



## Alliance for Automotive Innovation

### Comments on U.S. Department of Energy’s Request for Information on Risks in the High-Capacity Batteries, including Electric Vehicle Batteries, Supply Chain [DE-FOA-0002502](#)

April 14, 2021

The Alliance for Automotive Innovation (Auto Innovators)<sup>1</sup> hereby submits comments on the U.S. Department of Energy’s (DOE) request for information on Risks in the High-Capacity Batteries, including Electric Vehicle Batteries, Supply Chain (the RFI).<sup>2</sup> Our comments build off of recent public releases highlighting the auto industry’s commitment to a sustainable future: The Auto Industry EV Policy Letter to President Biden<sup>3</sup> and our Auto Innovation Agenda.<sup>4</sup>

#### Auto Industry’s Commitment to a Sustainable Future

The auto industry is committed to a sustainable future and will invest \$250 billion in electrification by 2023.<sup>5</sup> However, auto industry investment alone is not enough; a strong domestic EV battery manufacturing and recycling policy can provide national energy security, increase domestic jobs, and make electric vehicles more affordable. Auto Innovators supports domestic EV battery

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<sup>1</sup> Formed in 2020, the Alliance for Automotive Innovation is the singular, authoritative and respected voice of the automotive industry. Focused on creating a safe and transformative path for sustainable industry growth, the Alliance for Automotive Innovation represents the manufacturers producing nearly 99 percent of cars and light trucks sold in the U.S. The organization, a combination of the Association of Global Automakers and the Alliance of Automobile Manufacturers, is directly involved in regulatory and policy matters impacting the light-duty vehicle market across the country. Members include motor vehicle manufacturers, original equipment suppliers, technology and other automotive-related companies and trade associations. The Alliance for Automotive Innovation is headquartered in Washington, DC, with offices in Detroit, MI and Sacramento, CA. For more information, visit our website <http://www.autosinnovate.org>.

<sup>2</sup> U.S. Department of Energy, “Request for Information on Risks in the High-Capacity Batteries, including Electric Vehicle Batteries, Supply Chain.” <https://eere-exchange.energy.gov/FileContent.aspx?FileID=4a23d243-9e96-40c6-97e2-223736d5aa35> (March 25, 2021) (hereinafter “RFI”).

<sup>3</sup> <https://www.autosinnovate.org/posts/communications/Auto%20Industry%20EV%20Policy%20Letter%20to%20President%20Biden%20March%2029%202021.pdf>

<sup>4</sup> [https://www.autosinnovate.org/about/advocacy/Autos\\_Innovation\\_Agenda\\_12152020.pdf](https://www.autosinnovate.org/about/advocacy/Autos_Innovation_Agenda_12152020.pdf)

<sup>5</sup> Electrification includes Battery Electric Vehicles (BEVs), Plug-in Hybrid Electric Vehicles (PHEVs), and Fuel Cell Electric Vehicles (FCEVs).

manufacturing and recycling policies that can be cost competitive globally and aid in creating sustainable supply chains for battery manufacturing.

Currently, the U.S. does not have significant processing capacity of EV battery materials and is reliant on other nations for refined raw materials for EV batteries, leaving the U.S. market exposed to the risk of being impacted by supply chains outside of U.S. control. As the shift to an electrified future continues, the risk becomes even more significant. As the recent global semiconductor chip shortage has shown, a lack of domestic resources can result in the U.S. shutting down the automotive workforce—a workforce that makes up 5.5 percent of the U.S. gross domestic product. The lack of semiconductors temporarily closed vehicle assembly plants in the U.S., and a lack of materials for EV batteries could be even more detrimental as the vehicle fleet transitions to electric.

### **Comments on DOE's Specific Requests**

In the RFI, DOE requests responses to specific topics. Auto Innovators offers the following responses to the specific requests:

#### (i) Critical materials including battery grade nickel, cobalt and lithium, underlying the supply chain for high-capacity batteries, including electric vehicle batteries

As the auto industry transitions to electrification, components and materials necessary to make that switch need to be available. Battery grade nickel, cobalt, and lithium are all critical to EV batteries, and it is projected that these materials will continue to be necessary in the manufacture of EV batteries. The graphs below show that there is justified concern that supply of the necessary materials will not meet demand as the auto industry transitions to an electrified future.

Bloomberg New Energy Finance (BNEF) predicts in Figure 1 that passenger EV demand for lithium will grow ten-fold over the next ten years. However, on the demand side, demand will outpace supply for all sectors by 2028, with EV passenger demand alone outpacing supply by 2029.

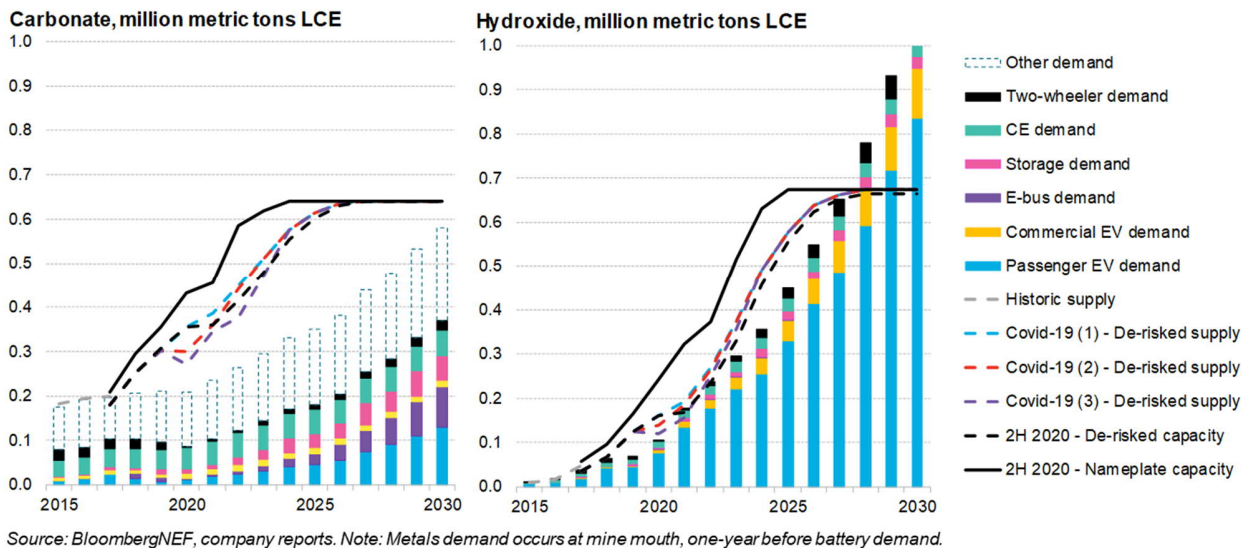


Figure 1 Lithium Chemical Supply & Demand<sup>6</sup>

BNEF expects that battery grade nickel demand will outpace supply in two years. Figure 2 shows confirmed battery grade nickel capacity through 2025. It is worth noting that there is still potential capacity that can be tapped into from under-utilized battery grade nickel refining in China.

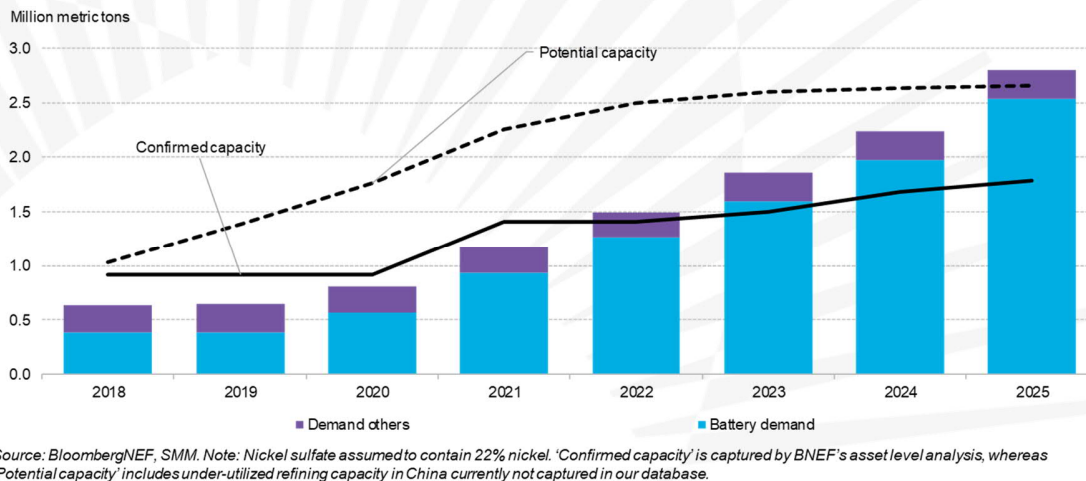
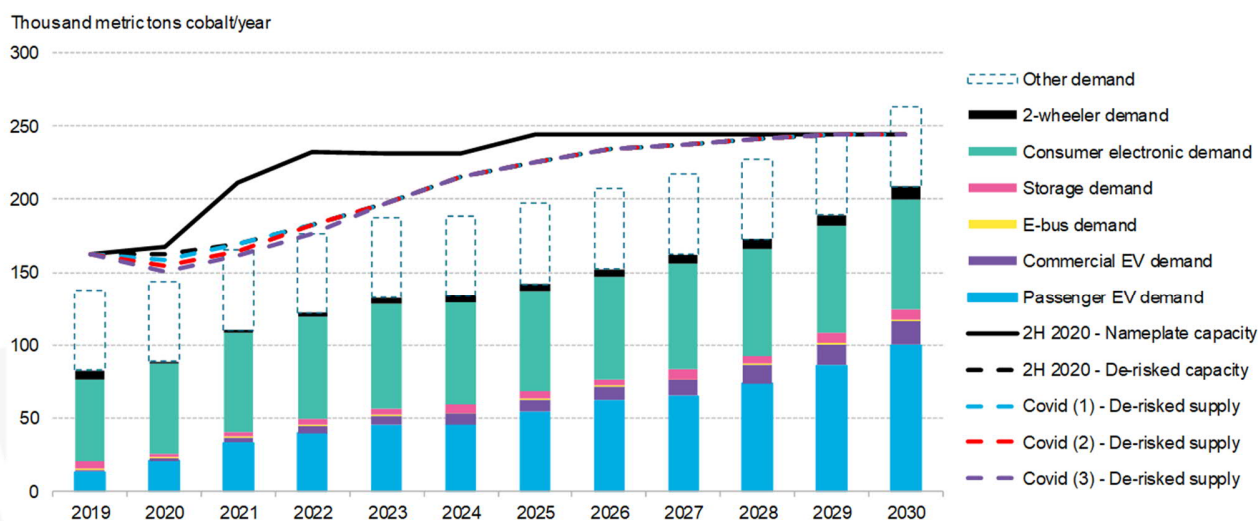


Figure 2 Nickel Sulfate Supply & Demand<sup>7</sup>

<sup>6</sup> BNEF 2H 2020 Battery Metals Outlook released December 22, 2020 (<https://www.bnef.com/insights/25181/view>)

<sup>7</sup> *Id.*

Looking out to 2030, BNEF projects that there will be sufficient cobalt supply to meet the increased demand. Part of the reason that cobalt is more comfortable in terms of supply and demand is that automakers and EV manufacturers have been investigating lower-cobalt content batteries for several years.



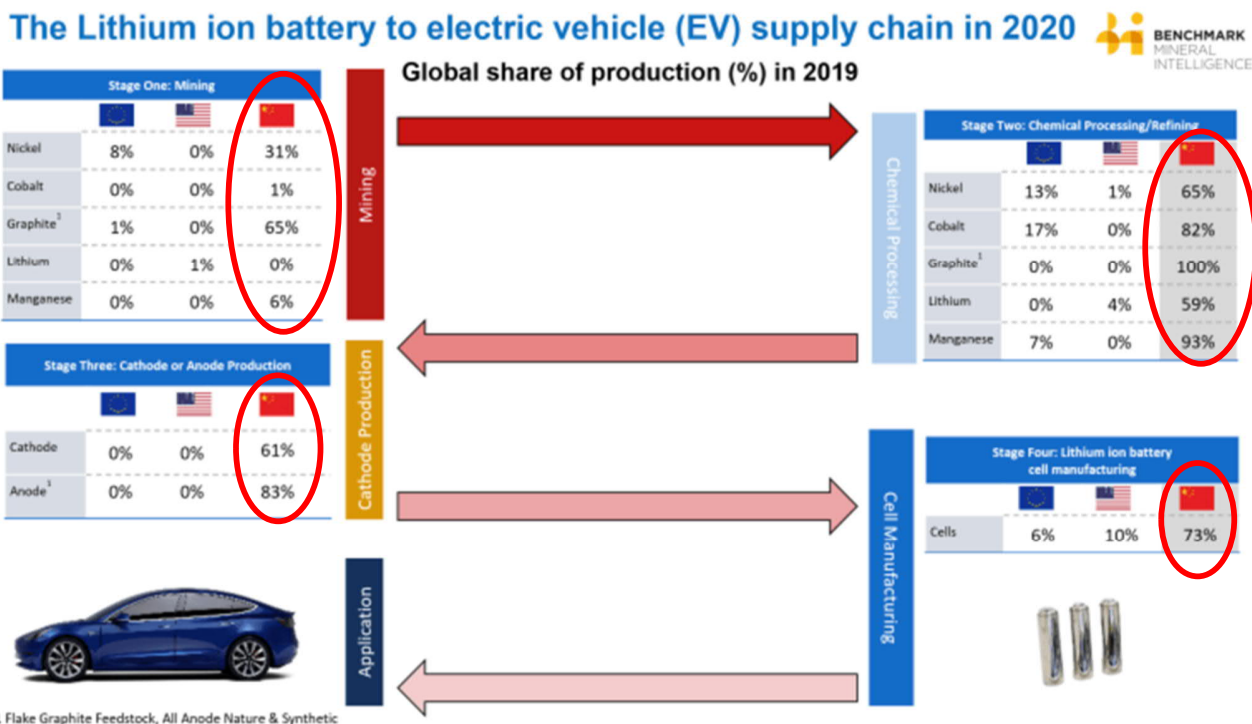
Source: BloombergNEF. Note: Metals demand occurs at mine mouth, one-year before battery demand.

Figure 3 Refined Cobalt Supply & Demand<sup>8</sup>

(ii) Manufacturing and other capabilities necessary to produce high-capacity batteries, including extraction of raw materials, refining, production of advanced cathode and anode powders, separators, electrolytes, current collectors, and advanced recycling technologies for high-capacity batteries.

In addition to supply and demand concerns for EV battery materials, there are also significant supply chain concerns with respect to where the battery materials are coming from. Today, the U.S. is dependent on Chinese supply chains to produce batteries that power America’s technologies. In 2019, Chinese chemical companies accounted for 80 percent of the world’s total output of raw materials for advanced batteries.

<sup>8</sup> *Id.*



Source: Benchmark Mineral Intelligence, <https://www.instituteforenergyresearch.org/renewable/china-dominates-the-global-lithium-battery-market/>

Figure 4 Global Battery Material Supply Chain

- Lithium – China is among the top five countries with the most lithium resources and has been buying stakes in mining operations in Australia and South America, where most of the world’s lithium reserves are found.<sup>9</sup>
- Battery Grade Nickel – Mining is fairly evenly spread around the world; however, China controls 65 percent of the chemical processing.<sup>10</sup>
- Cobalt – The Democratic Republic of Congo (DRC) is the source of two-thirds of the global production, but China has over 80 percent of the cobalt refining industry. China also owns eight of the 14 largest cobalt mines in the DRC.<sup>11</sup>

<sup>9</sup> <https://www.instituteforenergyresearch.org/renewable/china-dominates-the-global-lithium-battery-market/>

<sup>10</sup> *Id.*

<sup>11</sup> *Id.*

- Manganese – China mines only six percent of the world’s manganese but refined 93 percent of it in 2019.<sup>12</sup>

The above points highlight the fact that the U.S. is heavily reliant on Chinese supply chains for EV batteries from mining through cell manufacturing.<sup>13</sup>

EV battery recycling offers an opportunity to reduce U.S. reliance on foreign nations for critical minerals used in EV batteries, while providing national energy security. A domestic battery recycling policy can provide national energy security by reducing our dependency on foreign nations for critical minerals by keeping the recycled materials in the U.S. and using them to manufacture new batteries. To maximize the creation of U.S. recycling jobs, and to secure domestic sources of battery materials, it will be important that recycling capacity keeps up with the growing demand for both recycling services and battery materials for U.S. cell manufacturers. If locally recycled materials are used, it will further encourage domestic cell manufacturing and the associated supply chain. The federal government has an opportunity to stimulate investment in domestic EV battery recycling and battery cell manufacturing, and in turn create domestic jobs.

(iii) The availability of the key skill sets and personnel necessary to sustain a competitive U.S. high-capacity batteries ecosystem, including the domestic education and manufacturing workforce skills needed for high-capacity battery manufacturing, the skills gaps therein, and any opportunities to meet future workforce needs.

The auto industry supports over ten million jobs and continues to put over one trillion dollars into the economy each year.<sup>14</sup> For the electrified future to truly be sustainable, the workforce must be able to transition from internal combustion engine vehicles to EVs. Domestic EV battery manufacturing and recycling offer an incredible opportunity for the U.S. workforce to lead. Auto Innovators

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<sup>12</sup> *Id.*

<sup>13</sup> In addition, the process to manufacture EV battery cells and the battery pack depends on a carefully designed, closed loop manufacturing cycle in order to produce high quality batteries. There are a number of chemical substances, like n-methyl-2-pyrrolidone (NMP), that are critical to the battery cell manufacturing process and that will need to be available for use for the development of U.S.-based manufacturing and supply chain EV battery capacity. Thus, it is important for DOE to participate in the interagency review process as EPA develops risk mitigation rulemakings that could restrict usage of these chemicals.

<sup>14</sup> [https://www.autosinnovate.org/about/advocacy/Autos\\_Innovation\\_Agenda\\_12152020.pdf](https://www.autosinnovate.org/about/advocacy/Autos_Innovation_Agenda_12152020.pdf)

commends DOE for including workforce education and skills needed to support the transition to an electrified auto industry.

(vii) Policy recommendations or suggested executive, legislative, regulatory changes, or actions to ensure a resilient supply chain for high-capacity batteries (e.g., reshoring, nearshoring, or developing domestic suppliers, cooperation with allies to identify or develop alternative supply chains, building redundancy into supply chains, ways to address risks due to vulnerabilities in digital products or climate change).

In the recent letter to President Biden, Auto Innovators, the United Autoworkers International Union (UAW), and the Motor & Equipment Manufacturers Association (MEMA) made the following policy recommendations to encourage and incentivize investment by manufacturers and suppliers:

- Expand the 48C Advanced Energy Manufacturing Tax Credit to allow vehicle and equipment manufacturers to retool, expand, or build new facilities for the manufacture, or recycling, of advanced light-, medium-, and heavy-duty electric and fuel cell vehicles, batteries, fuel cells, components, and related infrastructure in the U.S.
- Expand investment in the Domestic Manufacturing Conversion Grant Program and appropriate funds to accelerate the domestic manufacture of batteries, power electronics, electric motors, and other technologies in zero emission vehicles.
- Promote national security and economic security enhancements through the development of U.S.- based supplies of critical minerals (extraction, processing, recycling), battery and fuel cell manufacturing, and other critical components, including semiconductors.
- Expand R&D incentives that maintain and enhance American automobile manufacturers' and suppliers' leadership in the development and production of new innovations that will make the zero-emission future a reality.
- Expand, modernize, and fund the Advanced Technology Vehicles Manufacturing Incentive grant and loan program at the Department of Energy.
- Expand and target workforce training and development programs that will upskill the existing workforce and train new workers to support both our evolving workforce needs and future technology innovations.

- Complement the various tax credits that support renewable energy production by creating a new investment tax credit to support hydrogen production and storage.
- Establish Clean Energy Manufacturing Grant Programs to provide grants for manufacturers, including vehicle manufacturers and equipment and component suppliers, to reequip, expand, and establish facilities for the manufacturing of clean energy technologies and components.<sup>15</sup>

This letter highlights the need for a comprehensive approach focused on consumers, infrastructure, manufacturing, innovation and supply chain resiliency and also provides additional policy recommendations to advance consumer adoption of EVs and grow charging and hydrogen refueling infrastructure in the U.S.

In addition to the recommendations detailed in our letter to President Biden, we also encourage DOE to look for opportunities to address the short-term monetary challenges that will face EV battery recycling. As the EV market is still growing, there will not be considerable number of batteries coming out of service for some time, which will make it fiscally challenging for EV battery end-of-life logistics and recycling. DOE has an impressive track record of investing in the advancement of EV battery recycling with programs such as the ReCell Center at Argonne National Laboratory and the American Made Battery Recycling Prize. This type of investment and leadership from DOE must continue and expand for EV battery recycling in the U.S. to become a positive business case.

### **Supplementary Recommendations**

In addition to the specific requests that DOE has posed, Auto Innovators offers the following recommendations:

- Consider global regulation and legislation for harmonization opportunities.
- Promote full supply chain participation and establish clear roles and responsibilities.
- Support a common and transparent mineral supply chain assurance process.

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<https://www.autosinnovate.org/posts/communications/Auto%20Industry%20EV%20Policy%20Letter%20to%20President%20Biden%20March%2029%202021.pdf>



## Conclusion

The auto industry is committed to a sustainable future that includes a significant shift to electrification, IHS Markit predicts that there will be 130 EV models available in the U.S. by 2026.<sup>16</sup> This significant increase in electrified vehicles will require substantially more batteries, which will increase the demand for critical minerals—minerals that the U.S. is currently dependent on foreign nations to provide. As the industry transitions, the U.S. has an opportunity to take a leadership role in manufacturing and recycling EV batteries at a globally competitive cost. This is about more than the future of the auto industry in the U.S., it is about the nation’s global competitiveness, economic security, and the transition of the U.S. workforce. Auto Innovators commends the Administration and DOE on pursuing this critically important component in the country’s sustainable future. We should learn from the semiconductor shortage to ensure that the same does not occur with EV batteries.

Auto Innovators stands ready to work with the Administration and DOE to advance EV battery technology throughout the lifecycle of the product. If you should have any questions, please contact me at [dbowerson@autosinnovate.org](mailto:dbowerson@autosinnovate.org).

Respectfully Submitted,



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<sup>16</sup> Brinley, Stephanie. IHS Markit. “IHS Markit Forecasts EV Sales to Reach U.S. Market Share of 7.6% in 2026.” Accessed April 5, 2021. <https://ihsmarkit.com/research-analysis/--ihs-markit-forecasts-ev-sales-us.html>