Sustaining a New Industry: Securing Critical Minerals for Electric Vehicle Battery Manufacturing

The manufacturing industry is making a comeback in the United States as Electric Vehicle (EV) financial incentives are luring major market players towards domestic production. Panasonic, GM and LG, Toyota, Zinc8, Ion Storage Systems, along with others are leveraging these incentives by expanding and building manufacturing factories for EV batteries across the country.[1] Although this new economic development is promising, it comes with challenges; EV batteries require critical minerals which raise concerns surrounding availability, human rights, and environmental impacts.

"Critical" minerals are defined under the Energy Act of 2020 by the U.S. Geological Survey[2] which lists the five "critical" minerals as lithium, cobalt, manganese, nickel, and graphite; these minerals are all key to the chemistry of EV batteries.[3] The U.S. heavily imports these critical minerals leaving the country open to disruption risks.[4] The U.S. mines a minimal amount of lithium, cobalt, and nickel; however, it does not mine any manganese or graphite.[5] As the clean-energy transition ramps up, a secure supply of these minerals that is both environmentally and ethically responsible becomes increasingly necessary.[6]

The Inflation Reduction Act attempts stabilize the supply chain by pushing for domestic manufacturing and processing along with collaboration from other countries through free trade agreements. The Act encourages these points of focus by offering consumers a $7,500 tax credit for EV purchases where the final assembly of the EV must take place in North America.[7] To receive the full tax credit, 50% of the battery components must also be manufactured or assembled in the U.S. while 40% of the critical minerals in the battery must be extracted, processed, or recycled in the U.S. or in a country the U.S. has a free trade agreement with.[8] These required percentages increase every year, as laid out in the Inflation Reduction Act.[9] If a

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[1] Under the Bipartisan Infrastructure Law, the Department of Energy awarded $2.8 billion in grants to 20 companies for EV batteries manufacturing and processing. The Inflation Reduction Act further enables processing, manufacturing, and mining by expanding eligibility for the 45X production tax credit. The Department of Energy Loan Program Office and Defense Production Act are also involved in funding the expansion of critical mineral sites, while the CHIPS and Science Act assists research for critical mineral mining strategies. Owen Minnot & Helen Nguyen, *IRA EV Tax Credits: Requirements for Domestic Manufacturing*, BIPARTISAN POLICY CENTER (Feb. 24, 2023), https://bipartisanpolicy.org/blog/ira-ev-tax-credits/. These factories are popping up around the country with Nevada, Kansas, Oklahoma, Tennessee, Ohio, Michigan, North Carolina, New York, and Maryland hosting the sites for this economic development. Anne Fischer, *Battery manufacturing ramps up in the U.S.*, PV MAG. (Sept. 23, 2022), https://www.pv-magazine.com/2022/09/23/battery-manufacturing-ramps-up-in-the-u-s/.

[2] BRANDON TRACY, CONG. RSCH. SERV., R47227, CRITICAL MINERALS IN ELECTRIC VEHICLE BATTERIES 1 (2022).

[3] *Id*.

[4] *Id*.

[5] *Id*.

[6] *See Will mining the resources needed for clean energy cause problems for the environment*, ASK MIT CLIMATE (July 21, 2022), https://climate.mit.edu/ask-mit/will-mining-resources-needed-clean-energy-cause-problems-environment.

[7] Minnot & Nguyen, *supra* note 1.

[8] *Id*.

[9] *Id*.

vehicle only meets one of the two battery component or critical mineral standards, the consumer will qualify for half of the tax credit, $3,750.[10]

For these tax credits to come to fruition and to sustain this new manufacturing industry, the U.S. is looking at both domestic and international opportunities. The domestic side includes looking at current mining permitting processes and finding ways to streamline them. The Biden Administration invoked the Defense Production Act to permit the Department of Defense (DoD) to increase domestic mining and the processing of critical minerals.[11] This allows the DoD to conduct feasibility studies and modernization projects along with by-product and co-product production feasibility at existing mines, mine waste reclamation facilities, and other industrial spaces.[12] A mining reform effort is also being launched so that the Department of the Interior can make recommendations to improve the efficiency and outcomes of the mining permitting process on federal lands, all while ensuring that there are environmental, community, and Tribal engagement standards.[13] This involves examining the antiquated Mining Law of 1872 that governs hardrock mining on public lands.[14] Finally, the Biden Administration released a Permitting Action Plan to streamline Federal permitting and environmental review. This plan attempts to ensure early coordination and effective communication across Federal agencies by creating transparent timelines and permitting schedules, engaging in meaningful outreach with states, tribal nations, territories, and local communities, improving agency responsiveness, and using agency resources to improve impact.[15]

Also taking place at home, research efforts are ongoing to lower the mineral requirements of future EV batteries. Current projects aim to lower costs of EV batteries, extend EV ranges, and reduce charging times.[16] Additional research is attempting to improve the cathode or anode production processes to lower production costs of specific types of batteries.[17] This increase in efficiency and lowering of costs attempts to lessen the strain on the supply chain of critical minerals by meeting high mineral demands. Secondary mineral supply is another research area that focuses on the recycling of EV batteries that reach their end of life along with the recycling of other materials that contain the critical minerals necessary for EV batteries.[18] The economic viability of recycling and how to optimize battery disassembly, shredding, or processing is a

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[10] *Id*.
[11] EXEC. OFF. OF THE PRESIDENT, FACT SHEET: BIDEN-HARRIS ADMINISTRATION DRIVING U.S. BATTERY MANUFACTURING AND GOOD-PAYING JOBS (2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/10/19/fact-sheet-biden-harris-administration-driving-u-s-battery-manufacturing-and-good-paying-jobs/.
[12] *Id*.
[13] *Id*.
[14] *Id*.
[15] EXEC. OFF. OF THE PRESIDENT, FACT SHEET: BIDEN-HARRIS ADMINISTRATION RELEASES PERMITTING ACTION PLAN TO ACCELERATE AND DELIVER INFRASTRUCTURE PROJECTS ON TIME, ON TASK, AND ON BUDGET (2022), https://www.whitehouse.gov/omb/briefing-room/2022/05/11/fact-sheet-biden-harris-administration-releases-permitting-action-plan-to-accelerate-and-deliver-infrastructure-projects-on-time-on-task-and-on-budget/.
[16] Tracy, *supra* note 2, at 5.
[17] *Id*.
[18] *Id*. at 17.

problem that is being contemplated.[19] These research efforts could reap effective and low-cost methods to lessen the strain on demand of critical minerals.

International efforts to secure critical minerals include the Minerals Security Partnership (MSP), the Partnership for Global Infrastructure and Investment, and a potential "critical minerals club." The MSP is a strategic partnership between Australia, Canada, Finland, France, Germany, Japan, the Republic of Korea, Sweden, the United States, the United Kingdom, and the European Commission.[20] The mission of this group is to leverage collaborative opportunities and to build responsible mineral supply chains that account for ethical labor standards and environmental sustainability.[21] The United States also entered the Partnership for Global Infrastructure and Investment which is a coordinated effort with the G7 countries to invest money in low- and middle- income countries.[22] This partnership emphasizes responsible mining of critical minerals along with more investments in new global battery manufacturing.[23] The U.S. committed to mobilizing $200 billion in investments through grants, Federal financing, and leveraging private sector investments.[24] There are also talks of a "critical minerals club" in which the U.S. is negotiating trade agreements for critical minerals with Japan, the EU, and the U.K.[25] The "club" plans to further attempt to reach an agreement with Ukraine or Zambia.[26]

Electrification is a main strategy being deployed to address climate change which includes the mass adoption of EVs. These new vehicles are dependent on mining, processing, assembly, and manufacturing. New financial incentives encourage development in these areas and are coupled with requirements for obtainment. As feasibility is examined, a domestic and international approach is being taken to address the availability of the critical minerals in EV batteries. Reforming the permitting processes for mining in the United States, conducting research focused on increasing efficiency and recycling, and collaborating with foreign allies are all necessary components to maintaining this new wave of domestic battery production, all while ensuring ethical labor standards and environmental responsibility.

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[19] *Id*.
[20] EXEC. OFF. OF THE PRESIDENT, *supra* note 11.
[21] *Id*.
[22] *Id.*
[23] *Id*.
[24] EXEC. OFF. OF THE PRESIDENT, FACT SHEET: PRESIDENT BIDEN AND G7 LEADERS FORMALLY LAUNCH THE PARTNERSHIP FOR GLOBAL INFRASTRUCTURE AND INVESTMENT (2022), https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/26/fact-sheet-president-biden-and-g7-leaders-formally-launch-the-partnership-for-global-infrastructure-and-investment/.
[25] Andrew Duehren, *U.S. and EU Advance Buyers' Club for EV Battery Minerals*, THE WALL STREET JOURNAL (Feb. 15, 2023), https://www.wsj.com/articles/u-s-and-eu-advance-buyers-club-for-ev-battery-minerals-5288287e?utm_source=ground.news&utm_medium=referral.
[26] *Id*.