minerals, including investment in mining, processing, refining and infrastructure. Diversification is possible, with the world's second largest cobalt reserves being in Australia, and large reserves being available in Canada, Indonesia, the and the Philippines. Cobalt is typically mined as a byproduct of copper and nickel mining. Additionally, cobalt is highly recyclable and—with the right policies—the United States can establish a largely circular economy for cobalt.

On human rights: Conditions at artisanal and small-scale mining (ASM) sites in the DRC are generally poor. The ASM cobalt sector is largely informal and connected to some very negative impacts including highly hazardous working conditions, gender discrimination, unfair trading practices, and, in certain instances, child labor. ASM remains a business reality in the Congolese cobalt supply chain and cannot simply be shut down. Cutting ASM out of the cobalt supply chain is neither feasible, due to the interwoven nature of the cobalt supply chain, nor desirable from a development perspective. Rather than excluding the ASM sector from markets, a truly just transition would bring artisanal workers and communities

along by promoting formalization, capacity building, professionalization of mining techniques, and fair-trading practices, among other drivers to improve outcomes for ASM communities.

Diversification

There is enough cobalt for the US to achieve a resilient long-term supply of cobalt, albeit it also needs to take steps to ensure it can continue to access these resources. Globally, new cobalt streams can be brought online in a number of ways, including undeveloped mining assets, extracting cobalt from tailings sites, recycling, and—assuming it can be done sustainably—nascent exploration of deep-sea resources (where there is estimated to be 120m tons of cobalt, compared to 8.3m on land¹). While the US does have exploitable cobalt reserves, there will remain a need to source cobalt by other means.

Lithium-ion batteries will be the main driver of demand for cobalt over the next decade. This growth is expected to be significant, primarily driven by the increased use of electric vehicles. While there are many alternative cathode chemistries available for electric vehicles, none can match the range, performance, durability, and sustainability of those containing cobalt, which is why they have been the preferred technology choice for manufacturers.

It is possible to achieve increased diversification of supply chains for cobalt, but there will remain a need to source from the Democratic Republic of the Congo (DRC). Therefore, it is important for the US to engage in the DRC and invest in it as well at the same time as seeking partnerships outside of the DRC. The recently signed Memorandum of Understanding is a step in the right direction. The DRC recently outlined plans to secure more of the battery value chain, including refining and cathode manufacturing, domestically. There is an opportunity for the US to support and benefit from this.

One advantage cobalt-containing chemistries have versus some other cathode types is their high recyclability. The US can take advantage of this if it plans ahead. Cobalt is a valuable metal, and this makes cobalt-containing batteries economically attractive for recyclers. Cobalt is also highly recyclable from cathodes (90%+) and endlessly recyclable, helping used batteries be efficiently transformed into new batteries, while reducing the need for primary cobalt. It's worth noting that alternative cathode chemistries may also use critical minerals but without the ability to be well recycled. Recycling rates have doubled through 2010–2021, going from 4% to 9% in 10 years. Recycling is expected to continue to rise especially due to new technological innovations that will come onstream. It is expected to reach 20% of the total cobalt supply in 2030.²

However, whilst recycling can play an important role in the medium term, there will also be a need to use primary cobalt in the coming years. Reserves of cobalt in the DRC constitute about 48% of all global reserves; Australia has the second largest (18%), with Indonesia third (7%). Significant reserves also exist in Canada, Madagascar, and the Philippines. Diversification is therefore achievable.

As with many industries, refining of cobalt is currently concentrated in China (72%³). Cobalt refining does take place in developed Western economies, and there is the potential for this to be ramped up if there is a political desire to do so. The second largest refining country is Finland albeit at only 8% of global supply and Canada at 4%.⁴ The DRC recently outlined plans to try to secure more of the battery value chain domestically—including domestic refining of cobalt and cathode production—to secure more value addition from their natural resources. This plan will require investment, both in facilities themselves but also in associated infrastructure, and the US is well-placed to support them.

It is also important to note that batteries can be used for years once manufactured. This means supply chain fluctuations would likely be more of an industrial concern than a consumer one.

We suggest a number of ways to achieve stable long-term cobalt supplies. This includes broad mining capacity (DRC, rest of world, and domestic) as well as investment in domestic mining capacity and exploring possibilities for sea-based resources.

¹ United States Geological Survey, Mineral Commodity Summaries 2023—Cobalt.

² The Global Cobalt Socio-Economic Analysis (SEA), Cobalt Institute/Wood Mackenzie, 2021 (can be made available on request).

³ Wood Mackenzie.

⁴ *ibid.*

Below are some specific policy recommendations for each of these, the totality of which will contribute significantly to supply chain resilience:

1. **Domestic mining**—the US is unlikely to be self-sufficient for cobalt from its own land-based reserves however it does have reserves that it can exploit, and this can certainly support supply chain resilience.
2. **Democratic Republic of the Congo**—the current administration in the DRC has a reasonable relationship with the US and is keen to secure economic growth from its natural resources. There is an imperative on the US to engage proactively with its government, to support its ambitions and to make strategic investments in projects and infrastructure. This would help the US secure access to cobalt whilst also creating additional supply. It should be a key part of its international engagement.
3. **Invest outside the DRC**—more mining capacity needs to be developed in the next decade to meet the expected demand for cobalt. US and Western companies can make those investments across the world in order to ensure long-term stable access to cobalt. The US Government might choose to make these investments a strategic priority, especially in countries like Australia and Canada.
4. **Recycling**—a circular economy for cobalt can be established, although the main barrier currently is collection rates for used batteries. Policy mechanisms could support the collection and recycling of end-of-life batteries. This will take time to create, so primary materials will be needed until a critical mass of recycled content is achieved. The EU has already done work on this via its proposed Battery Regulation.

There is also the opportunity for the US to support investment in cobalt refining and processing capacity. This can be done profitably in Western nations but tends to have migrated to China where the economics have typically made more sense for companies. There is notably also a trend toward the co-location of the electric vehicle supply chain—vehicle manufacturing, battery production and cathode production—which means having a robust value chain for cobalt creates synergies for the whole green economy. Therefore, having processing and battery manufacturing capacity is a catalyst for competitive electric vehicle manufacturing.

Human rights

The majority of all cobalt mined in the DRC comes from industrial mines that are mostly operated by large or global companies. Some 12% of DRC supply is estimated to come from artisanal and small scale mining (ASM),⁵ although estimates are difficult to make and can vary between 10–20%. Responsible mining practices is a priority for the cobalt industry. The mining industry provides the resources necessary for creating and developing modern materials and enabling technological progress and, as a responsible industry, has also provided substantial benefits including economic advantages, environmental stewardship, health and safety standards, social welfare, infrastructure, education and training, alternative livelihoods and human rights awareness.

We acknowledge that conditions at ASM sites generally are poor. The ASM cobalt sector is largely informal and connected to some very negative impacts including highly hazardous working conditions, gender discrimination, unfair trading practices and in certain instances child labor.

The production of cobalt from artisanal sites in the Congo represents the second-largest cobalt-mining sector in the world after industrial production in the DRC. Cobalt extraction through ASM therefore is an important source of cobalt and an important development opportunity for the DRC, on the condition that responsible practices can be established.

ASM remains a business reality in the Congolese cobalt supply chain and cannot simply be shut down. Cutting ASM out of the cobalt supply chain is neither feasible, due to the interwoven nature of the cobalt supply chain, nor desirable from a development perspective. Instead, companies committed to setting up responsible cobalt sourcing practices must consider how to take responsibility for addressing the severe practices that blemish the ASM sector.

The Cobalt Institute advocates on the need to move forward mindful of the need for a green, equitable and just transition. Rather than excluding the ASM sector from markets, a truly just transition would bring artisanal workers and communities along by promoting formalization, capacity building, professionalization of mining techniques, and fair-trading practices, among other drivers to improve

⁵ Cobalt Institute, State of the Market report (produced by CRU), 2021.

outcomes for ASM communities. Failure to do so risks amplifying the existing inequities that have exacerbated the climate crisis. It also drastically reduces the ability of downstream companies, particularly those subject to ever more stringent human rights due diligence legislation and import bans, to source artisanal cobalt at all without risking significant penalties.

The Cobalt Institute advocates for standards that reflect the unique needs of the ASM sector and that are aligned with international frameworks such as the U.N. Guiding Principles on Business and Human Rights and the OECD Due Diligence Guidance. This must be accompanied by the recognition from downstream users, and indeed regulators, that these cannot be achieved overnight and that there must be upfront investment and capacity building to support sites to progressively meet these standards.

Addressing deep-rooted challenges that hinder the progress of the ASM cobalt sector is not the sole responsibility of any individual company. Only by working through a multi-stakeholder approach with key actors in the supply chain, globally and in the DRC, including the government, cooperatives and concession holders, civil society, workers, as well as companies further up the value chain, will effective systems that promote responsible cobalt practices be developed. Coupled with standards, is the need to address the root causes driving some of these severe practices through multi-stakeholder approaches.

There are several initiatives already set up to with the objective of achieving formalization of the ASM community and eradication of child labour, which the CI is engaged with. However, although there has been some effort recently for the initiatives to coordinate amongst each other, and particularly through the RMI's creation of an ASM Coordination Dialogue Group, it is hard to get access to the data to demonstrate the collective impact they are having on the ground. We therefore call for more transparency and disclosure of these efforts and common metrics to help us to demonstrate tangible progress to stakeholders and the country itself.

Key initiatives and partners include, among others:

- The Fair Cobalt Alliance (FCA)
- Responsible Minerals Initiative (RMI), which is developing its ASM Cobalt Criteria (formerly spearheaded by the Global Battery Alliance's Cobalt Action Partnership). It also convenes an ASM Coordination Dialogue group.
- The Entreprise Générale du Cobalt (EGC)
- Cobalt For Development (C4D)
- Global Battery Alliance
- Pact
- OECD
- U.N. Global Compact
- Responsible Batteries Initiative
- Copper Mark
- Better Mining
- Drive Sustainability
- Afreewatch
- SARW
- US Department of Labor
- EU DG for International Partnerships (DG-INTPA)
- ILO
- Project COTECCO

The political and legal context has been challenging and impeded progress to making positive changes on the ground. The Cobalt Institute advocates for the DRC Government to be clear and coherent on its commitment to progress the formalization of the ASM cobalt sector. This in our view is key to instilling greater confidence amongst downstream players and financial institutions to invest in formalization efforts as well as in other ambitious plans the Congolese Government has to retain more value in-country through the development of a local battery value chain.

The Cobalt Institute believes that the solution to ASM governance must be on Congolese terms, in accordance with Congolese law, and in line with existing formal and informal governance frameworks, at national, provincial, and on-the-ground levels. Congolese agency must be a key part of the discussion.

The Cobalt Institute is keen that all international actors handling matters relating to ASM acknowledge Congolese frameworks and institutions already involved in this issue, including—but not exclusive to—the following:

- Clauses in the Mining Code covering ASM, such as stipulations on *Zones d'Exploitation Artisanale* (ZEAs) or requirements around cooperatives.
- The *Service d'Assistance et d'Encadrement de l'Exploitation Minière Artisanale à Petite Echelle* (SAEMAPE), the oversight body charged with improving conditions on ASM sites.
- The *Entreprise Générale du Cobalt* (EGC), with the mandate to manage formalized ASM sites, and which has staff, equipment, and an established purchaser, albeit without ZEAs on which to operate, and with its legal monopoly in question.
- The *Autorité de Régulation et de Contrôle des Marchés de Substances Minérales Stratégiques* (ARECOMS), with the mandate to set regulation and standards in the artisanal sector, albeit as yet not operational.
- The *Centre d'Expertise, d'Evaluation et de Certification* (CEECE), charged with certifying the origin of mined material.
- The Musompo trading centre of the Lualaba provincial government, the management of which is subcontracted to Sud South, aimed at ensuring traceability and improved standards in the trade of ASM cobalt.

The Cobalt Institute recognises—and communicates clearly to our partners—that the Congolese government is willing and able to work with large scale miners (LSM) and ASM operators and wants to welcome further operators and Western investment.

The Cobalt Institute acknowledges the existing regulatory frameworks on community development alongside LSM, which provide substantial volumes of finance from LSM operators toward local development outcomes. These include, but are not limited to:

- The requirement that mining firms implement a commitment register (*cahier de charges*)
- Community endowment (*dotation*)
- Local government share of royalties (*redevance minière*)
- The *Fonds Minier pour les générations futures* (*Fomin*). This receives funds from the royalties.

The Cobalt institute acknowledges the existing informal norms for governing ASM operations developed by ASM actors themselves, which rely on informal contracts and structured informal organizations.

Concluding remarks

The Cobalt Institute advocates a coordinated approach to critical minerals sourcing, based on using US foreign policy and labor standards to raise standards, whilst also supporting security of supply. Political engagement with sourcing countries will create “win-wins” for the US, that include access to critical minerals and ensuring US-standards of worker safety and protection are ensured. This will also bolster the competitiveness of US companies and industries in fast-growing sectors.

On artisanal mining, industry is keen to work with the U.S. Government and Congress to address concerns and ensure the highest standards of human rights are maintained, including for example through supply chain transparency initiatives.

We look forward to the opportunity to be a resource to you and your staff and thank you for your kind consideration of this communication.

Sincerely,

CAROLINE BRAIBANT,
Interim Director General

