THIRD WAY

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The US is About to Become an Electric Vehicle Manufacturing Powerhouse

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Key Takeaways

The Biden Administration and Congress have put the U.S. on the path to becoming a global leader in electric vehicle manufacturing. Sweeping legislation to help build a robust domestic supply chain for EVs will create millions of good-paying jobs, generate trillions of dollars in economic value, and help us meet our climate goals. This memo outlines the specific policies in the Bipartisan Infrastructure Law, CHIPS and Science Act, and Inflation Reduction Act that have set America up for success in EV manufacturing. These policies will boost production and processing of critical minerals, launch a domestic industry for semiconductors, onshore production of EVs, batteries and components, and incentivize the purchase of clean vehicles.

The Bipartisan Infrastructure Law: Securing Our Supply of Critical Materials and Batteries

The Problem:

Our transition to EVs must not result in us becoming overly reliant on any single country, particularly China, for the raw materials used to make batteries. And this is a real risk: companies backed by the Chinese government own much of the world's critical material processing, including over half of the world's lithium processing, 70% of cobalt processing, and nearly 75% of graphite processing. State-owned Chinese companies are also major players in mineral extraction, owning nearly all of the world's graphite production and a significant amount of the world's lithium production. [1]

The Solution:

Last year, as part of the Bipartisan Infrastructure Law, Congress created several new programs that will tackle this issue head-on. Most importantly, the bill provides **$3 billion in grants for battery material processing**, which will bring critical material processing to our shores and ensure that wherever these minerals are extracted, they can be processed in American factories by American workers. This program will help accelerate the private sector's ongoing efforts to develop supply chains for critical minerals that don't rely on China or other adversaries for these materials. [2]

It also provides another **$3 billion for battery recycling and manufacturing**. This funding will help develop a battery recycling ecosystem so we can harvest critical minerals from spent batteries and reduce the amount of new minerals we need to take out of the ground. Battery recycling is not yet at commercial scale but could ultimately help us meet as much as 18% of cobalt demand, 11% of lithium demand, and 17% of nickel demand by 2035.

These programs, and their 50% non-federal cost shares, combine to provide $12 billion that will help us scale up a globally competitive battery industry that reduces our dependence on critical minerals from Chinese state-owned companies.

CHIPS and Science: Tackling one of the World's Biggest Supply Chain Challenges

The Problem:

An EV requires thousands of semiconductors, also known as chips—more than twice the number needed for an equivalent gas-powered car. The chip industry is highly concentrated in East Asia, and chips have been in short supply since 2020 due to COVID lockdowns in Asia, bottlenecks at ports around the world, and significant increase in demand for chips from other industries. This shortage has snarled auto production and threatens to derail our EV goals.

The Solution:

In August 2022, President Biden signed into law the CHIPS and Science Act, which includes nearly **$52 billion in grants and tax incentivizes for semiconductor manufacturing**. The bill's passage led to a flurry of announcements from chipmakers planning to expand production in the US:

- Intel announced that the new law could enable the company to build six additional semiconductor factories in Ohio on top of the two it is already building, providing good-paying jobs for thousands more people in the coming years.

- Micron announced it will invest $15 billion in a new memory fab in Boise, Idaho—the first new plant of its kind to be built in the US in 20 years—creating 17,000 jobs.

- GlobalFoundries announced it will seek CHIPS funds to modernize its chip factory in Vermont to keep it globally competitive. Funding from the bill could also help the company build a new factory at its facility in Malta, New York.

While passing the CHIPS and Science Act can't solve the semiconductor shortage overnight, it will help build a domestic industry for one of the most important components of an EV and ensure the US can be a global leader in this industry in the long run. These investments will create high-paying

jobs in factories across the country, lower the cost of EVs and other goods that require semiconductors, and make us more resilient to future supply chain shocks.

The Inflation Reduction Act: Making it All in America

The Problem:

The US holds a competitive advantage in EV assembly, but this advantage is threatened by our reliance on other countries for all of the inputs. [3] In order to protect and grow auto jobs while growing US manufacturing leadership, we need to onshore the production of batteries, battery components, and other critical components like electric motors, inverters, and battery management systems. Here too China has raced ahead of us, with Chinese companies owning 75% of the world's production of graphite, cathode material and anode material (key components of battery cells), 75% of the world's battery cell production, and over half of the world's EV assembly. [4]

The Solution:

The Inflation Reduction Act creates several programs that will jumpstart American production of EVs, batteries, and components. [5] These include:

- **$2 billion in Domestic Manufacturing Conversion Grants**, which will help automakers and suppliers retool their factories to make EVs. This program alone could create 3,100 average annual jobs (direct, indirect, and induced). [6]

- **A new Advanced Manufacturing Credit** (45X) to incentivize the production of critical materials, batteries, and other clean energy technologies. This credit will be a game-changer for the battery industry and could significantly drive down the cost of an EV battery, which will in turn put EVs within striking distance of price parity with gas-powered cars.

- **Several improvements to the Advanced Technology Vehicle Manufacturing (ATVM) loan program**, which was instrumental in building up Tesla and helping Ford ramp up EV production back in the early 2010s. Congress eliminated the cap on how much money DOE can lend from this program and provided the department with $3 billion to cover the cost of providing these loans. [7]

- **A 10-year EV purchasing tax credit** designed to push EV and battery makers to bring their operations to the US and tackle China's dominance over the supply chain. The credit now requires final assembly to occur in North America and will soon come with increasingly stringent requirements around the sourcing of critical minerals and battery components. While these requirements will hamper how many EVs are eligible for the credit in the near term, they will ultimately ensure that the US and our allies lead the EV future.

- **A credit for purchasing a previously owned EV** on the used car market, worth up to $4,000. This will allow automakers to add $4,000 to their estimates of what a leased EV will be worth when the lease expires (the residual value of the vehicle), further incentivizing them to produce EVs for their leasing businesses.

The Inflation Reduction Act is working already. By providing long-term policy support for US-made EVs, the bill has unleashed a wave of private sector investments across the EV supply chain:

- Hyundai is considering accelerating the construction of its new EV plant in Georgia to comply with the new EV tax credit's final assembly requirement;

- Toyota is investing an additional $2.5 billion in its new battery plant in North Carolina, which will now bring over 2,000 jobs to the state;

- Ultium Cells, a joint venture between GM and LG Energy, is eyeing a fourth battery plant in Indiana in addition to the ones it will build in Michigan, Ohio, and Tennessee;

- Honda and LG have announced they are teaming up to build a battery production facility in the US;

- Panasonic, which is already building a $4 billion lithium-ion battery plant in Kansas, is looking to build an additional plant to supply batteries to Tesla;

- Samsung SDI is moving up construction of its new battery plant in Indiana in response to the new tax credit requirements;

- Sparkz will build a factory making cobalt-free batteries in West Virginia, where it will hire 350 workers including displaced coal miners.

Thanks to the Inflation Reduction Act, we can expect to see many more announcements like these in the months ahead. [8]

The US should lead the world in electric vehicles. Now, we can.

The transition to EVs represents an enormous opportunity for our economy and for the climate—but only if we seize it. The troika of legislation enacted by Congress provides long-term strategic support that will enable companies to make longer-term investments so they can scale up production, reduce costs, and ultimately offer their EVs at competitive price points. Taken together, these legislative packages will help ensure we have a reliable and secure supply of critical materials, tackle the shortages that are holding back our auto industry, and onshore the entire supply chain for EVs—all while getting the US on a path to deep emissions reduction. In short, the US is about to become an EV-making powerhouse, and in doing so will create trillions of dollars in economic value and millions of jobs for American workers. [9]

To make the most of these investments, the federal agencies implementing new spending programs should complete rulemakings and get the money awarded quickly so companies can start breaking ground on new facilities and hiring workers. They should also continue to leverage existing programs like ATVM that have been successful in building the EV industry we have today. [10] Meanwhile, Congress should continue pursuing permitting reform, with a goal of streamlining the permitting process to make it easier to start mineral extraction operations in the US while maintaining rigorous environmental protections.

Gone are the days when we thought we had to choose between growing the manufacturing base and addressing climate change. In fact, we know now that not only *can* we do both, but in order to ensure American workers and companies lead the global transition to a clean energy economy, we *must* do both. Through the Bipartisan Infrastructure Law, the CHIPS and Science Act, and the Inflation Reduction Act, the Biden Administration and Congress have made it clear that we don't have to choose between a robust industrial economy and a clean one: we can have both, and the time to start building that economy is now.

ENDNOTES

1. Global Supply Chains of EV Batteries." International Energy Agency, July 2022, Page 27, https://iea.blob.core.windows.net/assets/4eb8c252-76b1-4710-8f5e-867e751c8dda/GlobalSupplyChainsofEVBatteries.pdf

2. Automakers and other companies have been working to secure the supply of raw materials needed to meet projected demand for EVs in the coming years. See, for example:

   "How Global Carmakers are Investing in Argentina's Lithium Potential." Bnamericas, 9 Aug. 2022, https://www.bnamericas.com/en/news/how-global-carmakers-are-investing-in-argentinas-lithium-potential

   LaReau, Jamie L., "GM has 3 new deals with suppliers to assure it hits EV production target." Detroit Free Press, 26 July 2022, https://www.freep.com/story/money/cars/general-motors/2022/07/26/general-motors-electric-vehicles-materials/10146847002/

3. Boston Consulting Group assessed that the US has a competitive advantage in the OEM segment of the EV value chain but has fallen behind in other segments such as raw materials and battery and powertrain production. See: "Potential for US Competitiveness in Emerging Clean Technologies: Publication Appendix." Boston Consulting Group, September 2022, Pages 84-86, https://thirdway.imgix.net/Potential-for-US-Competitiveness-in-Emerging-Clean-Technologies-Appendix.pdf

4. "Global Supply Chains of EV Batteries." International Energy Agency, July 2022, Page 27, https://iea.blob.core.windows.net/assets/4eb8c252-76b1-4710-8f5e-867e751c8dda/GlobalSupplyChainsofEVBatteries.pdf

5. For a more detailed list of EV policies included in the Inflation Reduction Act, see: "The Inflation Reduction Act—What it Is and What it Means for EV Adoption." Zero Emission Transportation Association, August 2022, https://www.zeta2030.org/insights/the-inflation-reduction-act-what-it-is-and-what-it-means-for-ev-adoption

6. Pollin, Robert et al, "Job Creation Estimates Through Proposed Inflation Reduction Act." Political Economy Research Institute, 4 Aug. 2022, Page 21, https://peri.umass.edu/publication/item/1633-job-creation-estimates-through-proposed-inflation-reduction-act

7. Montoni, Nicholas, "How to Unleash the LPO's True Potential." Third Way, 27 July 2021, https://www.thirdway.org/memo/how-to-unleash-the-lpos-true-potential

8. Even before the Inflation Reduction Act was passed, several automakers made big announcements about growing EV and battery manufacturing in the US.

   In September 2021, Ford announced it was partnering with SK Innovation to build two battery plants in Kentucky, creating 5,000 jobs. See: "Ford to invest $5.8 billion to build two Kentucky electric battery plants." The Lane Report, 27 Sep. 2021, https://www.lanereport.com/146877/2021/09/ford-to-invest-5-8-billion-to-build-two-kentucky-electric-battery-plants/

   In May 2022, Stellantis announced it was partnering with Samsung SDI to build a lithium-ion battery plant in Indiana that will create 1,400 jobs. See: Lawrence, Eric D. and Dave Boucher, "Stellantis, Samsung to invest $2.5B, create 1,400 jobs at Indiana EV battery plant." Detroit Free Press, 24 May 2022, https://www.freep.com/story/money/cars/chrysler/2022/05/24/stellantis-samsung-ev-battery-plant-indiana/9909477002/

9. "Potential for US Competitiveness in Emerging Clean Technologies: Publication Appendix." Boston Consulting Group, September 2022, Pages 22 and 24, https://thirdway.imgix.net/Potential-for-US-Competitiveness-in-Emerging-Clean-Technologies-Appendix.pdf

10. Before the Inflation Reduction Act was signed, DOE announced new ATVM loans for the first time in a decade, illustrating the impact this program can have.

In July 2022, DOE closed a loan to Syrah Technologies, enabling the company to expand its facility in Louisiana producing graphite-based active anode material, which is a critical component of lithium-ion batteries. See: "DOE Announces First Advanced Technology Vehicles Manufacturing Loan in More than a Decade." US Department of Energy, 27 July 2022, https://www.energy.gov/articles/doe-announces-first-advanced-technology-vehicles-manufacturing-loan-more-decade

DOE also offered a conditional commitment for an ATVM loan that will enable Ultium Cells, a joint venture between GM and LG Energy, to manufacture lithium-ion batteries in Michigan, Ohio, and Tennessee. See: Shah, Jigar, "LPO Offers Conditional Commitment for Loan to Build New EV Battery Cell Manufacturing Facilities in Ohio, Tennessee, Michigan." US Department of Energy Loan Programs Office, 25 July 2022, https://www.energy.gov/lpo/articles/lpo-offers-conditional-commitment-loan-build-new-ev-battery-cell-manufacturing