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Navigating the Critical Minerals Challenge: Insights from Industry Leaders

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China controls much of the global market for minerals that serve as essential inputs into a wide range of modern technologies, including for defense capabilities, creating a dangerous supply vulnerability for the United States. Washington has taken steps over the past several years to reduce its dependence on China, including outreach to resource rich nations, recycling and recovery programs, reviewing mining permitting laws, and providing financing for mining and mineral processing. But many of these efforts will take years to see fruition, and the U.S. dependence on China is likely to continue for some time. BENS recently interviewed three industry leaders for their perspectives on this complex challenge: Jon Evans, President and CEO of Lithium Americas; Selina Hayes, Founder and CEO of Hayes Group International; and Anthony Weiss, Executive Director at TechMet USA.



Jonathan Evans
President and CEO
of Lithium Americas



Selina Hayes
Founder and CEO
of Hayes Group
International



Anthony Weiss
Executive Director
at TechMet USA

Interviews have been edited for length and clarity.

The United States has taken a range of actions over the past several years to address our critical minerals supply vulnerabilities, many of which will take years to see fruition. What current efforts should the U.S. government double down on to effectively move the needle on our critical minerals supply?

Jonathan Evans: Domestically the United States has a lot of critical minerals but accessing them is always mired in controversy. Everything is wrapped up in this malaise around permitting reform. That issue has to be fixed for us to do anything else. Even John Podesta, Senior Advisor to the President for Clean Energy Innovation and Implementation, [said we've got to fix permitting](#) or else nothing's going to get done in this country. If you're an investor, you have to have surety on when you're going to get the return on your investment. If it's stuck in permitting forever, that's a problem.

Additionally, if the mine is on federal land, you don't have to pay a royalty to the government. But there are arguments that since oil, coal, and gas companies have to pay royalties on federal land, so should mineral companies. I think all companies including ours, because we are on federal land, are open to a fair royalty. For example, the Nevada Mining Code is very modern and often used as an example for the U.S. government to follow because it taxes net profits rather than gross profits or the amount of dirt taken out of the ground. That approach accounts for the fact that much of the cost of mining is the processing done to the raw ore after it has come out of the ground to make a useful end use application.

There are good efforts that are bipartisan regarding permitting in the Senate and there are bills that if promulgated, the Senate would vote yes. However, if they got to the House of Representatives, they would die if everyone voted along partisan lines. It's also just becoming too political right now. I'm on Capitol Hill all the time and I have to hear it from both sides. Both parties agree that we have to protect our national and economic industrial base. And both agree that we have to build stuff. There is a way to make everybody kind of happy with that.

Batteries are the key issue here. These minerals are in every battery. But they're also in weapon systems or helping to power our military. General Motors (GM) is developing a light combat vehicle that's battery powered as well as electrical storage units to replace diesel generators. I'm an ex-tanker. I only cared about three things every day. I cared about fuel, ammo, and water/food – in that order. And if you're driving a Humvee around somewhere, and it is battery powered, it's quiet. I don't have to haul around a bunch of HEMTTs (fuel servicing trucks) full of flammable fuel with me. And there's no heat signature. Small reconnaissance drones are battery-powered, making it a national security issue. Missiles and precision bombs all use thermal batteries (lithium/lithium alloy). That's the type of stuff we're seeing on the battlefield right now.

Another important government effort that has been supported for industry is low cost loans or small grants. It's just like the Space Race back in the 1960s. And look at all of the benefits that resulted from those investments. Many of the programs being designed today require significant due diligence before being granted and many require full repayment with interest. Our country has longstanding programs in place to help industries with significantly higher annual taxpayer costs such as agricultural subsidies which have been around since the New Deal. We have new challenges now where government assistance is needed to shore up industries that are important for our national and

economic security as our economy is changing and we need to meet the challenge to remain globally competitive. Talon Metals is an example of a nickel company that's working in northern Minnesota, and they've been given some money by the Department of Defense (DoD). And one of our peers (Albemarle) is working with the DoD to reopen a mine in North Carolina. Government is supporting these efforts as essential to national security.

Selina Hayes: I'll preface by saying it is incredible what is considered a critical mineral. Who thought copper and nickel would be part of a critical minerals list? What this shows is there has been a perfect storm of exponential growth in tech, development of green strategies, and persistent mining restrictions. Twenty years ago, the mining industry was told no, we don't want you to mine anymore. Now critical minerals have become a topic of the day in the U.S. government, but it's taken a long time.

The first thing that I think should be done is stockpiling. We should start building up a stockpile of processed minerals, and to be honest, the U.S. government shouldn't manage it. It should be managed by private industry with U.S. government support.

Then with the stockpile, it gives you a three-to-five-year window of knowing that we can continue our industrial base and decide how we want to reduce our dependence on China over the long term. We are still going to have to buy from China, but it gives us time to be able to come up with other solutions, maybe doing offshore refining and separation with some of our new partners in Africa and South America. They don't have the same environmental restrictions we have, so it could be easier.

Without the stockpile, you can't do this because to build those operations up, that takes five to seven years. Then, to develop our technology that is cleaner and more efficient to refine and separate here in the United States to create a domestic supply, that will take much longer.

For military requirements, the Services could come out and say, "we anticipate needing this amount over the next five years." And look at it like an offtake agreement with the stockpile. It may be that you don't buy the full amount, but at least you've got some estimates there, and that gives some security to private industry.

That said, the U.S. military is a small customer of rare earth and critical minerals directly. Really, the larger automotive companies and other OEMs (original equipment manufacturers), your Lockheed Martin's and GMs, are the major purchasers. I think a stockpile is like an insurance policy. To build a stockpile and get private industry involved in it, owning it, and running it, you have to make a great business case. If they're going to invest money in it, they have to make money. That's one thing I think can be done.

Anthony Weiss: The U.S. government has come an incredibly long way in recognizing that we need to urgently address a 20-year disadvantage in critical mineral security. And it's one of the few areas where there is bipartisan agreement that mineral security is a vital necessity.

Essentially, I feel we've got to do more of everything. Government agencies need more resources, more engineers, underwriters, analysts, more relevant overall expertise. The [Inflation Reduction Act](#) (IRA) and the [Bipartisan Infrastructure Law](#) were significant steps forward and there are several other helpful existing initiatives. I'm impressed by the caliber of the experts that have been recruited from the private sector, as well as the deeply committed Department of Energy employees who understand what's at stake. The [State Department's Mineral Security Partnership](#) is clear in intention

and thinking hard on how to add the right partners. Agencies like the Export-Import Bank and the Development Finance Corporation (DFC) are also making impactful progress. The DFC is a direct equity investor in [TechMet](#), the group that I work with, and their investment has been transformational in a variety of ways. They made their initial investment under the previous administration, and then have followed and furthered their dollar investment in subsequent equity raises.

There isn't one specific government effort that can serve as a silver bullet, it's really all of them, together and holistically, ensuring they are fully resourced and coordinated at both interagency and then at different government levels. It also devolves to the state and local level, all the way to issues like permitting. It's a multi-pronged, multi-agency set of issues that need to be constantly reinforced. Building capacity for production, processing, or recycling of all these critical minerals is highly technical and capital intensive. We're trying to do all of this quickly, and I think traditional government structures and processes were not designed for all that needs to happen. My concern is that we have a lot of directionally great efforts, but overall we are spread too thin to make enough of a difference in reducing our exposure. But overall, to move the needle, U.S. government funding agencies need more resources and to deploy capital much faster, while maintaining high environmental, social, and governance (ESG) standards. It's a very difficult task with high stakes.

How can the United States improve its commercial diplomacy with resource rich countries, including across Africa, to better compete with China's investments in the same regions?

Jonathan Evans: One issue is making sure we're engaging in the right kind of diplomacy with the countries we're trying to work with. There is a lot of effort to compete with China in Africa, but if you're looking to invest in the region, you have to be concerned about dealing with corrupt governments. The U.S. government can help address those governance challenges through government-to-government commitments on the conditions for investment and cooperation.

Another area is helping to achieve the right incentive structure for the parties involved. Obviously, the host country has to see there's a benefit to them, but then the company that's investing is also putting their capital at risk and needs to see a return. We want to avoid situations like what happened in [Panama with First Quantum](#) operating a major copper mine and the government ordered it closed. The company had to raise \$2+ billion in asset sales to keep afloat.

The [critical mineral requirement](#) in the IRA's tax credit is helpful in this regard. Companies like GM get a \$3750 tax credit for each electric vehicle they sell where a percentage of the critical minerals are sourced domestically, or a friendly country (those with which the United States has a Free Trade Agreement), making it important for them to build and invest in IRA-compliant supply chains. In addition to promoting investment, that tax credit allows the automaker to pay a premium for non-China-sourced minerals because the additional cost of each car is smaller than the remaining benefit of the tax credit.

Selina Hayes: My thing is the United States must turn out, show up, and find out what's going on. Let's not make it so transactional. Let's bring in our financial institutions that I think have been underutilized in the national security realm, the likes of the [Export-Import Bank](#) and [DFC](#). We should start really looking at what a partnership looks like.

The conditions of humans in these mines, especially when it comes to artisanal mining, are tragic. But there's no point going in with a stick and saying, "you've got to fix this before we think about investment." What does it do to the security environment if all of those artisanal miners are out of work? So, we have to come-in with really solid solutions to address these domestic challenges rather than just taking and exploiting. I think you could do really good deals for both sides, and that is the differentiator in comparison with China, which is transactional and exploitative.

Technology transfer is also an issue where simply getting a visa to come to the United States to discuss cooperation is a major challenge. We can go to Africa; many countries have pretty much opened their borders so that you can go there. But we don't do the same in return. It shouldn't be that way. It should be that we want these new partners to come to the United States and be able to do true tech transfer.

I remind folks that especially in a country like Nigeria, there is so much going on in the tech world there. A Nigerian woman recently sold her company for \$330 million to an American company for data centers. This is an example of how the relationship goes both ways.

I think the government is doing some great things, but there's also some hindrance that prevents us from doing business and being competitive. We're just now getting comfortable sharing data with Australia, one of America's strongest allies. With these new partners, we certainly want their data, but are we willing to give something back in return? You'd want to be able to share new mining techniques and new methods in mining that, for example, prevent young children from dying. It goes back to building real partnerships and contributing things that will have a lasting benefit for our partner as well.

Anthony Weiss: Many of the processes that are being used for these critical materials were developed in the U.S. going as far back as the 1950s and 60s. It's remarkable the number of areas where we lost preeminence of this expertise, but that's where we sit today. Now we have to claw our way back. I think we're making positive strides with commercial diplomacy, but we can't do enough of it and fast enough. It's unclear how we get there without U.S. government support for projects that might otherwise not get private capital. I think the agencies – whether it's Department of State, Commerce, or another – need more resources. The [Bureau of Energy Resources at the State Department](#) is an example where the team is incredibly knowledgeable, but I suspect additional support would be welcome.

It sounds obvious, but I think more boots on the ground to promote our commercial interests and more money to contribute directly to relevant projects would make a difference. The U.S. needs to offer tangible investment alternatives to those put forth by our adversaries. Many countries want to work with American or Western investors, but they can't wait 12-18 months for projects to start. They need investors ready and able to move quickly, and traditionally, that hasn't been the U.S. But we are making progress.

There are some well publicized recent examples. The [Lobito Corridor](#) from the Democratic Republic of the Congo to Angola is in my view a step forward. The Export-Import Bank just announced a [significant investment in a rare earth project in Australia](#). Those are recent and positive examples, but you need more of those to start moving the needle. To reiterate, we are 20 years behind, not just a couple of years. If you look at where western countries are in comparison to China in particular,

relative to ownership or control of these critical materials and their processing capacity, the difference by any metric is stark. Then there's the domestic versus the international side of this issue. You're never going to rely on the whole supply chain domestically, from extraction to final product, but you can get there if you combine the resources of partner countries like Brazil, Australia, and others – hence the critical nature of commercial diplomacy.

How are private investors viewing efforts to onshore, friend-shore, or near-shore critical mineral processing capabilities?

Jonathan Evans: There's very little moving so far with friendshoring. Tesla is the only one actively building a facility, because that's just Tesla. They just do it on their own and the material is slated to come from either Australia or Canada if they can get it. It's difficult for other companies trying to raise capital in this environment.

We don't have an edge over somebody building another facility in China or somewhere else where no one cares about environmental standards or politics, geopolitics or anything else. Projects are really stalled.

While the CHIPS Act and IRA are helping to level the playing field, the process has been slow and there are some challenges to the structure of some of that government support. For example, [the IRA's advanced manufacturing production credit](#) provides a 10% credit on your capital expenditure under certain conditions. But the Treasury Department excluded the cost of processing reagents from that credit due to concerns about cheating, even though such reagents make up a significant cost of production and are largely purchased domestically. Lithium Americas signed on with Tesla, Albemarle, and about 12 Senators, to advocate for placing such a credit back in. Treasury was appreciative of the input and wanted our comments, but without a change, there is a lack of incentive.

Selina Hayes: On the prospect of near-shoring processing in partner countries with minerals, a key issue is the conditions for investment. You've got some investors that will invest only in a project that has a strong [ESG](#) plan. I don't think the sustainability or ESG discussion is bad. I think that we're all heading for the same goal that we want to do this responsibly. We all want a clean environment for every human. But we have to take a wholistic view of the conditions we want to create. You may have an ESG strategy that will affect someone's job and then they have nothing else to do. And if people are becoming unemployed as a result of that strategy, that may impact local stability and the conditions for investment aren't improving.

We also have to take into account how our potential partners will view the conditions we set for that partnership. The younger generation will make their own choices, and if we're talking about engaging countries in Africa where you need to have an ESG strategy, those nations may wonder why Western countries that mined for centuries without ESG are now demanding it from others as a requirement.

The reality is this is a dirty business. Even if the end product for these minerals is for clean energy, just pulling the rock out of the ground is a dirty process. And that's just the first step. It involves a massive use of water. It creates tailings which are toxic and require careful storage and management. Then there's the pollution involved in transport. I've seen miles and miles of trucks coming out of the Democratic Republic of Congo, with all this exhaust, just idling because the infrastructure doesn't allow easy transport. This is all for an electric vehicle that's green, but it's not green in many respects.

But you know what we're seeing, too, especially in Africa, is that there's some nationalistic elements applied to rare earths and critical minerals where they say, "listen, these minerals are not leaving this country unprocessed." I think we're going to see more of that, where countries want to export higher up the value chain. Which then creates another dynamic that could create stress on the ability for us to get it into the supply chain because market prices will go up.

Anthony Weiss: Producing and processing critical minerals in the U.S. and among allied nations often costs more. But it is worth every penny to secure our future. This work requires a higher risk tolerance than companies would normally take on. As an example, we know today the ESG obligations that the DFC has attached to its investment in our group, with relevance to operations outside the U.S. We obviously agree with and operate by these metrics, but we would be hard pressed today to invest in all jurisdictions. A large, publicly traded company with history and shareholder obligations will equally hesitate to engage in what can be 10-year-plus timeline project that can require hundreds of millions of dollars without adequate political or similar support.

Western investments follow a certain narrative. Whether it's pension funds or private equity groups, they have investment criteria that, frankly, differ from state backed or owned entities. The latter can take different and longer-term positions and have different metrics and timelines. It's not an even playing field. If we don't build capacity and a secure supply of critical minerals between the U.S. and its allies, we have a significant number of national security concerns. You must think about risk differently – like being subject to monopolistic pricing or being cut off entirely from some of these essential inputs.

I think a good example is the current situation with nickel. [Nickel pricing has massively declined on the back of very low-cost Indonesian supply](#), much of it backed by Chinese state funded backers. The reality is now other projects or expansion plans across multiple geographies are on hold because pricing is too low to justify the short-term return on investment. Meanwhile, no new production comes on stream, the Indonesian projects expand, and prices stay relatively low. But in a few years, the prices start to rise, while control of production remains the same, and our dependency on adversaries is even greater than it was before. That's not a far-fetched scenario, and certainly one that, if nothing changes, is in place today. I think the answer is figuring out ways to produce and process these critical minerals in this country and in aligned jurisdictions – recognizing that it's worth every extra penny that it might cost in terms of risk and the other standard criteria. Long-term demand for these metals will grow exponentially. The only questions are who will produce them, by what standards, and who will have access to supply. If you don't think in these terms, we'll be worse off than we are today.

But there's an important role here as well for the OEMs that depend on these minerals as essential inputs. They are behind the curve and I don't think they can do enough, or work fast enough, to catch up. OEMs need to invest directly and as quickly as possible. It's not a question of just profit and loss, but also of survivability and viability over the next five to ten years. They have already committed billions to building factories that will sit idle if they can't access the required critical minerals. If the OEMs and related industries don't increase their rate of investment in anticipation of the upcoming dislocation, they do so in some cases at existential risk.

In the face of an aging and retiring domestic mining workforce, exacerbated by a decline in mining engineering and geology programs, how can the United States develop the necessary critical minerals workforce for domestic production?

Jonathan Evans: Well, part of it is rebranding. We don't have problems hiring people. We're in the green transition, and these are green materials that are going to be used in the energy transition. You have to rebrand yourself to show that you're part of this growing industry to kids coming out of school. This is where the future is to them. You would be surprised how many mid-career people look at it the same way.

And part of that future involves repurposing people from traditional, declining mining industries to growing, dynamic ones. Our mining partner is a coal company, and it's the same skill set, just a different material. They're also really good at mine planning and reclamation and so forth. The bulk of our employees are chemical engineers because processing is the key. I can take stuff out of the ground, but if I can't make it into a highly pure product at the end of the day, it's useless. Those are chemical engineers that do that. There's a lot more people out there if you repurpose. I think we're making the problem bigger than it should be. We have tons of students that want to work on this stuff because they think it's cool.

And when you go out and you show them what we're doing in this process, they love it. They don't see the mine, they see where this is going. It's going into a high energy battery that's going to be in a car or drone. It's a very youthful workforce now. I was stunned working with these guys, how it's just different folks compared to a generation ago.

Selina Hayes: I think that's a good question and I think that goes to that phase three strategy I was talking about. One, stockpile. Two, offshore, because we're not going to get through the Environmental Protection Agency. And three, engaging young people in the discussion. Promoting and supporting new startup tech companies that are working out how we do this more responsibly here in the United States is important. The U.S. government's [Small Business Innovation Research program](#) can provide early funding to develop new technology in this area.

I think that there's a great opportunity to create new jobs around new responsible mining. I understand that mining in West Virginia doesn't sound very glamorous to younger people. It would require changing the perception of mining and what it looks like. So, how do you make it cool? If you know that you're dealing with new, innovative technologies that came from a startup environment, then you might be more enthused about or thinking that you're working with stuff that's at the cutting edge, rather than a centuries old industry.

I work with geospatial data. How can that be more effectively used to find where some of these deposits are? Answering that will help determine where best to drop the drill and be more efficient in mining applications, and using space assets to identify what's in the ground can also attract people interested in leveraging space capabilities.

I don't think we want to encourage people going down into the mine to pull things out. I think there are better ways of doing it, but bringing this industry back domestically will create a jobs market. There's just such a clash of what we want to do compared with our regulations and laws in place. I think we need to really look at what our end goal is. We need to ask if we are willing to mine here?

And I think the answer is, “yes.” I don’t want us to make the same mistake we did in the 1980s and decide the answer is, “no, we’re just going to do it elsewhere.”

Anthony Weiss: We need to do what we do best in this country and innovate. This is as exciting a moment as any I’ve seen in my 30-plus years in the mining, metal, and processing space. It’s exhilarating to meet and speak with smart, engaged entrepreneurs and investors looking for innovative clean and green tech solutions on all aspects of the energy transition. Not just EVs or batteries, but the broader related spectrum of applications.

I don’t think any country does it better than the U.S. when it comes to innovation – utilizing our private sector strengths, combined with public resources, to really nurture and support new ideas for mining, processing, and new product development. There are concepts that I never imagined in the mining world that are being discussed and developed from AI when it comes to geology and operations all the way to biotech. Growing that ecosystem can help ensure we stay competitive, and develop industry approaches that are cleaner, safer, more efficient, and more attractive to all those we want to work in this industry.

The workforce question is not straightforward. We have to do a better job of explaining that mining is not an inherently egregious industry that does nothing but destroy the landscape. The reality is that there is a tradeoff. Mining has its challenges, but not all mining operations are equal and the industry has evolved and there are so many aspects that have dramatically changed for the better over the past two or three decades. There is an ability to use advanced, less indiscriminate mining technologies. There is greater attention to water or chemical usage and management, as well as multiple other parameters that go into mine and production planning. We should now be better positioned to attract mining, processing, and chemical engineers, as there is a compelling set of longer-term opportunities for careers in this broad space. But we also must realize that the only way to ensure higher standards is to be the ones doing it. The operations outside of our jurisdiction do not operate by our environmental, labor, and governance standards, and it will be a rush to the bottom if we are not willing to commit the required resources.

The narrative is compelling, especially when you put it in the context of what the goals are: job creation, mineral independence, national security, clean energy, climate change mitigation, all of which are ultimately interrelated.



1030 15th St. NW · Suite 200 East
Washington, DC 20005
www.BENS.org | X: @BENS_org | 202.296.2125