

EV BATTERY SUPPLY CHAINS AND ANTI-COMPETITIVE INDUSTRIAL POLICY



UNITED STATES SENATE COMMITTEE ON THE BUDGET HEARING
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OPENING STATEMENT

Chairman Whitehouse, Ranking Member Grassley, and distinguished Members of the Committee, it is my sincere pleasure to appear before you today.

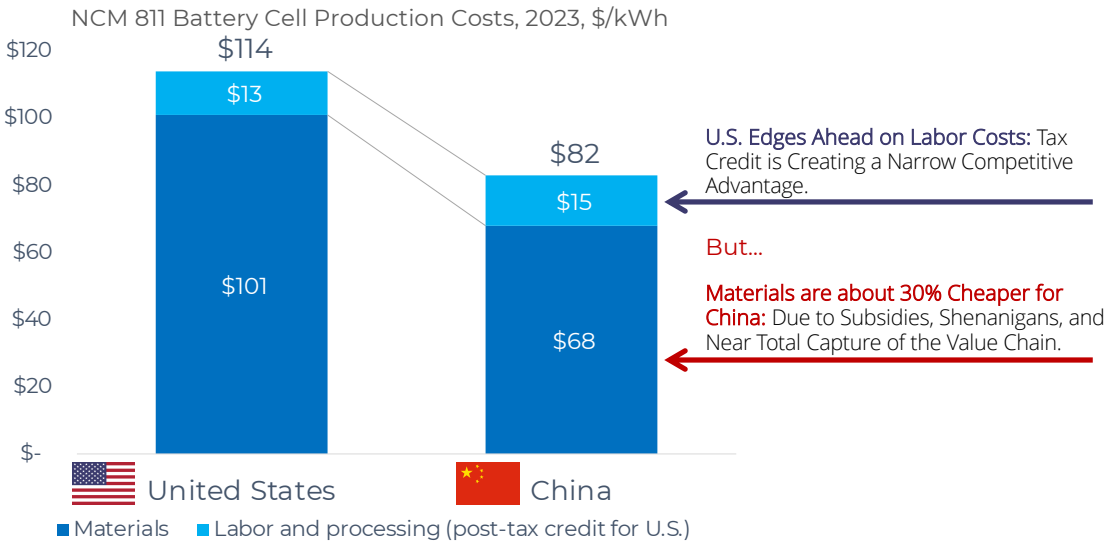
My name is Maureen Hinman, and I am the Chair and Co-founder of Silverado Policy Accelerator, a non-profit, bipartisan think and do tank focusing on developing novel policy solutions to our most pressing economic, environmental, and national security challenges through a focus on rigorous research, cross-domain policy engagement, and granular policy implementation.

Fittingly, the challenges before the global battery and electric vehicle supply chain represent a fulcrum of these risks, challenging our ability to transition American lives and livelihoods to a clean economy, maintain a critical manufacturing base, and preserve energy independence.

Currently, the EV battery sector is following a well tread pattern of the United States acting as chief global innovator on critical emerging technologies but falling short on the downstream industrial development because our market economy, bound by the rule-of-law, cannot reasonably compete with the openly predatory, non-market industrial policies of the Chinese Communist Party (CCP).

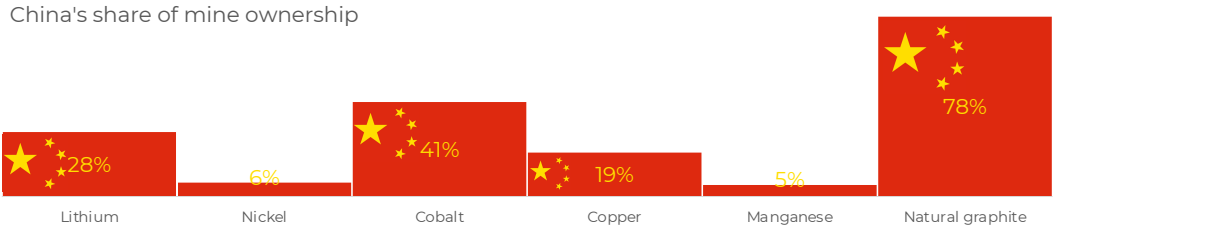
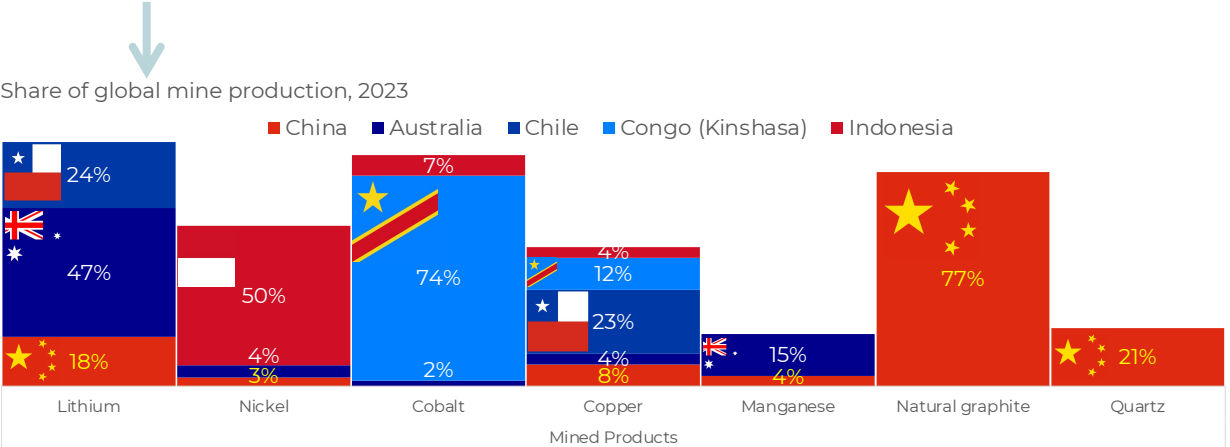
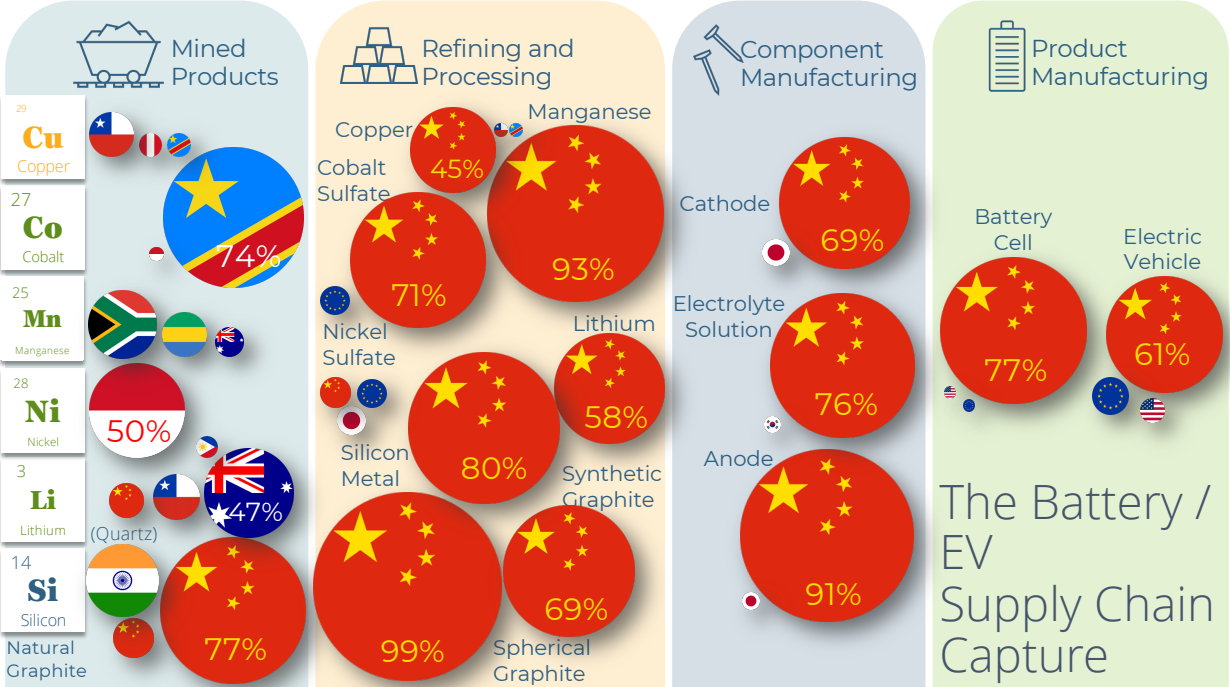
To change this script, we need to broaden the collective understanding of the impact the CCP's policies have on global competition and American national security. While yielding price distortions that have created low costs for consumers in the short-term, the CCP's industrial policies ultimately create an unsustainable risk matrix for the United States. For example, battery cell production costs, which comprise about 30-40 percent of the total vehicle production cost, sit at \$114 per kWh in the United States compared to just \$82 per kWh in China. This difference is owed to the fact that materials remain about 30 percent cheaper in China.

FIGURE 1. NCM 811 BATTERY CELL PRODUCTION COSTS



A cursory look at the EV battery supply chain reveals a troubling state of play: China has captured the balance of global supply chains for refined mineral products, battery components, and final products including battery cells and electric vehicles. For several of the mined products that are unavailable within China itself, Chinese firms own a major stake in mines globally. China controls 28 percent of lithium mines, 41 percent of cobalt mines, and nearly 20 percent of copper mines.

FIGURE 2. GLOBAL EV BATTERY SUPPLY CHAIN CAPTURE AND CRITICAL MINE OWNERSHIP AND INVESTMENT

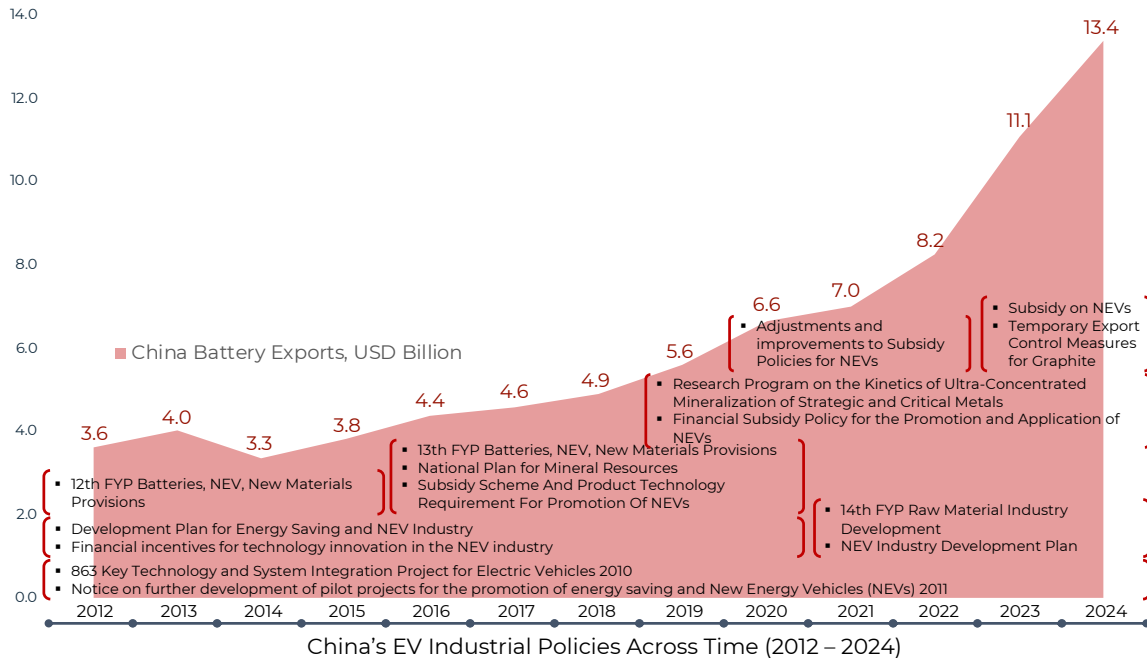
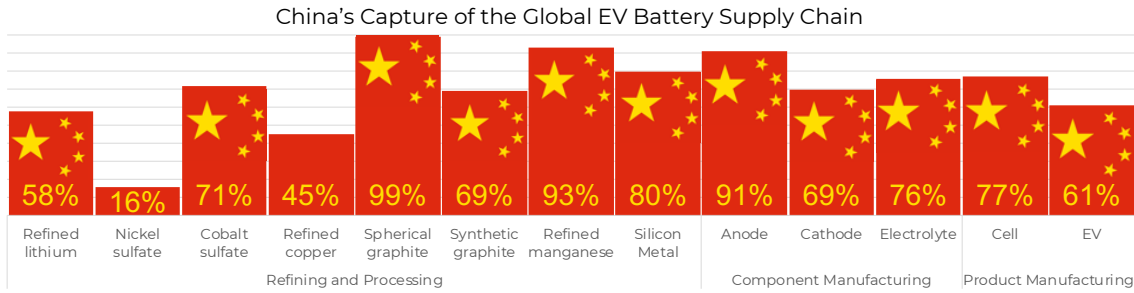


The CCP achieves these results through an industrial policy playbook I call the six S's:

1. First, China **sets** specific goals and targets for what it determines to be priority sectors including through sector specific 5 Year Plans and policies like Made in China 2025.
2. Next the CCP, **shelters** its infant industries from markets and competition using tools such as tariff and non-tariff trade barriers and limits on foreign investment.
3. Simultaneously, China **subsidizes** target industries directly, across the value chain through a variety of payment systems both formal and informal that firms operating in a market economy, underpinned by the rule of law, could simply not sustain.
4. Concurrently, Chinese firms and often the government itself are encouraged to acquire or outright **steal** foreign technologies and then merge and innovate upon them without the costs associated with legal acquisition of intellectual property.
5. Once Chinese technologies have a toehold in global markets, the CCP **subverts** competition through a variety of non-market strategies including undermining market pricing by building overcapacity and production untethered to real demand and then exporting the surplus on the global market at below cost prices, throttling or limiting supply to undermine competitors, making strategic investments in adjacent industries and critical infrastructure in key markets, and engaging in economic coercion and intimidation.
6. Finally, once China has established a near market monopoly Chinese firms **sell** everywhere at a price of their choosing, weaponizing supply chains in their favor.

The CCP's approach dwarfs' other nations efforts not just in strategy, but critically in scope, scale, and consistency across the entirety of the supply chain. Put simply, China unfairly and illegally subsidizes more programs, for more critical nodes, over a longer period, and with more dollars. The CCP's stated goal is to establish global monopoly power in all critical industries and they are well on their way to achieving this end in the EV battery market. The International Energy Agency anticipates that China's battery manufacturing capacity will account for 77 percent of world demand by 2030.

FIGURE 3. EV AND EV BATTERY INDUSTRIAL POLICIES ACROSS THE SUPPLY CHAIN, OVERTIME, AND ANNUAL SUBSIDIES



These cheap batteries are no deal.

Effectively countering these efforts will require that the United States and market economies deploy coordinated, agile policies at a scale sufficient to correct for market distortions and to protect U.S. public and private investments in industrial and environmental security. Silverado and I remain at your service as you devise policies that can meet this generational challenge.

Senators, thank you for your time.

APPENDIX: SUPPLEMENTAL INFORMATION

FIGURE 1. U.S. AND CHINESE BATTERY PACK PRICES AND PRODUCTION MARGINS

Battery pack prices by region, 2023

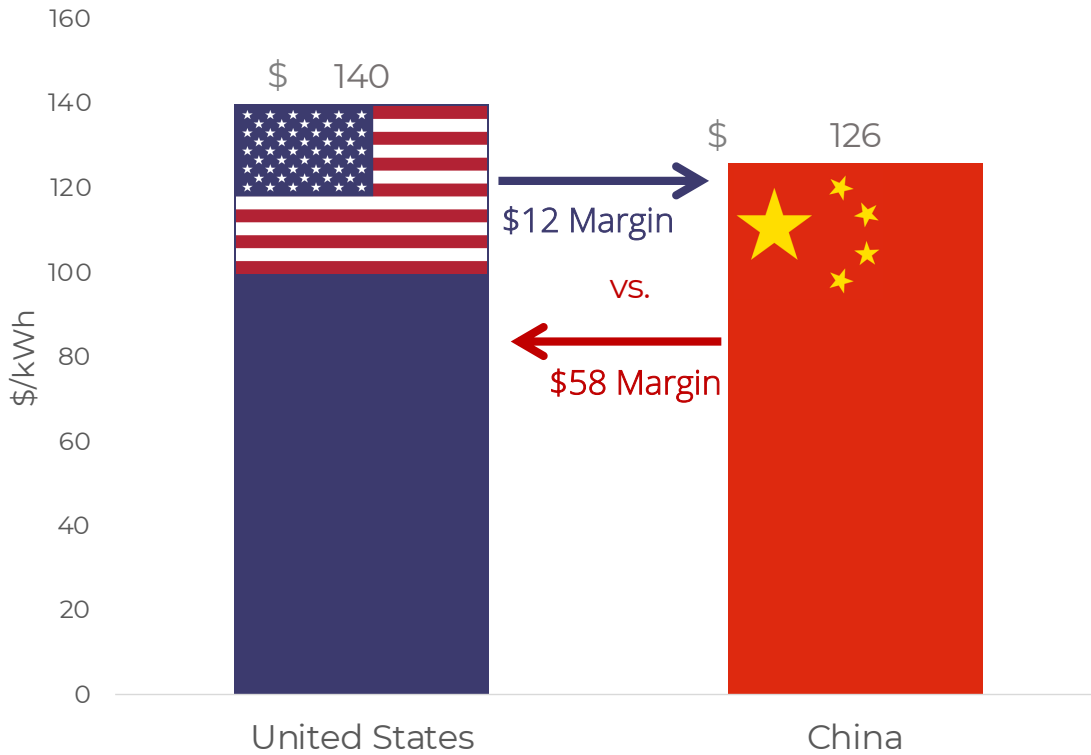
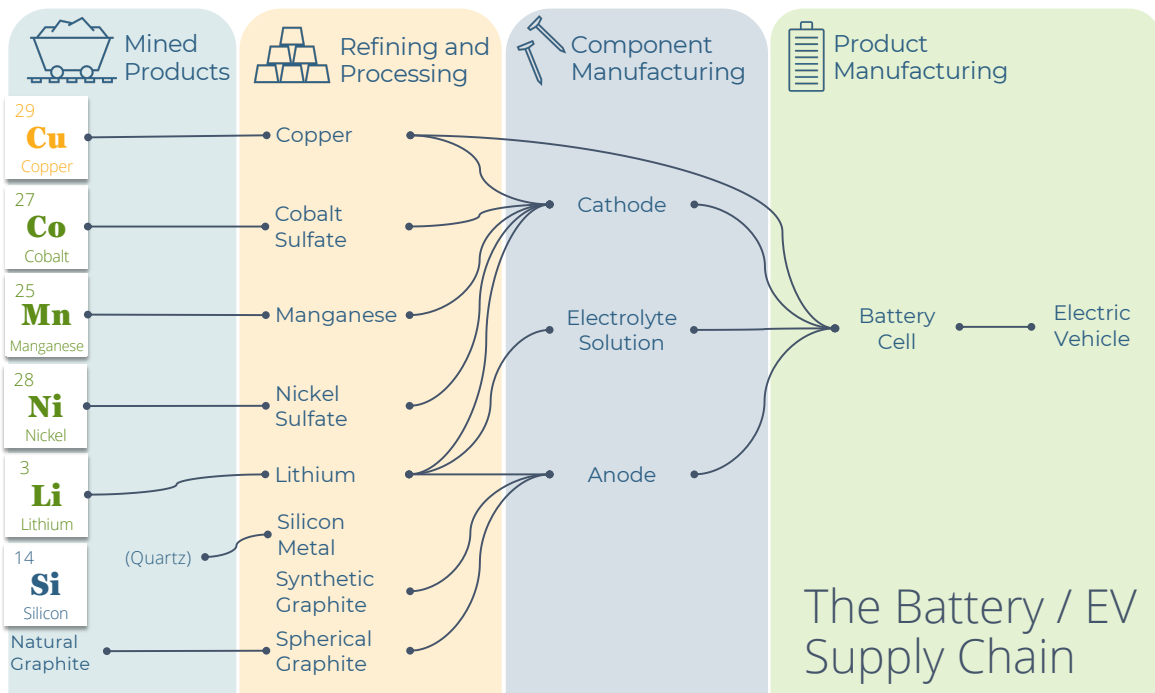


FIGURE 2. SIMPLIFIED EV BATTERY SUPPLY CHAIN



EV battery supply chains begin with mined products, including critical minerals such as copper, cobalt, nickel, and of course manganese. Mined products are refined and processed into industrial grade sulfates and metals that are used in the manufacture of the three critical components of cathodes, anodes, and electrolyte solution that comprise the finished battery cell.

FIGURE 3. COMPARATIVE MARKET ACCESS: U.S. AND CHINA

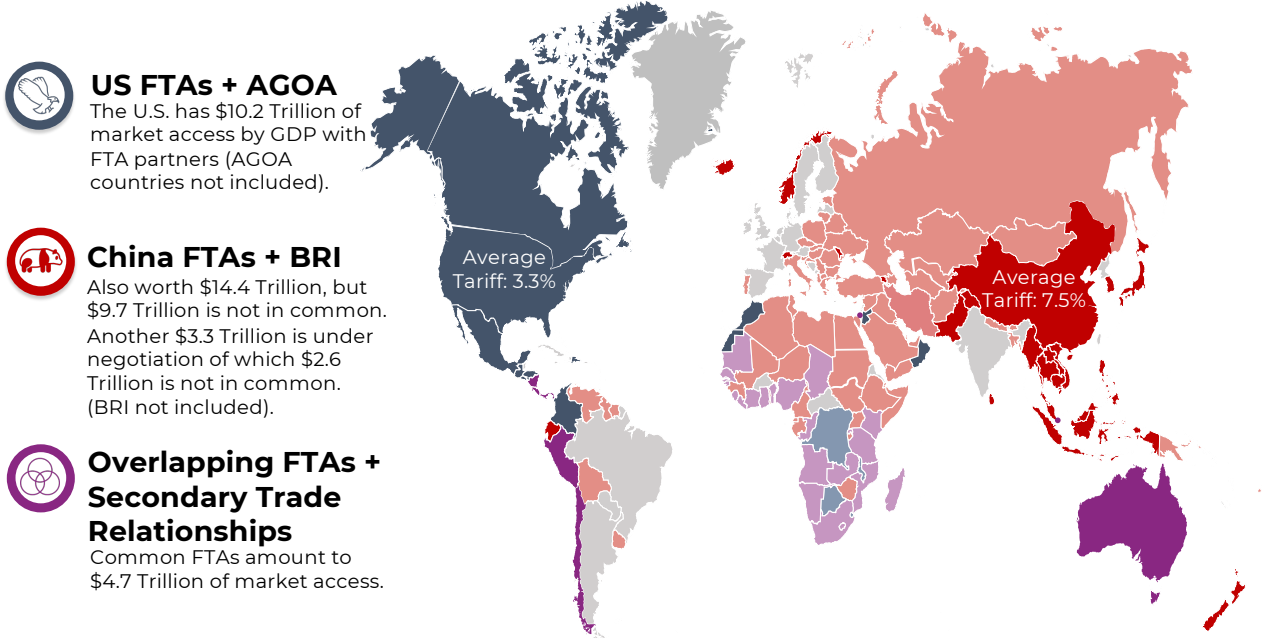
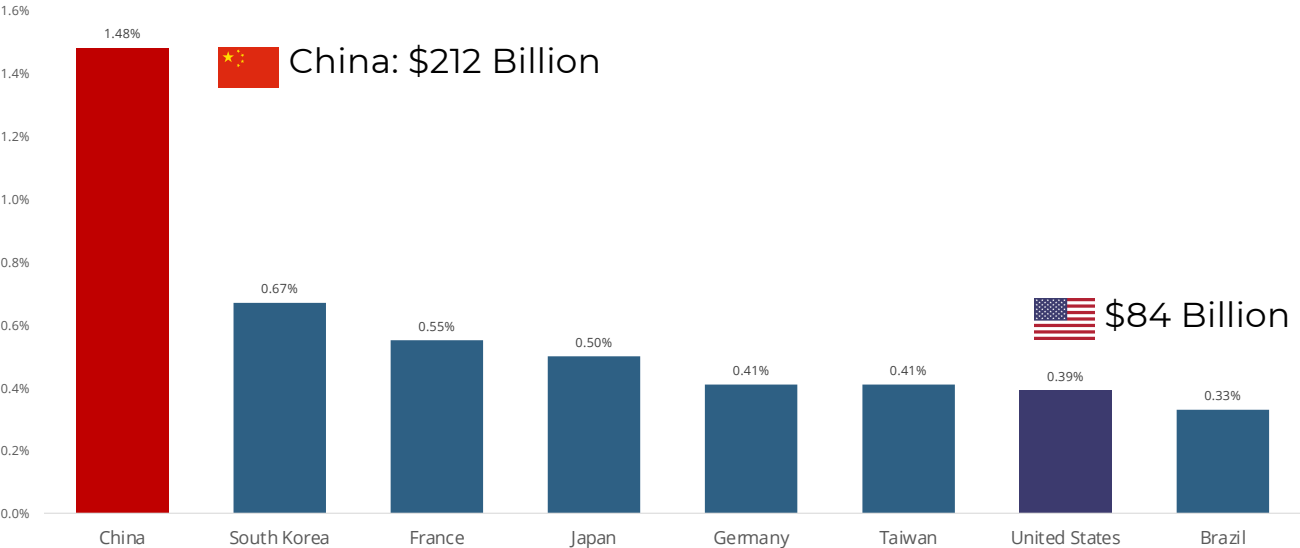


FIGURE 4. COMPARATIVE GROSS INDUSTRIAL POLICY SPENDING

Industrial policy spending as a share of GDP



NOTES AND SOURCES

Critical Mineral Supply Chains*: The data, except quartz, are production or production capacity for the latest available year (2021, 2022, or 2023). Quartz data are share of global exports. USGS; Global Trade Tracker; OECD; Visual Capitalist; Benchmark Mineral Intelligence; BloombergNEF; OECD.

CCP Industrial Policies Span the Battery / EV Supply Chain: USGS; OECD; Visual Capitalist; Benchmark Mineral Intelligence; BloombergNEF; OECD National Plan for Mineral Resources; 2016-2020. "Unlocking the true value of the EV battery through price" Simon Kucher, 2023.

Battery Critical Mine Ownership & Investment: Quartz data are the share of global exports. Copper mine ownership data are 2023, all other mine ownership data are 2022. The ownership share for all minerals except copper is from New York Times data and "is based on estimated production volumes multiplied by ownership equity stake." The methodology for calculating the copper mine ownership was not published in the data source. Other approaches to calculating ownership can result in significantly different ownership shares. For example, Benchmark Mineral Intelligence estimated that 60 percent of lithium mine output in 2023 was "associated with a Chinese company." USGS; Global Trade Tracker; Benchmark Mineral Intelligence; Open Mineral, "Who Controls Copper? Geotechnical Shifts in Copper Mine Ownership,," May 16, 2024, <https://openmineral.com/2024/05/16/who-controls-copper-geotechnical-shifts-in-copper-mine-ownership/>; Chang, Agnes and Keith Bradsher, "Can the World Make an Electric Car Battery Without China?" *The New York Times*, May 16, 2023, <https://www.nytimes.com/interactive/2023/05/16/business/china-ev-battery.html>.

Comparing 1 Year of Year of Battery Subsidies: Tariff rates are for electric passenger vehicles. Tariff rates as of May 2, 2024. Subsidy estimates are preliminary estimates for the latest available year, which is 2022 for China and 2023 for the United States. The China data includes direct government subsidies, low interest loans, and tax refunds. U.S. data are primarily the Inflation Reduction Act (IRA) and federal R&D expenditures. State and local incentives for the United States are not included. The estimates are based on publicly available data sources and financial data from Bloomberg L.P.

Active CCP Battery/EV Industrial Policies Overtime: IEA, Silverado Policy Accelerator, Global Trade Tracker.

Emergent Competitive Differences: Battery Cell Production Costs: CRU Group, "What Could It Cost for Europe and North America to Localise the Battery Supply Chain?" April 11, 2024. Note: Values are derived from a chart and, therefore, are approximate.

Emergent Competitive Differences: Battery Pack Prices: BloombergNEF, Lithium-Ion Battery Pack Prices Hit Record Low of \$139/kWh, November 26, 2023, <https://about.bnef.com/blog/lithium-ion-battery-pack-prices-hit-record-low-of-139-kwh/>.

Battery Manufacturing Capacity to 2030, GWh: IEA, "Lithium-ion Battery Manufacturing Capacity, 2022-2030," May 22, 2023, <https://www.iea.org/data-and-statistics/charts/lithium-ion-battery-manufacturing-capacity-2022-2030>; IEA, *Batteries and Secure Energy Transitions*, April 2024, <https://www.iea.org/reports/batteries-and-secure-energy-transitions/executive-summary>.

Industrial Policy Spending as Share of GDP – Macro, 2019: DiPippo, Gerard, Ilaria Mazzocco, and Scott Kennedy, *Red Ink*, Center for Strategic and International Studies, May 2022, <https://csis-website-prod.s3.amazonaws.com/s3fs->

public/publication/220523_DiPippo_Red_Ink.pdf?VersionId=LH8ILLKWz4o.bjrwnS7csuX_C04FyEre.

Access Match Up: Average tariff rates are from 2022. GDP data are 2023. IMF, "GDP, Current Prices,"

<https://www.imf.org/external/datamapper/NGDPD@WEO/OEMDC/ADVEC/WEOWORLD>; WTO Stats, <https://stats.wto.org>.