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THE DEVIL IS IN THE DETAILS

MINERALS, BATTERIES, AND US DEPENDENCE ON CHINESE IMPORTS

Ben Taulli and **Joshua Busby**

EXECUTIVE SUMMARY

OVERVIEW

US dependence on China for critical minerals and battery supply chains represents a national security risk, leaving the country potentially vulnerable to military supply chain disruptions, coercion, cyber threats, and risks to key economic sectors. While it is well understood that China dominates key segments of the global market, the degree of US reliance on Chinese suppliers remains unclear due to data limitations. Current trade data fails to capture firm-level dependencies and market concentration fully, impeding policymakers' ability to make informed decisions. This brief examines the global battery supply chain, identifies gaps in trade data, and outlines four key recommendations for improving US tracking of import reliance.

GLOBAL BATTERY SUPPLY CHAIN AND CHINESE MARKET DOMINANCE

China holds a commanding position in the global battery supply chain, controlling a substantial share of the entire value chain from upstream mineral extraction and refinement to downstream anode, cathode, and finished battery production. Much of the publicly available data on Chinese production, however, does not provide an accurate picture of US dependence on Chinese suppliers. More data is required to drive the nuanced

policymaking required to grow the US battery supply chains and learn from China where applicable. Much of China's production is directed towards its domestic market, and existing trade data does not account for firm-level details or the role of Chinese firms operating through foreign subsidiaries.

The US imports nearly three-quarters of its lithium-ion batteries from China. Less well known is that only about 30% of electric vehicle lithium-ion batteries are imported, the rest are already produced domestically. The US has specific dependencies on China for graphite but Chinese presence in US supply chains for other midstream commodities such as nickel and manganese is less significant.

BARRIERS TO UNDERSTANDING US IMPORT DEPENDENCE ON CHINA

Despite extensive global data, the US lacks firm-level detail in trade data. Current tracking methods rely on Harmonized Tariff Schedule (HTS) codes, which aggregate imports by commodity, weight, dollar value, and country of origin. Firm identifying data is collected at the border but is not shared outside the Department of Commerce and Customs and Border Protection (CBP). Conducting firm-level analysis with HTS codes presents three major challenges:

1. **Outdated Classifications:** HTS codes lag behind technological developments, making it difficult to distinguish battery-related imports from other mineral commodities. Most battery-related materials are categorized under broad, non-specific codes.
2. **Limitations in Trade Publishing:** Data aggregation at the country level obscures Chinese firm involvement in battery manufacturing (e.g., Poland-based factories owned by Chinese companies).
3. **Intentional Data Obfuscation:** US firms can hide import partners by using freight forwarders or by filing for confidential treatment with US CBP, a custom ubiquitously practiced across the industry as hiding imports can confer certain industry advantages.

Annually published US Geological Survey (USGS) reports provide insights but still lack firm-level specificity. Data provided to the Department of Energy via electric vehicle manufacturers seeking tax credits, may provide much more granular detail, but the information is likely skewed by the types of firms seeking the credit - those who already qualify for the credit by having supply chains already decoupled from China. It is also unclear if intergovernmental sharing mechanisms exist to proliferate such data once captured.

RECOMMENDATIONS FOR STRENGTHENING US DATA COLLECTION

To improve transparency and better assess US reliance on Chinese suppliers, we propose four key actions:

1. UPDATE TRADE CODES FOR BATTERY SUPPLY CHAINS

- Refine HTS codes to distinguish between key battery components such as cathodes, anodes, and precursor materials.
- Create a distinct classification for recycled battery materials (black mass) and emerging battery chemistries such as sodium-ion and solid-state batteries.
- Leverage more detailed Chinese and EU import codes to enhance tracking of lithium-ion battery supply chains.

2. ENHANCE DATA SHARING IN THE US GOVERNMENT

- Increase access to firm-level trade data housed within CBP for agencies like DOE and DOD.
- Require the Department of Commerce and CBP to produce an annual supply chain vulnerability report on critical minerals and batteries.

3. RETAIN AND EXPAND INCENTIVES AND DATA COLLECTION ON ELECTRIC VEHICLE SUPPLY CHAINS

- Retain Inflation Reduction Act (IRA) consumer tax credit incentives 30D, which require manufacturers to disclose mineral sourcing.
- Expand foreign entity of concern (FEOC) provisions to apply beyond consumer EV tax credits (30D) to commercial vehicle credits (45W) and battery manufacturing incentives (45X) – this both expands the reporting requirements that illuminates mineral import reliance and accelerates the mineral supply chain onshoring process.
- Ensure the FEOC requirements allow licensing and joint venture relationships like the one between Ford and CATL, while still incentivizing manufacturers to on-shore and friend-shore minerals sourcing, processing, and manufacturing.

4. LEAD INTERNATIONAL EFFORTS FOR TRADE CODE STANDARDIZATION

- Advocate for more advanced battery supply chain tracking through the World Customs Organization (WCO) to ensure global alignment on detailed classification of battery-related materials.

CONCLUDING THOUGHTS

Supply chain diversification through domestic production and ally-shoring is a desirable goal. However, just because minerals or batteries are provided by Chinese companies is not necessarily a reason to exclude them from US markets. In some cases, like battery grade graphite, there are few other options. Chinese firms like CATL are dominant providers of batteries and have specialized expertise in emergent battery chemistries like lithium iron phosphate. In January 2025, the DOD blacklisted CATL and 134 similar companies, meaning they are ineligible for DOD contracts, but the move may have wider reputational repercussions. It is difficult to verify claims of collaboration between CATL and the Chinese military, and it seems like there is high motivation by some members of Congress to exclude Chinese companies from market access no matter what. Elsewhere, we have argued that US- Chinese joint ventures may be necessary for the US to catch up with China with the latest in battery manufacturing techniques. This suggests a more sophisticated data and information strategy than merely identifying choke points of weakness in US supply chains and then seeking to decouple the US and Chinese market relations in the battery space. But both strategies ultimately require more information on US market vulnerabilities, something that is sadly lacking at the moment.

METHODS AND SCOPING

We scoped this report to reflect only unclassified and publicly available data. It is possible and even likely that the US government has data and classified reports that enable it to track the supply chain vulnerabilities we write about in this report. However, having interacted with a number of US government officials, it is not clear from these conversations that this data is in fact available or updated regularly, as we suggest should be done.

Additionally, this report focuses on the main minerals required for batteries (lithium, cobalt, nickel, graphite, and manganese), the intermediate cathodes and anodes that comprise batteries, and the finished battery cells. In this report, we have not analyzed the market for rare earth materials which also have applications in magnets that are deployed in electric vehicles, renewables, and military technologies. China dominates the market for rare earths and permanent magnets. China has used its market leverage over Japan previously in rare earths which prompted significant successful diversification efforts. Recent moves by China to restrict rare earth exports may prompt a similar reckoning in the United States.

INTRODUCTION

Over the past decade, relations between China and the United States have steadily deteriorated, with both countries engaged in escalatory tit-for-tat trade restrictions over minerals and semiconductors. Those that follow discussions of critical minerals and battery supply chains have probably read that the United States is overwhelmingly reliant on China for minerals, intermediate products, and finished batteries.

Some startling global statistics are often reported. For key minerals such as graphite, cobalt, manganese, nickel, and to a lesser extent lithium, China dominates the world market, given its capacity to process minerals. For example, in 2022, China controlled 100% of spherical graphite and 69% of synthetic graphite chemical processing and production. China also controlled 70% of finished battery production globally.

This degree of market dominance is thought to be a national security risk for the United States, for a variety of reasons. Batteries and some critical minerals have dual uses in civilian and military equipment, so any supply disruptions could make it harder to produce some weapons systems. Relatedly, officials worry that China could use this market dominance as a tool of coercion by threatening to withhold these materials. Moreover, to the extent that market dominance extends to final products like electric vehicles and solar panels, these technologies are increasingly linked to web devices, exposing them to cyber security risks. Finally, clean energy technologies are likely to be a large source of wealth generation in the 21st century. Countries that dominate these markets will have more funds to support their militaries.

However, since much of China's production is destined for its domestic market, these statistics tell us little about the extent to which the United States depends on China for key inputs. Moreover, what do we know about the identities of the firms that export minerals and batteries to the United States? Knowing how many and which firms export to the United States can be useful for several reasons. First, individual Chinese firms are increasingly subject to more intense scrutiny, given concerns about ties to the Chinese military and/or sourcing of materials using forced labor. Second, it may matter a lot for market stability whether a few firms have large market share, as any supply disruptions from them could have major implications for the entire market.

The previous Biden administration prioritized de-risking of supply chains from China across a range of products, including batteries, minerals, and pharmaceuticals. The Trump administration is continuing this work, though may deemphasize minerals and materials for the clean energy transition. However, in seeking to track US import dependence on China and Chinese firms, we encountered a number of challenges in access to data, which raise more profound questions about whether US decision-makers have the tools and information to inform their decisions. More data is needed in order to drive the type of nuanced policymaking required to both grow US battery supply chains and learn from China where applicable.

This report captures what we know about the global battery supply chain market, imports into the United States and barriers to information, and possible remedies for improving data collection and distribution going forward.

THE GLOBAL BATTERY SUPPLY CHAIN MARKET

Chinese battery makers like CATL and BYD are known to have a large share of the global market, but what percentage of that translates to the US market?

According to 2024 data from Benchmark Intelligence, China controls 70% of the world's battery pack assembly, 35% is done by a single Chinese company - CATL, followed by BYD at 14%. China holds 91% of the world's anode production, with the top five Chinese producers controlling 59% of the world market share. The cathode market is more competitive with the top five global producers controlling only 23% of the global market share, but even here all but the smallest of those companies are Chinese.

In metals extraction, a similar theme of Chinese market dominance presents itself. For example, 24% of the world's cobalt mining is done by one Chinese company CMOC. Two Chinese firms, Isky New Minerals and Guizhou Dalong Huichen, control more than 20% of the global manganese market each respectively (see Figure 1 below). A large proportion of nickel is produced in Indonesia. But even here, Chinese firms such as the Tsingshan Group are dominant players in Indonesia with joint ventures and arrangements to process nickel. Two Indonesian companies, Antam and Harita, are among the top five global nickel producers, and both have close arrangements with Chinese companies.

FIGURE 1: TOP 5 GLOBAL PRODUCERS OF CRITICAL MINERALS, CATHODES, ANODES, AND BATTERY CELLS

	LITHIUM (MINED)	COBALT (MINED)	NICKEL (MINED)	NATURAL GRAPHITE (MINED)	SYNTHETIC GRAPHITE	MANGANESE	CATHODE	ANODE	CELLS
		China Molybdenum (CMOC) 24%	Eramet 8%	Haida Group 9%	Putailai 10%	Isky New Materials Technology Co., Ltd. 22%	Hunan Yuneng New Energy Battery Materials 12%	BTR 18%	Contemporary Amperex Technology Co Ltd 35%
	SQM 18%	Glencore 18%	Norilsk Nickel (Nornickel) 6%	Luobei Aoxing New Materials Co 7%	Shangthai 10%	Guizhou Dalong Huicheng New Material 22%	Shenzhen Dynanonic Co. Ltd. 8%	Shanshan 16%	BYD Co Ltd 14%
	Pilbara Minerals 8%	Eurasian Resources Group (ERG) 9%	Vale 5%	Syrah Resource 6%	Shinzoom 9%	Bowman 11%	CATL 5%	Putailai 11%	LGES 7%
	Arcadium Lithium 7%	China Nonferrous Metals Mining Corporation 4%	PT Aneka Tambang Tbk (Antam) 5%	Shuangyashan Zhongshuang Graphite Co 6%	BTR 9%	Guangxi Yuding New Materials 9%	Zhejiang Huayou Cobalt Co., Ltd. 5%	Shinzoom (Xingcheng) 8%	Panasonic 5%
	Tianqi 5%	Huayou Cobalt 3%	PT Trimegah Bangun Persada Tbk (Harita) 4%	Nacional de Grafite 4%	Kaijin 8%	Guizhou Redstar Development Co., Ltd. (Dalong Manganese) 5%	EcoPro 4%	Shangtai tech 6%	Samsung 4%
% Chinese ownership in top five	5%	30%	0%	22%	46%	58%	30%	59%	49%

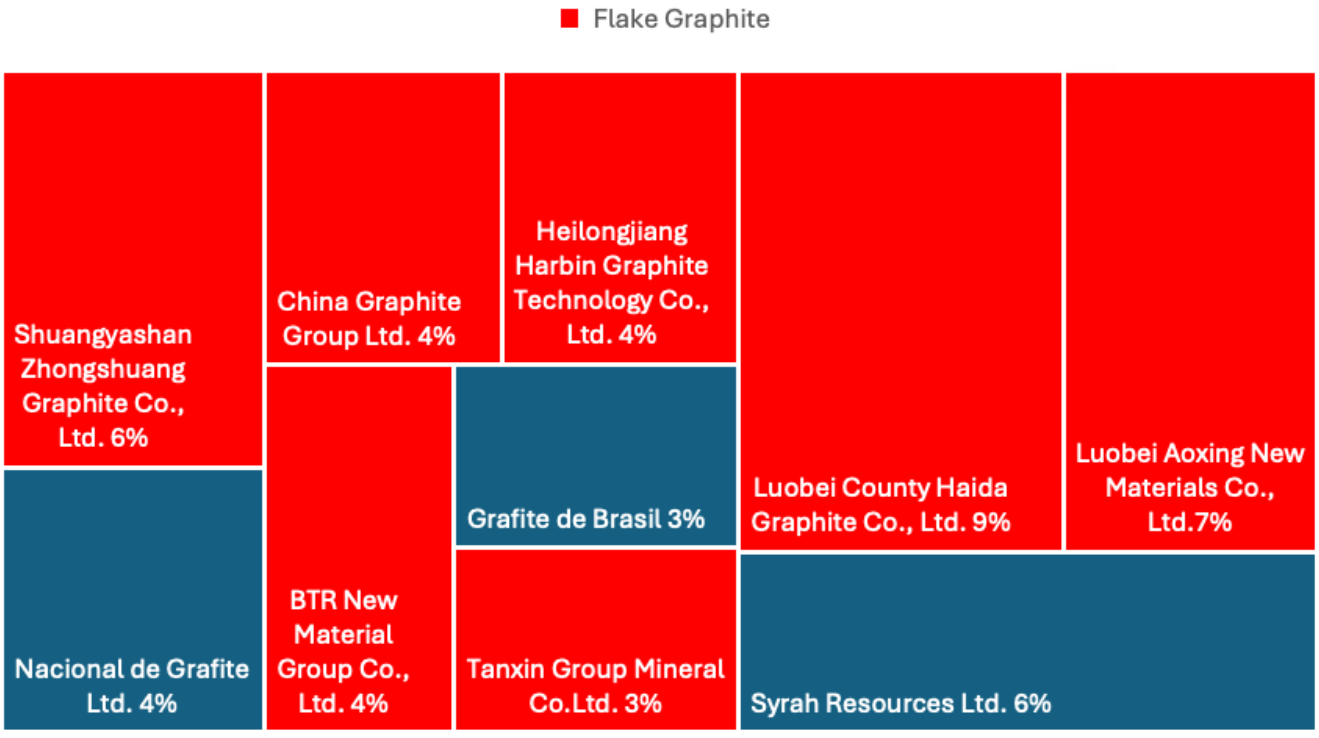
Source: Benchmark Intelligence

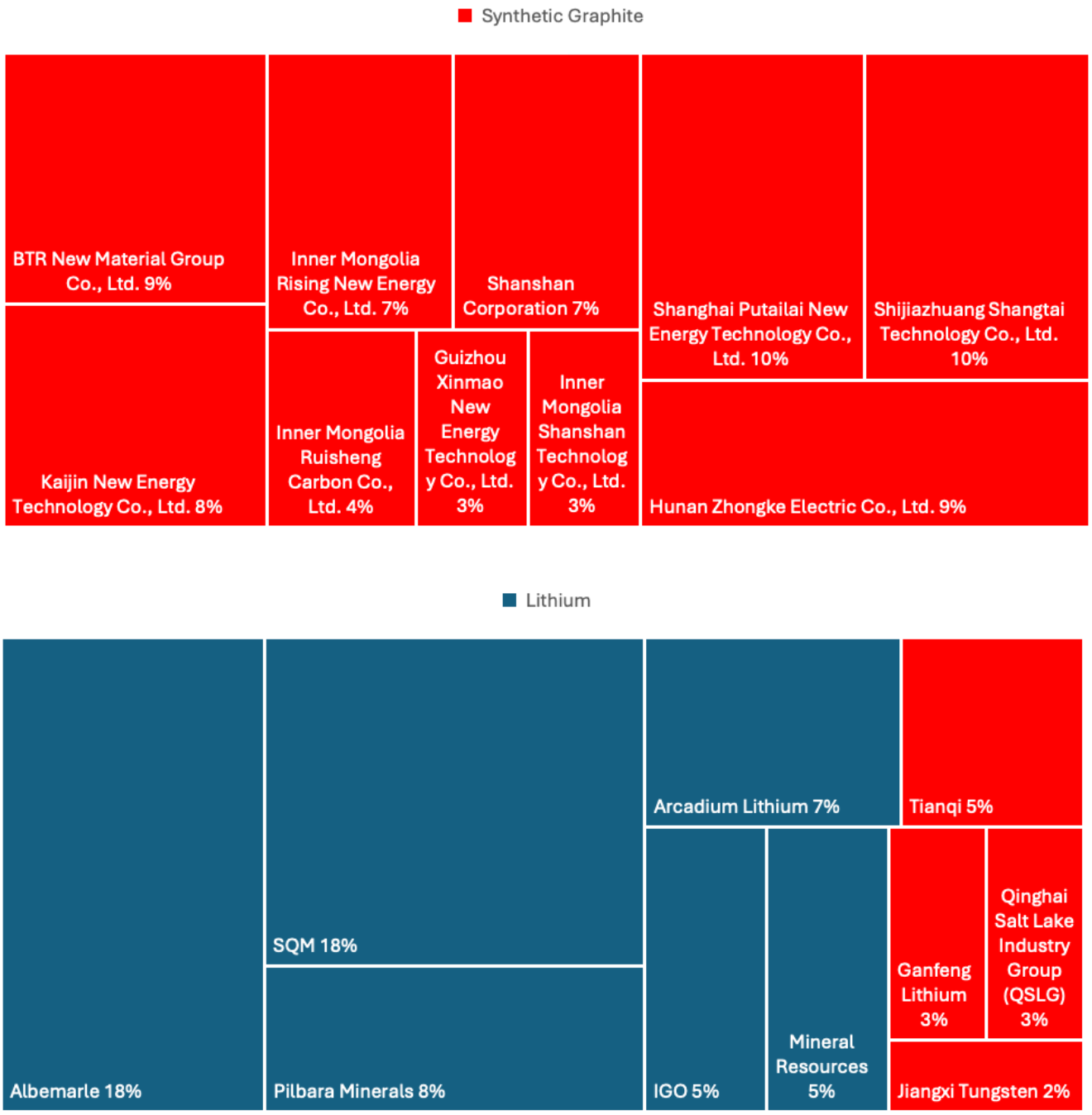
Benchmark has more detailed data on the top ten firms and their market share for lithium and graphite (see Figure 2). When we examine these in more detail, China's dominance in graphite is even more visible. All of the top 10 firms providing spherical graphite are Chinese, and together they have 71% market share. Seven of the top 10 flake graphite producers are Chinese, comprising 37% market share.

Only four of the top 10 lithium firms are Chinese (with 13% market share), but this likely understates Chinese influence since Chinese firms in some cases have ownership stakes in firms from other countries. For example, 20% of Chilean lithium miner SQM is owned by China's Tianqi Lithium Corp, and the second largest shareholder in Australia's Pilbara Minerals is China's Ganfeng Lithium Group. Both SQM and Pilbara are top three lithium producers.

This data, however, captures global market share. Are those the same firms supplying US companies? What about other parts of the battery supply chain? We discovered that it is actually quite difficult to find this out.

FIGURE 2: TOP 10 GLOBAL PRODUCERS OF LITHIUM, SYNTHETIC GRAPHITE, AND FLAKE GRAPHITE





Source: Benchmark Intelligence

UNDERSTANDING CHINESE BATTERY SUPPLY CHAIN IMPORTS INTO THE UNITED STATES

It is important for US policymakers to know both which countries are supplying the US market and how concentrated that production is. If one Chinese company has a large share of the US market, any interruptions

in that company's supply chain could have major implications for US suppliers in the absence of stockpiles or alternatives who can come online quickly. A US drone maker Skydio recently discovered this when Beijing banned Chinese firms from supplying the company with batteries.

In trying to answer these questions, we discovered that the data is not readily available to the public and possibly even to US policymakers, which may make it harder to track key US vulnerabilities. To understand these conclusions, it helps to take a step back and review how the US government tracks trade flows of imported goods.

HOW TRADE DATA IS COLLECTED

The main way the United States International Trade Commission (USITC) classifies and identifies imported goods is through the use of the Harmonized Tariff Schedule (HTS) system. The USITC and the US Customs and Border Protection (CBP) maintain a registry of imported goods that each have an assigned 8- and 10-digit HTS code, each number adding a level of specificity. The HTS data is used for analytical purposes for statutory studies of industries, free trade agreements, and trade remedy investigations.

The first 6 digits of the HTS code are based on the Harmonized System (HS). This is a 6-digit number set by the World Customs Organization (WCO) to track goods for the purpose of statistical analysis. The codes cater to the lowest common denominator, in terms of the reporting capabilities, of the WCO's 200 member countries. In other words, the codes must be maintained at a level of specificity such that developing countries with less robust customs programs can still record and report trade numbers to the WCO. Review of the 6-digit codes happens every five years and often lags behind technological development. For example, until 2022, the HS code for LED lights and solar panels was the same.

In the United States, import tariff rates are mostly assigned at the HTS 8-digit level; the 10-digit level is used mainly for statistical analysis, with some tariff rates applied at this level. For example, two similar goods of varying granularity may share the same 8-digit code and thus are subject to the same tariff rate, but differ at the 10-digit level and are thus reported differently for the purposes of statistical analysis. This has important implications for reporting standards, to be discussed in the section below. Outside of USITC analysis, large amounts of academic literature regarding critical minerals also use HTS and HS code data as the basis for their import analysis. HTS codes are virtually the only publicly available data set in which to conduct import and export analysis.

Examining different HTS code commodities under USITC's "Battery Supply Chain" designator, by the metrics available, import value and country of origin, quickly makes apparent the usefulness and limitations of this data. As seen in the table below, commodity classifications like "Mixtures of Two or More Inorganic

Compounds" are alarmingly unspecific, and data aggregated to the country level shows Poland as a top three import partner of EV batteries but obscures the fact that some of the largest EV battery manufacturers in Poland are Chinese. Overall, across the 65 HTS codes representing commodities classified under the "Battery Supply Chain" subheading, 40% come directly from China, a number that dramatically underrepresents China's influence in this market.

This is also a static snapshot in a dynamic rapidly changing space. For example, according to USITC data, China was responsible for 56% of US lithium-ion battery imports in 2021, which increased to 73% by 2023. That figure too is also likely to change going forward with the construction of many battery plants in the United States, which were facilitated by the Inflation Reduction Act (IRA), though the Trump administration's proposed rollback of the IRA may lead to increased project cancellations.

Import data also needs to be put into perspective as the United States also has production capacity of lithium-ion batteries. While it is true that most US imports of lithium-ion batteries come from China, it is probably less well-known that most of what the US needs is already produced domestically. The International Energy Agency reports that US electric vehicle battery production was 70 gigawatt hours (GWh) in 2023, and demand was 99 GWh, meaning that the US produced enough for more than 70% of its own needs. Some battery production in the US was exported, meaning that the US imported more than 30% of its battery needs, most of it from China. That is still high but shifts our understanding of the problem.

Table 1 shows the top ten imports by value into the United States for lithium-ion battery supply chains. China only appears as an important source of imports in finished batteries, graphite, and aluminum, though Chinese firms may have ownership stakes in firms from other countries. Moreover, Chinese influence on US supply chains could come about through pricing. Since China dominates the global market for minerals and processed materials, it can use its market power to strategically flood the market with products and drive down prices, making it hard for American, Canadian, Australian, and other minerals producers to stay in the market. Whether intentional or inadvertent, that may be a more important attribute of China's market dominance than the specific suppliers to the US market. Over the last two years, Chinese overcapacity has led to drops in prices, including for lithium, cobalt, nickel, graphite, cathodes, and anodes.

TABLE 1: US IMPORT DEPENDENCE OF BATTERY SUPPLY CHAIN MATERIALS

USITC's Top Battery Supply Chain Imports by Value and Trade Partner (2024)				
Commodity	**Partner #1**	**Partner #2**	**Partner #3**	**Total Import Value**
Lithium-Ion Storage Batteries, Nesoi (8507600020)	**China** (72%)	**South Korea** (7%)	**Japan** (5%)	**$18.74B**
Lithium-Ion Batteries For Elec Vehicle (8507600010)	**China** (65%)	**Japan** (13%)	**Hungary** (12%)	**$3.77B**
Mixtures Of Two Or More Inorganic Compounds (3824993900)	**Japan** (47%)	**South Korea** (40%)	**Germany** (4%)	**$3.66B**
Storage Battery Parts (Except Lead-Acid Type) (8507908000)	**China** (34%)	**South Korea** (28%)	**Malaysia** (7%)	**$3.04B**
Nickel, Unwrought, Not Alloyed (7502100000)	**Canada** (53%)	**Norway** (16%)	**Finland** (9%)	**$1.43B**
Polyethylene Having A Spec Gravity Gt=0.94, Nesoi (3901205000)	**Canada** (91%)	**Mexico** (2%)	**South Korea** (2%)	**$1.36B**
Polypropylene (3902100000)	**Canada** (57%)	**South Korea** (13%)	**Germany** (6%)	**$677M**
Aluminum Oxide, Except Artificial Corundum, Nesoi (2818200000)	**Brazil** (59%)	**China** (9%)	**Germany** (6%)	**$639M**
Carbon Black (2803000010)	**Canada** (46%)	**India** (16%)	**Mexico** (9%)	**$437M**
Artificial Graphite Other Than Plates, Rods, Powder, Etc (3801105000)	**China** (68%)	**South Korea** (8%)	**Mexico** (6%)	**$408M**

Source: USITC Trade Dashboard

*Table reflects US International Trade Administration's list of trade codes related to the lithium-ion battery supply chain, originally compiled for the Federal Consortium for Advanced Batteries (FCAB). Polypropylene and polyethylene are widely used plastics that are employed as separators within batteries.

PROBLEMS WITH EXISTING TRADE DATA CODES

Three major problems with classifying imports using the HTS code system exist: the classification of imported goods is often antiquated, the reporting mechanisms for such goods have structural flaws, and firms can purposely obscure trade data to hide imports.

THE CODES CAN BE OUTDATED

The HTS and HS classification systems are trailing behind rapid technological improvements in the battery space and in some instances are woefully inadequate. As seen in Table 1 above, the third largest battery import, "Mixtures Of Two Or More Inorganic Compounds" (HTS - 3824993900), can refer to a battery's electrolyte chemical, but includes many other industrial chemicals. In another example, anodes, cathodes, and precursor materials like refined graphite are all categorized under the same six digit HS code of 850790.

This led RMI, a leading academic and policy analysis institution on minerals, to make broad assumptions about current raw mineral import levels in a 2023 report. In its efforts to project 2030 battery supply gaps,

RMI evaluated imports under the aforementioned HS code, and determined that without being able to discern between anode and cathode precursor materials, RMI would have to make assumptions about what the imports were for, whether to ascribe them all to anodes or to cathodes or to split the weight between the two. In this case, RMI made a simplifying assumption that all of the imports in this category represented the upper bound of cathode imports with anode imports assumed to be zero. However, graphite is the primary material in anodes, and we know that the US has to import most of its graphite from abroad. This assumption led RMI to project a 75% supply gap of anodes in 2030 with a much smaller supply gap for cathodes, but that is purely an artifact of assumptions because the data is not great. RMI makes clear in its assessment that relying on import data as it exists "yields significant uncertainty". A disclaimer indicates that, "until further refinement import data should be understood as an upward bound" for imported battery goods.

HTS 8 and 10 digit codes are also inadequate regarding battery specificity. The Department of Energy's Office of Manufacturing and Energy Supply Chains (MESC) has petitioned the body responsible for these codes to make some key distinctions. That body is the so-called "484(f) committee," an interagency group whose job it is to update these statistical codes for trade data. For example, starting in 2025, battery grade graphite will receive its own unique 10 digit code, allowing it to be distinguishable from other forms of natural graphite prevalent in a large range of electronic products.

This update and others initiated by MESC are crucial but further reform and distinction are required. Ironically, one obstacle to updating codes is that code distinctions for commodities that a single producer dominates are not permitted, as any distinction of this nature would inadvertently reveal the dominating firm's exact level of imports. Considered proprietary information, this is not something the US government is willing to make available. For example, lithium tetrafluoroborate, a key component in lithium iron phosphate (LFP) batteries does not have a distinct code, nor do many of the precursor materials required to produce LFP cathodes, likely because these commodities are imported by only one company.

STRUCTURAL FLAWS IN HOW DATA IS COLLECTED

Structural aspects of the HTS code reporting process are inherently problematic for policy analysts or researchers conducting supply chain analysis. Goods entering the US are recorded by the importer in a Bill of Lading. That data is verified and recorded by the US Customs and Border Protection agency in a program called the Automated Commercial Environment (ACE). The US Census Bureau takes that data, scrubs all firm identifying information (e.g. company name), and then makes the data available to the public, aggregated to the HTS 8 and 10-digit code and the country of origin. Because most of the time the 8-digit code is used to assign tariff rates, importers have no incentive to characterize goods at the 10-digit level accurately. By the same token, CBP, with limited resources and millions of imports to evaluate every month, may be less incentivized to correct records at the 10-digit level so long as correct 8-digit code assigns the appropriate tariff.

FIRMS CAN HIDE TRANSACTIONS

Aside from the inherent problems in the reporting structure, there are several mechanisms by which importers and exporters can obfuscate their data deliberately. One way is to obscure information on ship manifest records, which are often used as a proxy for bills of lading by researchers interested in examining import data. This is common practice in import/export analysis, so much so that there is a cottage industry of commercial web services that provide aggregated bill of lading data made available through ship manifests (see for example ImportYeti).

This data has some known limitations. For example, it doesn't cover cross-border flows via rail or road from Mexico and Canada or air freight. But there are other limitations.

The simplest method for companies to obfuscate this data is by using a "freight forwarder" (e.g. FedEx, or Kuehne+Nagel a sea shipping company) to import the goods and thus shield the original sender as it appears in ship manifests. Outside of this, firms can file to have "Confidential Treatment of Vessel Manifest Data" with the CBP. In this way, "an importer or consignee may request confidential treatment of its name and address contained in inward manifests ... [and] of the name and address of the shipper or shippers to such importer or consignee" (19 C.F.R. § 103.31).

Because the US Census Bureau removes firm identifying information before publishing import data, firms can effectively strip their name from any publicly available record when they file for confidential treatment of their vessel manifest. This is by design, as companies closely hold import data since it confers an industry advantage to keep imports a secret from competitors. This makes mineral tracing all but impossible for not only the public, but also battery manufacturers who might be unaware of the origin of upstream battery components.

Only the Department of Commerce and CBP still have access to the information collected at the border in ACE that ties imported critical minerals to firms. It is unclear if robust intergovernmental sharing mechanisms exist for this data, or if firm identifying information tracks to minerals as they move along the battery assembly process and pass from firm to firm. Therefore, independently verifying critical mineral sourcing is extremely difficult for government agencies and impossible for the public. This is problematic for policymakers who want to ensure effective mineral onshoring measures.

What you can do with data as it exists today is roughly get a portrait of who some exporters are to the US but the HTS codes here are unreliable. You can not use it to determine market share. At most, you can get a portrait of the identity of some firms who have not hidden their data behind confidentiality and have not used a freight forwarder.

CHALLENGES USING OTHER SOURCES OF INFORMATION

There are other sources of data beyond trade data to track US import dependence in the minerals and battery space. We are aware of two sources including data collected by the USGS and data on electric vehicle (EV) supply chains from the Department of Energy.

DATA FROM USGS

The US Geological Survey (USGS) also collects data on mineral imports, drawing on voluntary surveys with manufacturers about their suppliers. USGS produces annual Mineral Commodity Summaries which are short statistical reviews of supply and demand. An annual Minerals Yearbook includes more detailed assessments but is often published one or more years behind (see the Graphite page for an example).

The information produced in these products are anonymized to show country-level patterns of import dependence. However, these minerals often have other uses than the EV or battery sector alone and these reports only reveal country-level dependencies, even if the narratives sometimes included a more disaggregated discussion at the producer level.

The USGS data is also limited to the minerals themselves and does not capture embodied mineral content in other parts of the battery supply chain such as cathodes, anodes, or finished batteries. This limits the ability for the US government or outside observers to have visibility on the whole supply chain. As Table 2 shows, US dependence on China for critical minerals is most obvious in graphite.

TABLE 2: US CRITICAL MINERALS IMPORT DEPENDENCE AND CHINA IMPORTS

Critical Minerals	% US Import Dependence	% of Imports from China
Graphite[1]	100%	37%
Manganese	100%	0%
Cobalt	76%	1%
Primary Nickel	48%	2%
Lithium	>50%	<3%

Source: USGS Mineral Commodity Summary 2025, USITC Trade dashboard

1 This includes: **2504101000**-Natural Graphite Crystalline Flake Exc Flake Dust, **2504105000**--Natural Graphite In Powder Or Flakes, Nesoi, **2803000010**--Carbon Black, **3801101000**--Artificial Graphite Plates Etc,For Elec Generators, **3801105000**--Artif Graphite Other Than Plates, Rods, Powder, Etc, **3801900000**--Preparations Based On Graphite, Neso.

DEPARTMENT OF ENERGY DATA FROM MANUFACTURERS SEEKING EV TAX CREDITS

Under the previous administration, the U.S. government was trying to better understand supply chain linkages for firms applying to have their vehicles eligible for consumer tax credits under Section 30D of the Inflation Reduction Act. While this may change with the Trump administration, companies that sought to have their vehicles qualify for consumer tax credits had to provide documentation to the Department of Energy (DOE) about the provenance of the minerals that went into their batteries and where they were assembled. To qualify for the full $7,500 credit, companies had to:

- Demonstrate that their vehicle battery sourced 40% of its critical minerals from the United States or countries with which the US has a free trade agreement – increasing 10% each year until 2026 in which it must be 80%; and,
- Demonstrate that 50% of their battery components were assembled in North America –increasing 10% each year until 2028 in which it must be 100%.

This documentation only applied to companies seeking eligibility for the credits. While firms who thought they had a shot at getting the credits likely applied for them, other firms who wanted to see how the rules were interpreted likely submitted information as well, with an eye towards eventually becoming eligible. Eligibility also required companies from having limited influence from so-called "foreign entities of concern" (FEOC) which involves strict limits from companies from covered nations which include China, Russia, North Korea, and Iran.

Those rules for foreign entities of concern were finalized in May 2024 and went into effect in July 2024. If the product contains any components originating from an entity from a covered nation, they are considered FEOCs and automatically ineligible for the consumer EV credits. Foreign companies from non-FEOC states can only have up to 25% FEOC ownership/control before they are also ineligible. For companies operating outside of China, what constitutes a FEOC is a state-owned entity or ones with some other element of government control like a company leader affiliated with the central or provincial government. For private companies like CATL or Gotion, they should not be classified as FEOCs.

Having said that, the FEOC classification process has yielded some surprises. Graphite was initially exempted from FEOC rules until the end of 2026, given challenges of traceability and China's dominance of supply chains. Manufacturers had lined up a source of graphite that they thought would meet FEOC rules when they went into effect in January 2027. The Chinese company BTR, which planned on sourcing graphite from Indonesia or Morocco, was identified by US firms as the preferred source. In January 2025, BTR was classified as a FEOC by DOE and that FEOC designation was extended to its overseas subsidiaries, complicating US companies' plans.

Notably, FEOC guidance only applies to the consumer EV tax credit, other industrial credits like the 45X Advanced Manufacturing Production Credit and 45W clean vehicle leasing credit do not currently have FEOC restrictions.

The DOE workbook associated with applying for tax credits requires information from EV manufacturers on the amount of applicable critical mineral (ACM) by weight in each battery cell and cells per battery. In the FEOC compliance report, detailed evidence (in the form of corporate charters or contracts) is required "to trace battery components from factory to battery cell to vehicle."

Presumably, this information provided the US government with unique, albeit limited insights. Some companies did not submit information, knowing that their sources of minerals or batteries did not meet the threshold for US or free trade agreement content or FEOC requirements. Nonetheless, given the limitations of other sources of data inside the US government, the submissions from US manufacturers were likely informative.

In the first year, only 27 vehicles from nine automakers were deemed eligible for the full tax credit, meaning they met both the battery assembly and critical mineral standards. In the second year, 42 vehicles from nine automakers were eligible for the credits. The small numbers of firms eligible for the credit in year one suggests heavy dependence on China. The expanding eligibility of models eligible in year two suggests private sector efforts to diversify supply chains. The challenge now is that the Trump administration may try to eliminate these tax credits entirely, seeing the consumer credits as leading to an unfair playing field between EVs and combustion vehicles.

However, eliminating these domestic consumer subsidies would remove a key driver of on-shoring and ally-shoring of minerals production, which is a goal of the new administration. It also deprives the US government of a valuable means to collect information on supply chains, at least from firms seeking support from the US government for the products they make.

WHAT COULD BE DONE

We identified several potential ways for the US government to better understand the degree of dependence on Chinese critical minerals suppliers.

UPDATE TRADE CODES FOR BATTERY SUPPLY CHAINS

The most immediate action needed is an update in HTS codes to accurately reflect the nature of battery-related imports today. This can be accomplished through a public petition to the 484(f) Committee mentioned

above. That committee, also known as the Committee for the Statistical Annotation of Tariff Schedules, is an interagency committee comprised of representatives from USITC, CBP, and the US Census Bureau. Recommendations can be submitted at any time, and the committee meets twice a year to review them.

Creating separate HTS codes for cathodes and anodes seems like a first step, and creating a category for LFP cathodes might be another. We also suggest a singular code for recycled battery "black-mass" and begin evaluating trade code viability for emerging battery technologies like sodium ion and solid state batteries. Given the diversity of chemicals, a consultative process with battery and EV makers might be warranted to determine the most feasible and high priority categorizations. There is also a lot of room to learn from China and the EU which have more detailed datasets for tracking lithium-ion supply chains.

ENHANCE DATA SHARING IN THE US GOVERNMENT

Second, the US government could benefit from more robust data sharing mechanisms for the firm-level import data contained within ACE, the database maintained by the Department of Commerce and CBP. While this data contains sensitive commercial information and companies' data should be protected against exploitation from competitors, some key governmental policymakers should have access, namely officials from the Office of Manufacturing and Energy Supply in the Department of Energy and possibly key officials working on supply chain vulnerability at the US Department of Defense.

Alternatively, the Department of Commerce and CBP could be tasked with producing an annual supply chain vulnerability report on the battery sector for the Federal Consortium for Advanced Batteries (FCAB), an interagency group that meets periodically to enhance the capacity of the United States to build an ecosystem for advanced batteries. A proposed bill by Sen. John Cornyn (R-TX), takes a good first step in this direction by requiring the Secretary of Energy and the Interior to publish a report on the status of critical mineral resources around the world. Still, we believe that more serious attention needs to be paid to the supply chain holistically, beyond initial resource extraction.

Another alternative would be a more transparent effort by USGS to reveal annual supply chain dependencies for minerals in a public report. However, there may well already be classified versions that are regularly prepared. It might be beyond its remit, but perhaps USGS could also assess broader supply chain vulnerabilities of embodied minerals in products like cathodes, anodes, and finished batteries. This is possibly a role for the US intelligence community as well.

RETAIN AND EXPAND INCENTIVES AND DATA COLLECTION ON ELECTRIC VEHICLE SUPPLY CHAINS

Third, the United States should retain the consumer incentives for electric vehicles and the reporting requirements for eligibility, and close the FEOC loopholes in 45X, the manufacturing production tax credit, and 45W, the EV leasing tax credit. This would not only continue to drive the on-shoring and ally-shoring of production but also facilitate the ability of the US government to better understand the market at the producer level.

While extending the application of FEOC to 45X and 45W are warranted, there is a delicate balance between on-shoring and ally-shoring of production and the need to learn from companies on the technology frontier of batteries, most of which are Chinese. The FEOC rules ought to be written in a way that would permit licensing and joint venture relationships like the one between Ford and CATL to manufacture lithium iron phosphate batteries. Some of the pending legislation before Congress to close these loopholes might make technology transfer and learning by American firms harder, such as the No Gotion Act, S.R. 369, which has a lower 10% threshold for Chinese ownership and control in any joint ventures or co-investment agreements.

If the 30D consumer tax credits are eliminated by this Congress and no FEOC restrictions are imposed on 45X or 45W, there would be no reporting requirements for minerals and battery content for electric vehicles, nor would there be any local or allied content requirements.

CONDUCT INTERNATIONAL STANDARD SETTING

Fourth, it may be desirable for the US to engage in more robust data development with other countries to ensure the harmonization of more extensive battery supply chain codes through the HS system. Given that other countries would like to know the provenance of materials to ensure better labor and environmental standards in supply chains, it makes sense to ensure that the more fine-grained HTS codes that the US has developed are broadly shared by other countries. By February 2027, firms operating in Europe will be required to have a battery passport so that battery and EV materials can be clearly traced. Harmonizing standards should be a high priority to reduce the compliance costs for private sector actors across different countries.

CONCLUDING THOUGHTS

Supply chain diversification through domestic production and ally-shoring of supply chains from friendly countries is a desirable goal. However, just because minerals or batteries are provided by Chinese companies is not necessarily a reason to exclude them from US markets. In some cases, like battery-grade graphite, there are few other options. Efforts to diversify away from China have encountered problems. A Syrah Resources graphite mine in Mozambique that is supported by the US government had to temporarily shutter operations after election-related political unrest in a part of the country with active Islamist movements. As Cullen Hendrix noted, this traded one form of political risk for another.

Chinese firms like CATL are dominant providers of batteries and have specialized expertise in emergent battery chemistries like LFP, which is rapidly displacing the nickel manganese cobalt (NMC) battery chemistry as the industry standard. In January 2025, the US Department of Defense blacklisted CATL, saying it was an agent of the Chinese military in the United States or contributing to China's military build-up. Some 134 Chinese companies are now on that list.

The listing means CATL is ineligible for DOD contracts, but the move may have wider reputational repercussions for CATL. CATL supplies Tesla with batteries and is also engaged in a licensing agreement with Ford to manufacture LFP batteries in Michigan. Secretary of State Marco Rubio introduced legislation in 2023 seeking to bar CATL from any US government subsidies. In 2024, a House committee also accused both CATL and another Chinese battery maker Gotion of having forced labor in their supply chains and sought a ban on both of them in the US market. It's difficult to verify these claims, and it seems like some members of Congress are highly motivated to exclude Chinese companies from market access no matter what.

Elsewhere, we have argued that the kinds of licensing agreements between Ford and CATL may be necessary for the US to catch up with China on the latest battery manufacturing techniques, lest it fall further behind.

This suggests the need for a more sophisticated data and information strategy than merely identifying choke points of weakness in US supply chains and then seeking to decouple the US and Chinese market relations in the battery space. Regardless, both strategies ultimately require more information on US market vulnerabilities, something that is sadly lacking at the moment.

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ABOUT THE AUTHORS

Benjamin Taulli is a former Air Force Officer and current graduate researcher at the LBJ School of Public Affairs.

Joshua Busby is a professor of public affairs at the University of Texas at Austin. From 2021 to 2023, he served as a senior advisor for climate at the US Defense Department. His most recent book *States and Nature: The Effects of Climate Change on Security* was published by Cambridge University Press in 2022.