

**Written Testimony of Joseph Britton**  
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**Before the U.S. Senate Committee on Energy and Natural Resources**  
**April 7, 2022**

Chairman Manchin and Ranking Member Barasso, members of the Senate Committee on Energy and Natural Resources: Thank you for the opportunity to speak with you today. My name is Joe Britton, and I am the Executive Director of the Zero Emission Transportation Association (ZETA), an industry-backed coalition that spans the entire EV supply chain, encompassing critical minerals developers, original equipment manufacturers, charging infrastructure installers, utility providers, and battery recyclers, among others.

Many here today may have strong opinions about electric vehicles (EVs), both positive and negative. Recognizing that, I intend to give you a candid assessment of the opportunities and challenges to expanding EV adoption in the United States. Ultimately, I believe that we will look back upon the expansion of the EV market over the next decade and recognize it as an American success story—but only if we get it right.

## **1. Opportunities**

### *1.1 Environmental and Public Health Benefits*

Transportation is the highest emitting sector in the United States, and it is the only sector that is worsening year after year.<sup>1</sup> The American Lung Association has found that electrifying our transportation sector could save 110,000 lives and avoid trillions of dollars in environmental and public health damages over the next thirty years.<sup>2</sup> That is because regardless of the generation source of their electricity, EVs have significantly lower total lifetime emissions than gas-powered vehicles. On average, EVs produce 66.9% fewer emissions than gas-powered vehicles over their lifetime.<sup>3</sup> As more clean electricity comes online in the coming years, EV emissions will decrease even further.<sup>4</sup>

On the other hand, gas-powered vehicles have a set carbon footprint with marginal opportunity for reduced emissions. Transportation-sector pollution includes particulate matter, nitrogen oxides, and carbon dioxide, among others, which are all linked to long-term respiratory, cognitive, and autoimmune impairment. Today, over 40% of Americans—more than 135 million people—live in places with unhealthy levels of ozone or particulate pollution.<sup>5</sup> The burden of breathing polluted air is not shared equally, either: people of color are more than three times more likely to be impacted.

### *1.2 Economic Benefits*

The economic potential of electrifying our transportation sector is unparalleled. The private sector is investing tens of billions of dollars to expand their EV manufacturing footprints across the country.<sup>6</sup> This belt of new investment reaches far beyond the historical home of automobile manufacturing in the Industrial Midwest: states like Arkansas, Georgia, Kentucky, Oklahoma, North and South Carolina,

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<sup>1</sup> “Fast Facts on Transportation Greenhouse Gas Emissions,” 2019, <https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions>

<sup>2</sup> “Zeroing in on Healthy Air,” American Lung Association, March 2022, <https://www.lung.org/clean-air/electric-vehicle-report>.

<sup>3</sup> “EVs up to 67% less emissions intensive than ICE cars,” Wood Mackenzie, September 10, 2018, <https://www.woodmac.com/press-releases/evs-up-to-67-less-emissions-intensive-than-ice-cars/>.

<sup>4</sup> “Renewable electricity growth is accelerating faster than ever worldwide, supporting the emergence of the new global energy economy,” IEA, December 1, 2021, <https://www.iea.org/news/renewable-electricity-growth-is-accelerating-faster-than-ever-worldwide-supporting-the-emergence-of-the-new-global-energy-economy>.

<sup>5</sup> “State of the Air: Key Findings,” American Lung Association, 2021, <https://www.lung.org/research/sota/key-findings>.

<sup>6</sup> Bushey, C., “US states lavish subsidies on carmakers for edge in EV race,” The Financial Times, February 4, 2022, <https://www.ft.com/content/8179bd8a-4d96-43a9-a8f9-074f9a275bd8>.

Tennessee, and West Virginia, among others, are also experiencing unprecedented investments.<sup>7</sup> These capital resources are putting thousands of Americans to work: in total, the EV industry could directly create 2 million jobs.<sup>8</sup> These direct jobs will support many more other jobs, too. In 2020 alone, the EV sector grew at an 8% rate, while the rest of the auto sector saw a 9% decline in jobs due to COVID-19.<sup>9</sup> Across the entire EV supply chain, the industry has created jobs in advanced manufacturing, mechanical and chemical engineering, commercial and industrial design, and software development.<sup>10</sup>

The ascendancy of the EV sector will create an even broader ecosystem of new careers. Installing and maintaining charging infrastructure, for example, generates more jobs per dollar of investment than traditional remanufacturing or highway maintenance.<sup>11</sup> Suffice it to say, the expansion of electric transportation will deliver not just environmental and public health benefits but also unparalleled economic benefits to communities across America. These benefits will be experienced not just by EV drivers, but by every American who benefits from a stable career, who avoids breathing polluted air, or whose small business benefits from a new manufacturing plant that just opened in their town.

Of course, at a time when we are contending with skyrocketing gasoline prices, it comes as no surprise that Americans are growing increasingly interested in owning their own EVs. Because of their reduced operating and maintenance costs, EVs are cheaper to own over their lifetimes than gasoline-powered vehicles. In fact, ZETA recently published a report showing that across the country, EVs are 3–6 times cheaper to drive per mile than gasoline-powered vehicles.<sup>12</sup> After all, electricity is far cheaper than gasoline, and because electricity isn't subject to foreign supply chain interruptions, its price is far more stable. According to a recent national survey, these cost savings are a compelling reason why a bipartisan 71% supermajority of American voters are considering an EV for their next vehicle purchase or lease.<sup>13</sup>

There is unequivocal potential for the domestic EV manufacturing industry to scale to meet this demand, which would cement the industry as a leading global manufacturing and job creation base. But the sector is at a crossroads, and we should not take for granted that American companies will have the support they need to meet this demand. Beginning in 2007, as low-gas-mileage vehicles fell out of favor with consumers as gasoline prices spiked, Americans increasingly began to purchase imports.<sup>14</sup> This, among other factors, helped precipitate the auto bailout.

We must ensure that the United States does not lose our global auto manufacturing leadership again. Around the world, countries are creating EV consumer incentives to drive down the sticker prices of EVs, building out national charging networks, and facilitating medium- and heavy-duty fleet electrification. This is not only aimed at driving electrification, but also toward ensuring that their economies are rising to the challenge to meet consumer demand. We too must be doing more to accelerate electrification—and not for the driver's sake, but rather to drive economic growth and reduce emissions to both address

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<sup>7</sup> Gringlas, S., "The Sun Belt is making a big play for the hot electric vehicle market," National Public Radio, December 28, 2021, <https://www.npr.org/2021/12/28/1068285310/the-sun-belt-is-making-a-big-play-for-the-hot-electric-vehicle-market>.

<sup>8</sup> Baldwin, S., A. Myers, M. O'Boyle, and D. Wooley, "Accelerating Clean, Electrified Transportation By 2035: Policy Priorities," Energy Innovation, April 2021, [https://energyinnovation.org/wp-content/uploads/2021/04/Energy-Innovation\\_2035-2.0-Accelerating-Clean-Transportation-Policy-Report.pdf](https://energyinnovation.org/wp-content/uploads/2021/04/Energy-Innovation_2035-2.0-Accelerating-Clean-Transportation-Policy-Report.pdf).

<sup>9</sup> "DOE Finds Strong Opportunity For Job Growth In Energy Sector Post-Pandemic," U.S. Department of Energy, July 19, 2021, <https://www.energy.gov/articles/doe-finds-strong-opportunity-job-growth-energy-sector-post-pandemic>.

<sup>10</sup> "Careers in Electric Vehicles," Bureau of Labor Statistics, [https://www.bls.gov/green/electric\\_vehicles/](https://www.bls.gov/green/electric_vehicles/).

<sup>11</sup> "Sustainable Recovery: World Energy Outlook Special Report," IEA, June 18, 2020, <https://www.iea.org/reports/sustainable-recovery/transport#abstract>.

<sup>12</sup> "Comparing the Operating Costs of Electric Vehicles and Gas-Powered Vehicles," ZETA, March 14, 2022, <https://www.zeta2030.org/news/electric-vehicles-are-delivering-marked-cost-savings-for-drivers-and-surging-gasoline-prices-are-making-the-cost-savings-increasingly-apparent>.

<sup>13</sup> "New National Poll Shows That A Large Bipartisan Majority Of Voters Favor Policies To Accelerate Electric Vehicle Adoption," ZETA, March 28, 2022, <https://www.zeta2030.org/news/new-national-poll-shows-that-a-large-bipartisan-majority-of-voters-favor-policies-to-accelerate-electric-vehicle-adoption>.

<sup>14</sup> Klier, T., "From tail fins to hybrids: How Detroit lost its dominance of the U.S. auto market," Economic Perspectives, Federal Reserve Bank of Chicago, 2009, <https://www.chicagofed.org/publications/economic-perspectives/2009/2qtr-klier>.

climate change and boost public health. The less we do in this policy arena, the more ground that we will concede to foreign commercial interests—and the fewer public benefits that will be within reach.

But getting this right requires not only strong support from policymakers who are willing to drive electrification—it will also take a comprehensive, bipartisan strategy designed to secure a North American supply chain for critical mineral production. These critical minerals—which include lithium, cobalt, nickel, graphite, and manganese, among others—are currently part of a global supply chain, and the United States would benefit from strengthening our domestic supply chain. These minerals are necessary for the modern Lithium-ion (Li-ion) batteries upon which EVs depend. But it is important to note that anyone who uses an iPhone or laptop, who drives any type of modern vehicle, or who wants to invest in our national security architecture also depends on critical minerals. These minerals are widely used and essential to the function of most modern consumer electronics, our satellites, and our missile systems—not just our electric vehicles.

### *1.3 Strengthening Our National Security*

We are witnessing the danger of overreliance on foreign markets and supply chains for a host of energy resources. And while many may think first of critical materials, it is important to note that this reliance also includes petroleum products, despite the fact that the United States is a net fossil fuels exporter. The truth is we still import almost half of our crude oil—because many of our refineries are not equipped to process the American-sourced and more-expensive light, sweet crude.<sup>15</sup> The heavy, sour crude that we import often comes from less friendly foreign capitals, which makes U.S. consumers and our allies more susceptible to global instability.

Electrifying our transportation sector could free us from this overreliance on foreign governments—if we make the right investments. Currently, China is the world’s most prolific critical mineral refiner. China’s mining and processing prowess stems from decades of government investments and policies to streamline its critical minerals processing. They have invested more than \$60 billion to establish a head start.<sup>16</sup> But that does not mean that we should be counted out. For example, the United States accounts for about 10% of global battery cell production, thanks in large part to the launch of several new gigafactories in recent years—and several more battery production factories are on the way. By 2030, U.S. battery production is expected to reach 800% of our 2020 capacity.

With the proper federal investment, the United States could be a global leader in critical mineral production and processing, which would help enable us to win the clean transportation race. The United States has 7.9 million metric tons of lithium content resources, which is the world’s fourth-largest identified lithium supply—or, 9.2% of the world’s total lithium resources.<sup>17</sup> The North American lithium resource supply is an even-greater 12.5 million metric tons. This far surpasses China’s 5.1 million metric tons of lithium resources. Similarly, we have 53,000 metric tons of cobalt reserves, and Australia, our close ally, has 1.4 million tons of reserves. China has only 80,000 metric tons. And while the United States’ nickel reserves are relatively small, the reserves of our close allies in Canada and Australia have a combined 22.8 million metric tons—dwarfing China’s 2.8 million metric tons. China is not the global leader in critical minerals development and processing because of its natural resources—rather, it is leading this race because it has invested so heavily in shoring up its industry.

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<sup>15</sup> “Oil and petroleum products explained,” U.S. Energy Information Administration, April 2021, <https://www.eia.gov/energyexplained/oil-and-petroleum-products/imports-and-exports.php>.

<sup>16</sup> Graham, J., K. Belton, and X. Suri, “How China Beat the US in Electric Vehicle Manufacturing,” *Issues in Science and Technology*, Winter 2021, <https://issues.org/china-us-electric-vehicles-batteries/>.

<sup>17</sup> “Mineral Commodity Summaries,” U.S. Geological Survey, January 2021, <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021.pdf>.

## 2. Examples of ZETA Member Companies' Leadership

### 2.1 Critical Minerals Developers & Processors

The private sector is actively working to onshore our critical minerals supply chain. ZETA represents a host of companies seeking to expand America's critical mineral production and our battery manufacturing capacity. For example, with regard to lithium, Albemarle produced 5,000 metric tons of lithium carbonate equivalent (LCE) in 2019, and it has a maximum capacity of 10,000 metric tons of LCE per year at their Silver Peak, Nevada plant, and the potential for 50,000 metric tons of LCE per year at their Kings Mountain, North Carolina plant.<sup>18</sup> Ioneer has a 1.2 million metric ton lithium reserve, and it will produce more than 21,000 metric tons of LCE per year. Lithium Americas operates an 8.2 million metric ton LCE mine, and it will produce 80,000 metric tons per year.<sup>19</sup> We believe that by 2026, U.S. lithium production could provide enough lithium to meet the demand of at least 750% of the EV market penetration in 2021, depending on how much of that lithium is integrated into EV-destined batteries.<sup>20</sup> And production will continue to increase throughout the decade, depending on government support.

Similarly, North American cobalt resources are vast, and production is scaling up to develop these resources.<sup>21</sup> Another ZETA member company, Jervois Mining USA Limited, is building one of the United States' first primary cobalt production operations in years. Its production could represent 15–20% of U.S. annual consumption. Jervois's Idaho Cobalt Operation will produce 1,915 metric tons of cobalt per year beginning in 2022.<sup>22</sup> Across North America, reserves that are economically viable for development are currently capable of producing nearly 300,000 metric tons of cobalt, which could secure enough supply for a much greater EV market penetration. Additional development in the coming years will grow these ready-for-production reserves to include more of North America's millions of metric tons of cobalt resources.

These critical minerals companies are ensuring that they are operating at the highest levels of sustainability and promoting social responsibility. Many of these extraction companies are members of the Initiative for Responsible Mining Assurance (IRMA) and other sustainable mining organizations.<sup>23</sup> They also report on emissions, water usage, community engagement, and employee diversity. These uniform business standards help ensure that American companies are among the most sustainable and community engagement-oriented critical minerals development companies in the world.

### 2.2 Vehicle Manufacturers

American EV manufacturers are additionally striving to build out their domestic critical minerals supply chains. ZETA member Tesla, the world's largest EV manufacturer, requires its suppliers to provide evidence of management systems that ensure social, environmental, and sustainability best practices in their own operations, as well as to demonstrate a commitment to responsible sourcing into their supply chains.<sup>24</sup> In addition to working on expanding its domestic sourcing (for example, Tesla recently announced its partnership with Talon Metals to procure domestic nickel),<sup>25</sup> Tesla's suppliers are mandated to abide by domestic and international material compliance requirements in the International Material Data System (IMDS) to meet EU and other international material and environmental-related regulations. This ensures that its critical minerals—and especially cobalt—are free of any of the labor abuses that have

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<sup>18</sup> "Investor Presentation and Non-GAAP Reconciliations," Albemarle Corporation, September 2020, <https://investors.albemarle.com/static-files/8636bf3c-868b-42e9-96b4-906a01f0cb17>.

<sup>19</sup> "Thacker Pass," Lithium Americas, August 2018, <https://www.lithiumamericas.com/thacker-pass/>.

<sup>20</sup> "Quarterly Light-Vehicle Sales Report: Q4 2021," Cox Automotive, January 2022, <https://www.coxautoinc.com/wp-content/uploads/2022/01/Q4-2021-Kelley-Blue-Book-Sales-and-Data-Report.pdf>.

<sup>21</sup> "Mineral Commodity Summaries," U.S. Geological Survey, January 2021, <https://pubs.usgs.gov/periodicals/mcs2021/mcs2021.pdf>.

<sup>22</sup> "Idaho Cobalt Operations," Jervois Mining USA, <https://jervoisglobal.com/projects/idaho-cobalt-operations/>.

<sup>23</sup> "About Us," Initiative For Responsible Mining Assurance, <https://responsiblemining.net/about/about-us/>.

<sup>24</sup> "Impact Report," Tesla, 2020, [https://www.tesla.com/ns\\_videos/2020-tesla-impact-report.pdf](https://www.tesla.com/ns_videos/2020-tesla-impact-report.pdf).

<sup>25</sup> "Tesla and Talon Metals Enter Into Supply Agreement For Nickel," Talon Metals Corporation, January 10, 2022, <https://talonmetals.com/tesla-and-talon-metals-enter-into-supply-agreement-for-nickel/>.

historically plagued the mineral's supply chain. Through its economic reach, private-sector companies like Tesla are helping to promote American environmental and labor values in global supply chains.

ZETA member Rivian also holds all its suppliers to an internal code of conduct.<sup>26</sup> This action ensures that its suppliers conduct due diligence to understand the source of the raw materials used in their products; to follow the Organization for Economic Cooperation and Development (OECD) Due Diligence Guidelines concerning sourcing, extraction, and handling of cobalt and other critical minerals; and to make a reliable determination of the origin and source of such minerals. The code also requires suppliers to exercise adequate due diligence to ensure that any of the critical minerals contained in their products do not directly or indirectly finance or benefit perpetrators of human rights abuses, or otherwise contribute to human rights violations. Rivian is exploring ways to extend partnerships to domestic suppliers of critical minerals, including both traditional established suppliers and suppliers of unconventional resources, including those with innovative technologies and those who can provide recycled materials.

Additionally, ZETA member Arrival builds electric transit vehicles and delivery vans. It similarly holds all of its suppliers to their Suppliers' Code of Conduct, which requires its suppliers to enforce environmental and labor standards.<sup>27</sup> It also requires Arrival's suppliers to consistently monitor and enforce these standards in their own operations and supply chain, as well as make improvements to meet or exceed Arrival's standards. Arrival expects its suppliers to exercise stringency in their supply chain via a due diligence management system in order to identify applicable risks and take appropriate steps to mitigate them. This includes determining whether relevant materials originate from regions with high risks, which include areas associated with conflict, child labor, forced labor and human trafficking, human rights violations, or other reasonably objective high-risk activities, including severe health and safety risks and negative environmental impacts.

### *2.3 Battery Manufacturers & Recyclers*

Like ZETA's critical minerals developers and EV manufacturers, many U.S. battery producers are also striving to onshore their critical minerals supply chains. ZETA member Panasonic, which builds EV batteries at the Nevada gigafactory it operates with Tesla, is entering into partnerships to stabilize its domestic supply chains for critical minerals. For example, Panasonic is working with Schlumberger New Energy to increase its domestic supply of lithium.<sup>28</sup> Panasonic is also partnering with ZETA member Redwood Materials, who is also testifying here today.<sup>29</sup> Redwood will recycle Panasonic's scrap copper foil—a critical part of the anode—and remanufacture it for use in new batteries.

Importantly, American innovators are also helping to ensure that critical minerals are recycled. Recycling technologies can reclaim up to 95% of critical materials from expired batteries in a commercially competitive way. I will defer to Redwood Materials on recycling-specific details because they are leading experts on the topic. Other recycling companies like Li-Cycle, which will be capable of recycling up to 45,000 metric tons of lithium here in the U.S. by 2025, are also among our membership. I will emphasize, however, that critical mineral recycling is imperative to the supply chain.

The capacity to recycle the critical minerals from EV batteries is another advantage over our gasoline-based transportation system. After all, when we import and burn fossil fuels, they are gone forever (except—of course, for the enduring negative impact they leave on climate change and public

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<sup>26</sup> "Supplier Code of Conduct," Rivian Automotive, [https://assets.rivian.com/2md5qhoeajym/5PEdyH1PnC3iEllseM49oY/060ec197886709bad62557bda70a618e/Rivian\\_-\\_Supplier\\_Code\\_of\\_Conduct.pdf](https://assets.rivian.com/2md5qhoeajym/5PEdyH1PnC3iEllseM49oY/060ec197886709bad62557bda70a618e/Rivian_-_Supplier_Code_of_Conduct.pdf).

<sup>27</sup> "Arrival Supplier Code of Conduct," Arrival, [https://arrival.com/us/en/legal/supplier-code-of-conduct?gclid=CjwKCAjwrqqSBhBbEiwAlQeqGmD4KuegrWpbqakYNHFivFjwHMjI-Q1H0aFVmziXW9Iqlu3xGUug1hoCFkYQAvD\\_BwE#human-rights-and-fair-labour-practice](https://arrival.com/us/en/legal/supplier-code-of-conduct?gclid=CjwKCAjwrqqSBhBbEiwAlQeqGmD4KuegrWpbqakYNHFivFjwHMjI-Q1H0aFVmziXW9Iqlu3xGUug1hoCFkYQAvD_BwE#human-rights-and-fair-labour-practice).

<sup>28</sup> "Schlumberger New Energy and Panasonic Energy of North America Announce Strategic Collaboration on New Battery-Grade Lithium Production Process," Schlumberger New Energy, June 10, 2021, <https://www.slb.com/newsroom/press-release/2021/pr-2021-0610-sne-panasonic>.

<sup>29</sup> Korosec, K., "Panasonic to use Redwood's recycled materials in battery cell production at Tesla gigafactory," Techcrunch, January 4, 2022, <https://techcrunch.com/2022/01/04/panasonic-redwood-battery-cell-production-tesla/>.

health). We must then continually import new crude oil, maintaining our susceptibility to the instability of oil-exporting foreign adversaries. After we use critical minerals, on the other hand, we can perpetually reuse them at a remarkably high rate of reuse, creating a circular domestic supply chain. Congress has previously considered legislation that would ban the export of battery cells after they enter the United States so that we could instead preserve a national stockpile of critical minerals to be recycled. One of the greatest weaknesses in our supply chain today is that we must often send domestically developed critical minerals to China for processing—and those refined minerals are then sent back to the United States for incorporation into batteries.<sup>30</sup> This practice harms our national security and is economically and environmentally costly. To compete globally, the federal government must invest in building out each of these stages of the critical minerals supply chain.

### **3. Recommendations**

In addition to the work that the private sector is doing to onshore our critical mineral development and processing, securing our critical material supply chain will also require reforms to American foreign and industrial policy. Winning the clean transportation race will require outcompeting other countries that are contending in this sector; as I have noted, many of these other countries have already invested tens of billions of dollars in developing robust domestic resources.

ZETA urges Congress and the Biden-Harris Administration to maintain environmental and labor protections for critical mineral extraction and refining. Mitigating environmental harms and protecting worker rights is the American way, and we do not support undermining these values; in fact, we hope that we can promote these American ideals throughout the global critical mineral supply chain. As I mentioned previously, we should work with our allies to promote these standards in any foreign sourcing in which we continue to participate.

As the United States works to build our domestic supply chain, we should seek to codify these standards in our trading relationships with our allies. The State Department, Export-Import Bank, United States Agency for International Development, and other federal entities should corroborate the work that private industry is doing to ensure that the United States promotes environmental, social, and governance (ESG) standards in foreign critical minerals development and processing operations. With a coordinated effort, we can ensure that foreign critical minerals operations uphold strong labor and environmental protections.

An example of direct federal investment is the Department of Energy's Loan Program Office (LPO) is providing funding for these critical minerals projects. LPO oversees the Advanced Technology Vehicles Manufacturing (ATVM) program, which offers low-cost debt capital for fuel-efficient or zero-emission light-duty vehicles. ATVM has \$20 billion available in loans for projects to develop and expand critical mineral development in the battery supply chain. The federal government must expedite access to these funds because capital-intensive projects such as extraction and processing are vital for our energy and national security.

And while these standards must be maintained in domestic operations, it is also incumbent upon the federal government (and state governments) to ensure that the permitting process is linear and sets responsible standards—however high—that can be met with predictability. Adhering to a schedule—which may still span years—promotes public confidence and stability in the permitting process, and will entice more private capital to invest in high-standard domestic critical minerals production efforts.

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<sup>30</sup> Puko, T., and T. Parti, "Biden Considers Invoking Defense Production Act to Boost Minerals for EV Batteries," *The Wall Street Journal*, March 30, 2022, <https://www.wsj.com/articles/biden-considers-invoking-defense-production-act-to-boost-minerals-for-ev-batteries-11648654304>.

ZETA's members were pleased that Chairman Manchin and Senator Murkowski's critical minerals bill was included in the bipartisan Infrastructure Investment and Jobs Act. This bill streamlined the permitting process on federal land for critical minerals. Specifically, it directed the Bureau of Land Management and the United States Forest Service to more efficiently complete federal permitting by creating and adhering to productive timelines and establishing permitting performance goals.

President Biden's invocation of the Defense Production Act was an additional positive step and demonstrated the Administration's attention toward resolving this economic and national security issue. This action will allow critical mineral production companies to more easily access federal funds to conduct feasibility studies, make productivity and safety improvements, and boost production capacity. These funds will also help strengthen the United States' mineral processing industry and accelerate transportation electrification.

Congress must further accelerate the build-out of a robust domestic critical minerals supply chain by expanding the Section 48 investment tax credit to include energy storage systems like batteries, implementing a production tax credit for battery cells, and creating a production tax credit for processing domestic critical minerals for use as battery inputs. Much like Senators Cornyn's and Warner's Creating Helpful Incentives to Produce Semiconductors (CHIPS) for America Act would strengthen the United States' semiconductor manufacturing to help us compete,<sup>31</sup> these tax incentives would encourage domestic investment in manufacturing that would strengthen an end-to-end advanced battery supply chain. These tax incentives would boost our critical mineral development and processing capabilities, and they would also incentivize the build-out of more cathode and anode production, battery cell production, and battery recycling facilities. These tax incentives would be particularly helpful in facilitating the co-location of critical mineral development and refining here in the United States.

#### **4. Conclusion**

As with most modern markets, the global critical minerals and battery supply chains are complex. What is unambiguous is that Americans' demand for cell phones, laptops, satellites, and both electric and traditional vehicles alike will continue to grow in the coming years. Swearing off these technologies—as some might suggest—due to global supply chain complexity only concedes these markets to foreign commercial interests and unfriendly capitals around the world. We know how to fight these battles, and we have won these battles before—but we must be willing to leverage our own potential to secure a future in which we are all better off.

By taking just a few legislative and regulatory steps, the United States can unleash the untapped potential of our critical minerals, battery production, and electric transportation industries. These industries have already begun to prove their transformative power, having created thousands of jobs and invested tens of billions of dollars into communities across the country. They are proving that EVs and other battery-reliant technologies can be produced ethically and responsibly while creating American jobs. American companies are working hard to stabilize and onshore their supply chains as we pursue a less carbon-intensive transportation system. But they need federal support in the form of predictable permitting timelines, tax incentives for critical minerals and battery-related technologies, and a whole-of-government focus on driving transportation electrification forward.

Thank you for your time and consideration. I look forward to answering your questions.

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<sup>31</sup> "Bipartisan, Bicameral Bill Will Help Bring Production of Semiconductors, Critical to National Security, Back to U.S.," Senator John Cornyn's Newsroom, June 10, 2020, <https://www.cornyn.senate.gov/node/5599>.