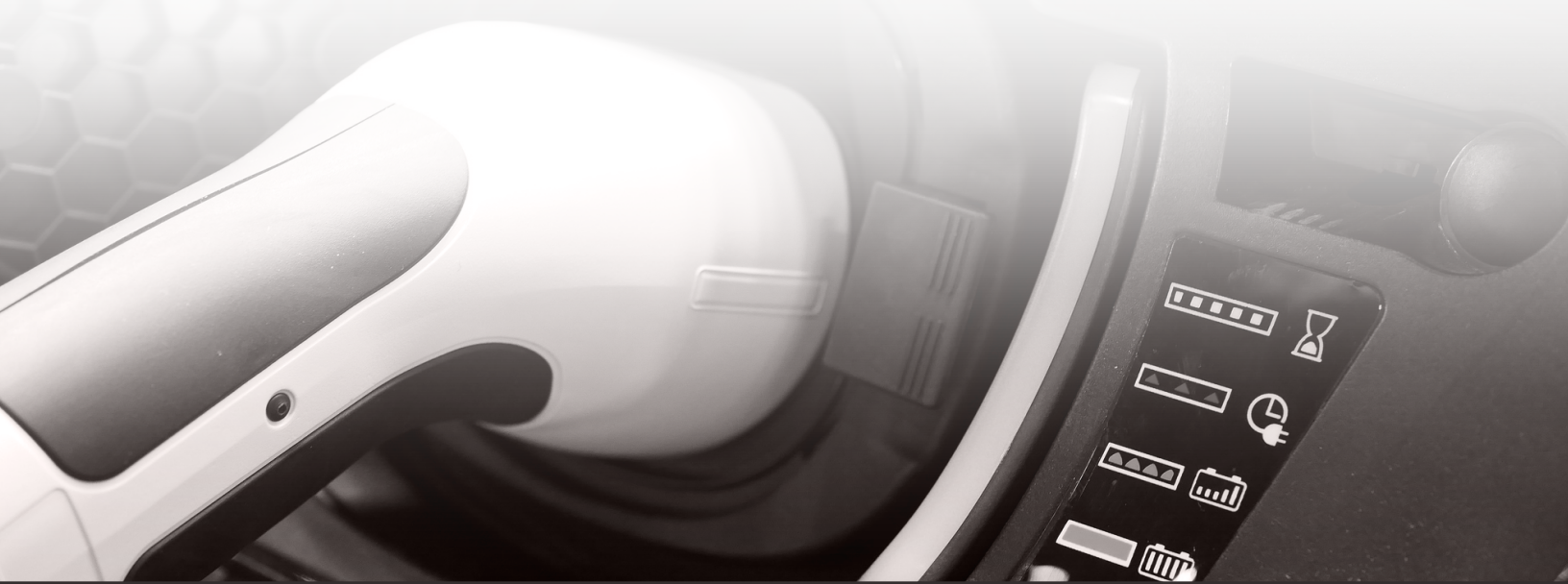


A Domestic Content Rule for Electric Vehicle Lithium-Ion Batteries Will Protect U.S. Jobs

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The International Energy Agency projects on the basis of national government expressed intentions, that global electric vehicle, EV, deployments are likely to grow at an annual rate over 25% between 2020 and 2030. New EV lithium-ion battery production will follow this demand. China and Europe are on track to account for the largest share of the EV battery market. Europe is expected to add 479GWh, while the U.S. may grow to 129GWh.¹ In 2021, China will have 148 of the world's 200 Li-ion mega-factories in the pipeline; Europe and North America have 21 and 11 mega-factories in the pipeline, respectively.² As a result, China is predicted to hold 67% of global lithium-ion cell capacity in 2030 and to retain a commanding global position in critical battery raw materials: Lithium (the U.S. imports 92% of its supply); Cobalt (the U.S. imports 100% of its supply) and Nickel (the U.S. imports 57% of its supply).³ A knowledgeable industry observer stated in congressional testimony: *"We are in the midst of a global battery arms race in which the U.S. is presently a bystander."* Over the next decade there will be tremendous competition between the United States, China, and the European Union for this battery market.

U.S. political leaders and the public rightfully view this outlook with extreme concern. The United States lags China in both battery innovation and manufacturing cost largely due to differences in supply chain management. The United States wants to avoid the experience of the century's first decade when Chinese photovoltaic, PV, panel imports dominated the U.S. market causing American job loss and increasing reliance on offshore production. Chinese PV panels prevailed in the U.S. market because of

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¹ *Global EV Outlook 2020: Entering the decade of electric drive?* (International Energy Agency, 2020). <https://www.iea.org/reports/global-ev-outlook-2020>

² According to Benchmark Mineral Intelligence: <https://www.benchmarkminerals.com/membership/global-battery-arms-race-200-gigafactories-china-leads-2/>

³ <https://www.benchmarkminerals.com/membership/global-battery-arms-race-200-gigafactories-china-leads-2/>

lower PV panel prices and unfair Chinese trade practices, leading to U.S. perception of an unfavorable balance of the benefits of trade in photovoltaics equipment and technology. To prevent a similar outcome, policymakers should consider a domestic content rule to *make* and *keep* lithium-ion battery manufacturing within the U.S. domestic manufacturing ecosystem, contributing to American jobs.

The Biden administration has met the challenge resolutely. Biden positioned himself as a champion of electric vehicles by including a \$174 billion proposal in The American Jobs Plan to “win the EV market” by investing in battery manufacturing and charging infrastructure.⁴ Acknowledging the threat to U.S. competitiveness, on February 24, 2021 President Biden issued an Executive Order for a review of supply chain risks including a report from the Secretary of Energy “identifying risks in the supply chain for high-capacity batteries, including electric-vehicle batteries, and policy recommendations to address these risks.”⁵ But given that EVs and Li-ion batteries are part of a fluid global manufacturing ecosystem that spans the Americas, Asia, Africa and Europe, it’s going to take intentional policy for the United States to “catch up”, never mind “win” in the global EV race.

The private sector recognizes what is at stake. Ford CEO Jim Farley called for action highlighting that “We need to bring large-scale battery production to the U.S. We can’t go through what we’re doing now with [computer] chips.” The current semiconductor chip shortage offers the auto industry a clear view of the implications of reliance on an over-concentrated foreign manufacturing capacity. The shortage is expected to cost global automakers \$110 billion in revenue this year due to lowered capacity from supply chain bottlenecks.⁶

Lithium-ion battery and PV module production differ in an important respect: battery and EV manufacturers often site their plants nearby to facilitate supply-chain management and reduce the cost of a fueled EV to the consumer. Each plant located in the U.S. can have a domestic or international owner. There is already traction on this front; for example, South Korea’s LG has an agreement to supply lithium-ion batteries it produces in Tennessee to EVs that GM assembles in that state.⁷ Ford committed

⁴ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>

⁵ The White House, *Executive Order on America’s Supply Chains*, February 24, 2021.

⁶ <https://www.cnbc.com/2021/05/14/chip-shortage-expected-to-cost-auto-industry-110-billion-in-2021.html>

⁷ GM and LG Energy Solution Investing \$2.3 Billion in 2nd Ultium Cells Manufacturing Plant in U.S.; <https://plants.gm.com/media/us/en/gm/home.detail.html/content/Pages/news/us/en/2021/apr/0416-ultium.html>

to a joint venture with SK Innovation to manufacture battery cells in the U.S.⁸ Both domestic and international auto manufacturers have already started to pursue battery manufacturing partnerships, and policy makers, taking heed of the chip-shortage, should design incentives to accelerate an evolution which keeps lithium-ion battery manufacturing in the United States.

The United States should consider adopting a domestic content policy to encourage this trend: all EVs sold in America should be equipped with a lithium-ion battery pack produced in this country. EV imports that enter the country with lithium ion battery pack produced abroad would be subject to a stiff import duty. U.S. border adjustment would levy a comparable export duty on U.S. originated EVs carrying lithium batteries to foreign markets, hopefully making the policy WTO compliant. Maintaining lithium-ion battery production in the United States, regardless of whether the production is from a domestic or foreign owned facility, maintains Li-ion battery employment in the United States. It also protects the U.S. economy from unanticipated shortage that might arise if Chinese domestic EV deployment, which is heavily subsidized for consumers, outpaces the rise of Chinese lithium-ion battery production capacity, thereby restricting exports.⁹

At a time when sustainability is gaining widespread public and business support, a policy of supporting elevated levels of lithium-ion battery production in the United States underscores the need to establish a framework for dealing with EV batteries when they reach the end of their useful life. Establishing a policy today that battery manufacturers, rather than battery purchasers, will be responsible for disposition of the batteries they sell will stimulate the growth of companies specializing in recycle or “second life” applications, as well providing an incentive for battery designers to consider end-of-life as part of the return on investment of the EV battery business. Anticipated increases in the cost of material for battery raw materials make the “second life” uses and recycling possibilities more attractive.

There are already signs that the private sector is taking note: While currently, lithium-ion batteries are collected and recycled at a rate of less than 5%, the ReCell Lithium Battery Recycling R&D center seeks to capture 90% of all lithium-based battery technologies in the US and recover 90% of key materials

⁸ Ford Commits to Manufacturing Batteries; <https://media.ford.com/content/fordmedia/fna/us/en/news/2021/05/20/ford-commits-to-manufacturing-batteries.html>

⁹ I-Y. L. Hsieh, M. S. Pan, W. H. Green, *Transition to electric vehicles in China: Implications for private motorization rate and battery market*, *Energy Policy*, 144, 11154 (2020).

from the collected batteries.¹⁰ BMW has announced a partnership with Umicore, a materials processing company, to develop a battery reuse and recycling system. Nissan also has developed a blueprint for giving batteries from the all-electric LEAF a second life, extending the usefulness of EV batteries.¹¹ These announcements are promising, but require proactive policy measures to scale development in tandem with manufacturing capacity expansion.

Timely consideration of a domestic content policy to secure lithium-ion battery manufacturing in the United States will help preempt repercussions previously felt by the U.S. from reliance on PV imports, and currently felt from chip supply chain bottlenecks. Policymakers should recognize the alignment of goals with the private sector with regards to supply chain management, acknowledging the apparent signs of traction and lessons from past supply chain weakness, and enact policy measures to drive U.S. manufacturing and recycling – U.S. ability to “win the EV market” depends on it.

¹⁰ <https://www.utilitydive.com/news/creating-a-domestic-market-is-paramount-for-us-battery-industry-to-close-th/557339/>

¹¹ <https://global.nissanstories.com/en/releases/4r>



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