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THE GEOPOLITICS OF BATTERIES

Busting the Leapfrogging Myth: The EU Needs a Comprehensive Approach to Next-Gen Battery Chemistries

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China made batteries central to its industrial strategy. Years of state support and innovation produced dominant firms now undergoing "involution," a kind of race-to-the-bottom competition that triggered a wave of consolidation. This puts pressure on Europe, sparking calls to leapfrog China with select next-gen batteries. But China is already advancing in future technologies, including solid-state batteries. Thus, Europe must prepare for a race across the full spectrum of battery chemistries instead.

Today, China is the world's leading producer of lithium-ion (Li-ion) batteries. Collectively, Chinese battery makers supply more than 65 percent of them. Although Chinese companies are especially dominant in the electric vehicles (EV) segment, they are beginning to capture other market segments, such as stationary energy storage systems, as well.

The global advantage of Chinese battery companies is the outcome of a successful strategy that was, above all, imbedded in the country's decades-old electric vehicle industrial policy push. In 2001, then Minister for Science and Technology Wan Gang argued that, while China was well behind countries such as Germany in combustion engines, it had a chance to leap ahead in electric mobility. Subsequent Chinese leaders have carried the baton forward. In 2014, China's President Xi Jinping doubled down on the country's EV bet, saying that "only electric vehicles would move China from an automotive country to an automotive superpower." EVs have launched China toward that status as Beijing has pursued policies to secure a strong position in both current and future battery value chains.

China's rapid rise in battery manufacturing and development has raised a key question for policymakers: should Europe aim to catch up or attempt to *leapfrog* China in next-generation battery technologies? In 2024, an expert at the Council on Foreign Relations wrote that the United States should leapfrog China by investing in solid-state batteries. Other experts have supported this idea. Yet, developments in China suggest that this is not a viable strategy. We argue here that the EU should instead recognize and prepare for competition with China across the full spectrum of battery technology. We close with recommendations for European and German policymakers on how to do so.

CHINA'S SOLID-STATE BATTERY INNOVATION CHAIN

China laid the groundwork for its current dominance in batteries with policies designed to secure both current and future battery value chains. Its 2017 Action Plan for Promoting the Development of the Automotive Power Battery Industry set ambitious energy-density targets far above today's industry standard for EVs of roughly 300 watt-hours per kilogram (Wh/kg) – namely, 400 Wh/kg by 2020

and 500 Wh/kg by 2025. Although China did not meet these aggressive goals, they reflect forward-looking planning aimed at next-generation technologies.

These planning efforts continue today. For example, solid-state battery research in China spans the full innovation chain – from basic science to market piloting. In early 2025, the National Natural Science Foundation of China (NSFC), the country's main scientific funding body, released a set of guidelines for research projects on next-generation batteries, including those that are solid-state. These projects aim for next-generation batteries with energy densities of 700 Wh/kg (see Memo 3 on export controls that set the current industry average of 300 Wh/kg as a threshold). Over the past several years, China launched National Key R&D Projects that have focused on solid-state battery research. They are part of the National Key R&D Program, which the Chinese government launched in 2016 to support the transition from basic research to applied technology and prototyping.

To supplement these efforts, state subsidies kick in at later innovation stages. Local finance bureaus also provide support (see Figure 1). The Jiading District Finance Bureau in Shanghai, for example, issued subsidies in 2025 that offered one-time awards worth millions of renminbi (RMB) each for expanding R&D, contributing to cluster formation and expanding production.

Several local governments include solid-state batteries in their industrial plans. Zhuhai Province, for instance, introduced a 5-year action plan dedicated to local solid-state battery development, while Hunan Province launched a two-year plan for lithium and advanced batteries. Solid-state batteries are also reflected in plans aimed at supporting future modes of mobility. For example, a 2024 Beijing Municipal Government plan fosters "low-altitude economy," which includes devices with electric vertical takeoff and landing (eTVOL) and unmanned aerial vehicles (UAVs) that require higher-density batteries, including solid-state batteries.

Figure 1: China's Government Supports the Entire Solid-State Battery Innovation Chain

CHINESE GOVERNMENT ENTITY	National Science Foundation of China (NSFC)	Ministry of Science and Technology (MOST)	Local Finance Bureaus
MEASURE	Major Research Plan	National Key R&D Program	—
NOTABLE EXAMPLES	"Beyond traditional battery systems" (grants in the years 2023, 2024, 2025)	"Research on solid electrolytes and interfacial catalysis reactions for next-generation solid-state batteries" (2024)	"Policies issued by Jiading District on Supporting the Development of the Intelligent Networked New Energy Vehicle Industry" (2025)
WHAT IS OFFERED	• 10×: 800k RMB, 3-yr. grant • 5×: 3 Mio RMB, 4-yr. grant • 1×: 15 Mio RMB, 4-yr. grant	Multi-million RMB 3- to 5-year grants	• R&D support: 10% reward, up to 5 Mio RMB • Production growth: 10% reward of approved expenses, up to 30 Mio RMB • Production expansion: 10% of approved expenses, up to 30 Mio RMB • Cluster development: reward up to 5 Mio RMB

Source: Websites of the NSFC, research institutes, and the Shanghai Municipal Government

This policy momentum has spurred numerous pilot manufacturing projects – although it remains unclear how many are fully solid-state rather than semi-solid or quasi-solid. The Chinese battery maker Farasis, for instance, reportedly launched pilot production of solid-state batteries expected to reach the mass market by 2026. Meanwhile, South Korean and Japanese battery producers are targeting rollouts around 2027.

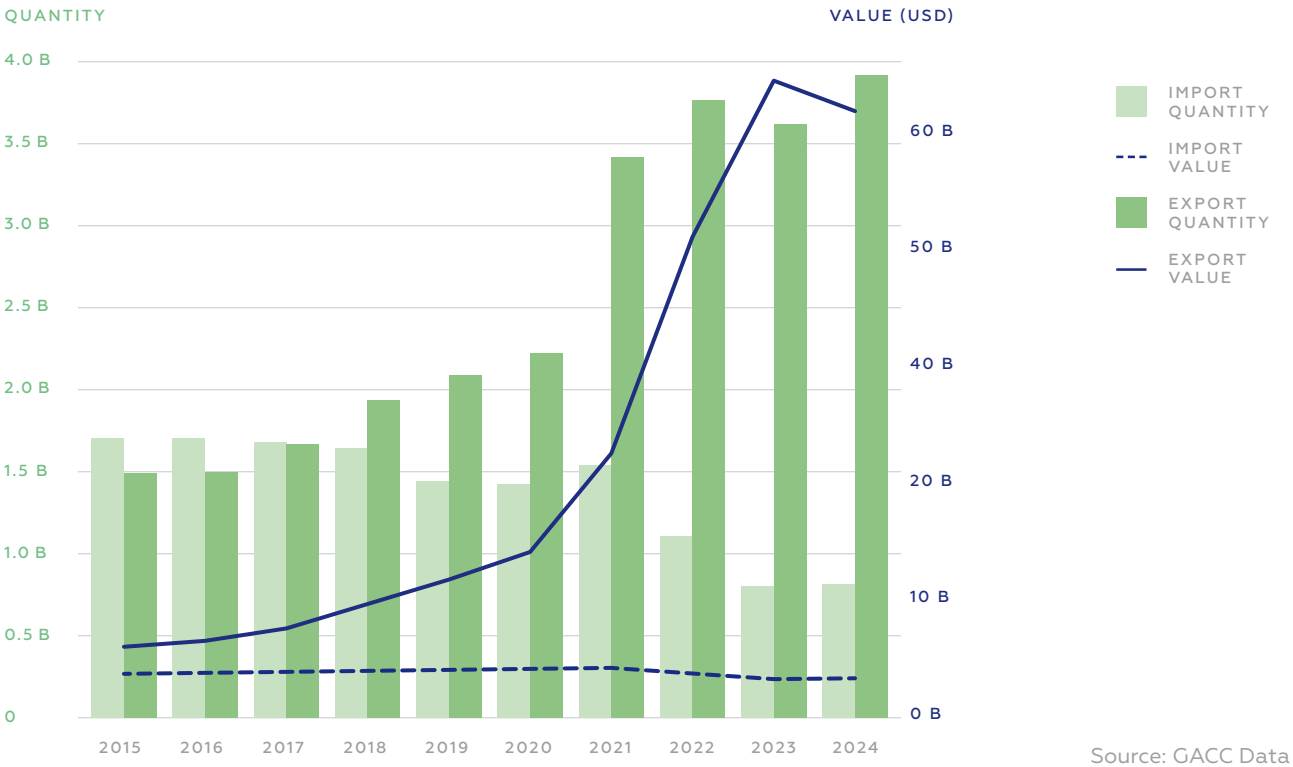
Against this background, Europe cannot expect to outcompete in next-gen battery technology unless it also invests heavily and acts strategically.

PAIN AND PROTECTION OF CHINA'S PROGRESS

Despite its obvious successes, China's battery sector is now facing serious growing pains (see Figure 2). In 2018, China became a net exporter of lithium-ion (Li-ion) batteries, and shipments soared soon after. It took some years for leaders in the Chinese Communist Party (CCP) to openly acknowledge overcapacity and act. In 2022, the government called for tighter coordination across the value chain and improved monitoring. Between 2023 and 2024, average battery prices fell by 12 percent, signaling mounting stress. In 2024, a wave of state-directed consolidation ensued as prices dropped by up to 30 percent and several gigafactory projects were canceled. Companies like Lopal Technologies – a maker of lithium iron phosphate (LFP) cathode active material (see Memo 3) – saw extreme stock volatility tied to orders that were either canceled or confirmed.

Faced with these market uncertainties, China's government is still focused on a central goal: ensuring that the country remains home to a fully self-reliant value chain. Last year, at the Third Plenum of the 20th Central Committee meeting of the CCP, special emphasis was placed on "improving the system for improving the resilience and safety level of the industrial chain and supply chain." This includes the need to "establish a security risk assessment and response mechanism for the industrial chain and supply chain." Similarly, the white paper China's National Security in the New Era, which was published in May, emphasized that "without high-level security, there can be no high-quality development." It went on to state that "traditional and non-traditional security factors remained intertwined," including the dependance of China on key tech imports. Importantly, the paper lays out key aspects of "high-quality development" that include the "safeguarding of key scientific and technological" assets. These developments indicate that battery supply chains in China are viewed as part of a larger security and self-reliance drive that has only intensified in the past several years.

Figure 2: Quantity and Value of Li-ion Batteries in China over the Past Decade



Source: GACC Data

POLICY RECOMMENDATIONS

China is pushing forward in several promising next-gen battery chemistries and views battery technology and supply chains as a security issue. This means that the EU and its member states cannot simply hope to leapfrog into storage sovereignty. Instead, European and German policymakers should:

- **Prepare for broad competition in next-gen batteries with energy densities of 300 wh/kg and above.** This preparation should take place across the full spectrum of battery chemistries, including not only solid-state but also other technologies such as sodium-ion (Na-ion) batteries. Where appropriate, strategic partnerships – including with China – can be pursued, especially if they stay clear of Europe's own military supply chains.

- **Clearly communicate and fund a battery strategy.** In particular, the federal German government should publish a comprehensive battery strategy like the microelectronics strategy it launched in 2025. This strategy should be closely aligned with the High-Tech Agenda Germany of the Federal Ministry of Research, Technology, and Space (BMFTR), which identifies battery research as part of a priority area called "technologies for climate-neutral mobility." Germany should also allocate budget from the special funds for infrastructure and rearmament that were made available earlier this spring to boost its battery production ecosystem.

- **Deploy the full range of available tools – both supportive and defensive – to strengthen the European battery industry.** These tools include not only industrial policy instruments but also protective measures. The latter could take the form of targeted tariffs or preferential treatment for domestic players in public procurement, including through the EU's International Procurement Instrument, which was created to support, monitor, and safeguard existing European players (see also Memo 2 and 3). The German government should deploy "Buy European" clauses in its electric vehicles subsidy schemes and take advantage of the next round of EV subsidy schemes to give preference to European players.

- **Treat battery technology as a high-priority critical technology.** Given the growing demand for batteries and the need for a robust, secure supply chain to support European and German rearmament, battery technology should be elevated to the group of four priority areas for risk assessment defined by the EU's 2023 critical technologies list – possible if it were moved to the existing rubric of "energy technologies." This elevation would trigger a deeper monitoring process, facilitating an EU-wide understanding of the geopolitical risks associated with batteries.

- **Actively encourage partnerships with battery leaders South Korea and Japan.** The aim should be to forge resilient supply chains by taking advantage of developments in the industries there. These partner countries should double down on initiatives already underway, including the announced cooperation between the Helmholtz Association and the National Institute for Materials Science (NIMS) in Japan.

The sweeping new export controls China issued in October 2025, which cover much of the battery value chain, underscore the need for energy storage sovereignty in Europe. China made the move amid mounting turmoil in Europe's battery sector marked by the bankruptcies of high-profile firms such as Northvolt and BMZ Germany. In response, DGAP's Center for Geopolitics, Geoeconomics, and Technology has launched this series of memos that examines the geopolitics of batteries.

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