EUROPE'S ELECTRIC BACKBONE

A STRATEGY FOR THE FUTURE OF BATTERIES

BACKBONE COALITION

The gateway technology for a sovereign Europe

Batteries are the backbone of Europe's future energy system, its industrial base and its defence readiness. Europe is embedding them across systems at record pace while producing almost none of the key inputs. All of that is supported by public money.

This paper sets out the strategic case to strengthen Europe's battery value chain, the security exposure Europe risks accumulating as things stand, and what the EU must do in the next three years to scale a competitive European battery sector.

The strategic case is built on three essential points:

1 **Batteries are a strategic gateway technology for a sovereign Europe.** They are no longer just an automotive technology, but a foundational part of the electric tech stack underpinning grids, industrial electrification, data centres and defence. Europe therefore needs to retain meaningful capability across the battery value chain, including in cells, midstream materials, manufacturing equipment and software. The objective is not full reshoring, but a resilient European backbone that reduces exposure to geopolitical coercion, supply disruption and cyber or operational risk.

2 **The cost of inaction is higher than the cost of building resilience.** Without a viable business case for European battery production, capital, skills, R&I and factories will move elsewhere, while Europe becomes increasingly dependent on concentrated foreign supply chains. That would weaken Europe's ability to shape standards, procurement and industrial development, and make future dependencies harder and more expensive to reverse. Europe will not always compete on the lowest unit cost, but the remaining gap should be understood as part of the price of maintaining strategic agency, industrial capacity and security.

3 **Europe needs support that is fast, focused and at scale.** Europe is not starting from zero: it already has a strong research base, industrial expertise and a large internal market. The challenge is to turn those assets into competitive scale. That requires simpler and more bankable production support, stronger demand signals for European-made products, targeted support for the midstream, better mobilisation of private capital, and trade and defence policy support.

The battery value chain is Europe's strategic imperative

MOVING BEYOND EVS

Batteries are not just about cars and a future-proof competitive automotive industry. They are the "gateway technology" and the foundational backbone of the electrified age. Crucial for grid stability, renewable energy storage, advanced robotics and defence systems, a robust battery ecosystem creates a domestic pull-factor for other critical industries. Upstream and midstream battery materials share direct industrial links with other strategic sectors. Large-scale storage, data centres and defence systems are now the fastest-growing sources of demand, while Europe's battery cell capacity was built almost entirely for cars.

THE DUAL-USE "ELECTROTECH STACK"

The battery, electric motor, power electronics and control systems form a strategic, dual-use technology stack essential to both economic prosperity and national security. As Europeans, we need to master and excel in these technologies along the battery supply chain, including in cell-making, manufacturing equipment and software solutions. If not, our vulnerabilities will not only expose us to isolated cyber and operational control risks but will also lead to system-wide exposures.

ENERGY AND GEOPOLITICAL SECURITY

Transitioning to a locally anchored battery ecosystem is crucial for Europe to bring about secure transportation and industrial electrification, while breaking its dependence on imported fossil fuels and defending against economic and geopolitical coercion. Weaponised supply chains and export controls are now instruments of statecraft. Since 2021, Beijing has escalated export licensing as leverage, most recently over third-generation LFP, artificial graphite anodes, cathode precursors, high-energy-density cells and the equipment to make them, with extraterritorial reach over anything made using Chinese process technology. Nor is dependence only about China. Material processing runs through physical chokepoints - nickel and its sulphur feedstock, graphite and petroleum coke - that a single regional conflict can constrict.

NATIONAL SECURITY

Battery systems are software assets. Whoever commands the firmware, communications and updates of the stack - battery management system, power conversion system, inverter - controls the battery itself. Remote access is inherent, not incidental, and every integrator widens the set of parties holding it. In 2025, US investigators reported undocumented communication equipment, including cellular radios, in Chinese-made inverters and batteries. The 2022 Viasat attack, which knocked out remote control of thousands of European wind turbines, is the precedent. There is no separate defence battery supply chain to fall back on: drones, field communications, munitions, armoured vehicles and the microgrids that keep bases running draw on the same cells, materials and equipment.

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DEFENCE READINESS DEPENDS ON INDUSTRIAL DEPTH

Recent conflicts show that military strength depends on the capacity to replenish equipment. Russia's weapons production relies heavily on Chinese dual-use inputs, while the war with Iran has strained US inventories and forced assets to be redistributed across theatres. In Ukraine, the mass use of battery-powered drones shows how battery supply chains underpin modern warfare. In a wider confrontation, Europe could not assume that allied production would meet its needs or that Chinese supplies would remain available. Dependence creates more than cyber risks: it erodes the factories, skills and supplier networks Europe needs in order to be able to quickly expand defence production if needed. A resilient European battery ecosystem is essential to sustaining operations and preserving strategic freedom.

THE COST OF SOVEREIGNTY

Secure, European-controlled supply chains offer a massive strategic advantage. True economic security means prioritising domestic value creation over the lowest short-term market price. Resilience always has a cost, but it is far lower than the cost of long term dependency on China. Still, the ambition should stay realistic: Europe will not close the cost gap with China outright but it can meaningfully reduce it, and pair that reduction with a security and sovereignty premium that pure cost comparisons miss. Reshoring the entire supply chain is not the goal either. The aim is a resilient backbone that captures a meaningful share of the European battery sector.

The Security Dividend of European Battery Production

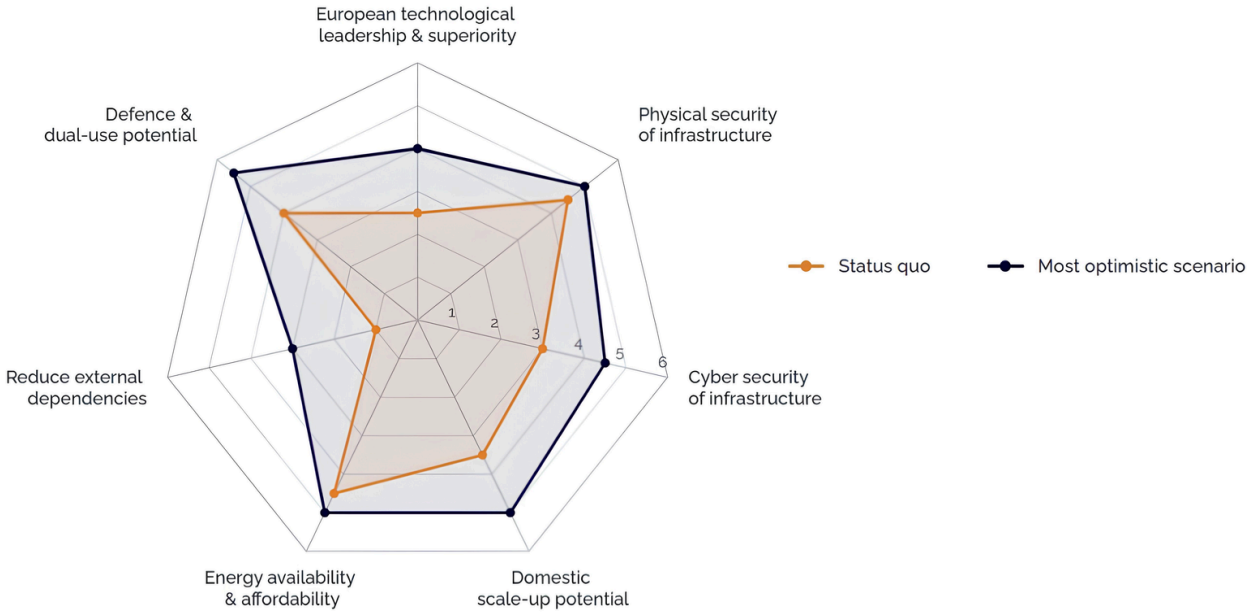

Figure 1 · EIES risk-based assessment of strategic technologies developed by the author and expert inputs. Scores on a scale of 1 (weakest) to 6 (strongest)

The high cost of inaction: What happens if we do nothing?

Europe still has a window to build a resilient battery value chain, but inaction would steadily erode that option: weakening strategic agency, driving investment and industrial capacity elsewhere, and deepening exposure to foreign supply chains.

THE LOSS OF STRATEGIC AGENCY

Losing our industrial core and trading a dependency on foreign fossil fuels for a total dependency on foreign cleantech monopolies is a far greater strategic risk than investing in domestic manufacturing today. Without the capacity to scale crucial segments of the battery value chain, Europe loses the ability to shape procurement, enforce standards and dictate the terms of industrial and technological competition.

WIDENING SUPPLY CHAIN VULNERABILITIES AND GEOECONOMIC EXPOSURE

Continued dependence on dominant single-source countries for critical raw materials and components leaves European industrial, automotive, energy and defence sectors highly exposed to geopolitically motivated export bans and supply disruptions. Without swift action, Europe's battery industry may still lack the technological maturity and scale-up capacity needed to protect critical parts of the value chain from external disruptions.

MISSING THE WINDOW OF OPPORTUNITY TO CREATE A EUROPEAN BATTERY MARKET

The next three years are critical. Without a viable business case for domestic battery manufacturing now, capital, talent, research and innovation (R&I) centers and factories will permanently relocate to countries such as the US and China, or be rerouted to others to circumvent EU FDI rules.

Weak "Made in EU" rules allow dominant global players to exploit loopholes - using indirect production structures, third-country subsidies or preferential jurisdictions to bypass EU market standards and access public funds without creating local value. If procurement continues to flow primarily to external suppliers, European producers will not accumulate the know-how needed to move down the cost curve and move up the technological and process efficiency curve. Europe risks losing its domestic producers because policy never gave them the scale to survive.

WE NEED TO REFRAME THE COST DEBATE

Europe cannot and should not try to match the lowest global price. The debate must shift from immediate unit costs to the much higher long-term cost of dependency, lost tax revenues and industrial decline. There's a high possibility that Chinese batteries will become more expensive once the prospects of a European battery value chain have been blown up - and/or that China stop selling best in class batteries once China's long-term dominance is asserted.

The urgent need for support: Fast, focused and at scale

Europe is not building from scratch. Years of policy support and first-of-a-kind projects have already put real ground under a European battery industry which keeps growing.

Europe possesses all the core assets. A solid research base, a massive internal market and deep industrial expertise. The task now is to set the right policy framework, accelerate and de-risk what already exists, not start from zero, and keep developing a strong portfolio of battery technologies and the associated ecosystem.

Europe faces both an innovation and a scaling problem in batteries. The current policy toolbox is too slow and too small to move the needle. The Battery Booster Strategy adopted in December 2025 provides the right diagnosis, but remedies fall short.

Action must be taken in five key areas:

1. BANKABLE PRODUCTION SUPPORT & MOBILISATION OF PRIVATE CAPITAL

Simple, swift and bankable funding via output-based support: Europe's current funding structures are slow, bureaucratic and unbankable - meaning they don't leverage private capital. The EU must transition to predictable, ex-ante production support (e.g. a fixed €/kWh of battery cells or components produced), taking inspiration from successful models like contracts for difference (CfDs) for renewable energy, output-based funding under CEF-AFIF, and the US IRA. Support must be tied to verified production. That is what rewards yield and process efficiency, and what firms competing against subsidised scale actually need**.**

Unleash private capital: Public funding is in short supply; it is therefore paramount that it de-risks and unlocks private investment to the maximum extent. Combining EU-level funding instruments (such as ramp up support under the European Competitiveness Fund in the next EU budget, as well as a continued dedicated battery partnership - BATT4EU under Horizon Europe for the period 2028-2034) with flexible national state aid, while modernising the Clean Industrial Deal State Aid Framework, will unleash the massive scale of institutional capital waiting on the sidelines. Public money should shift risk rather than subsidise price: CfDs, offtake backstops and EIB guarantees to commercial lenders, plus a first-of-a-kind guarantee covering part of a manufacturer's warranty until a production track record exists.

Fill the midstream gap and integrate the chain: the processing layer between minerals and finished cells is where Europe is weakest. Investors will not fund without committed buyers and buyers will not commit while cheaper alternatives exist. Europe can break the deadlock by tying public funding and de-risking tools to downstream offtake. Without a midstream there is no recycling loop either.

2. STRONGER DEMAND SIGNALS FOR EUROPEAN-MADE PRODUCTS: BOOSTING DEMAND VIA THE INDUSTRIAL ACCELERATOR ACT

Ensure strong and credible Made in EU provisions: Other jurisdictions extensively use local content requirements, while Europe has been subsidising demand without securing supply. Public funding instruments - including vehicle subsidies, tax schemes and public procurement - must favour strategic products made in Europe**.**

Tighten Foreign Direct Investment (FDI) rules: Foreign capital is welcome, but it must work for Europe. Major strategic investments must be tied to strict conditions: local joint ownership, mandatory technology transfers, local workforce employment and localised sourcing. But granting FTA equivalence under the IAA undermines its own goals by creating a re-routing backdoor: foreign capital can simply funnel through FTA partners to bypass strict EU FDI screening and exploit European market access.

Progressive timelines for the entire battery value chain: The EU must enforce mandatory key component requirements starting in 2027. The scope must expand to cover overlooked midstream materials like anode active materials, precursors, and recycled content.

3. FOCUSED INNOVATION SUPPORT

Keep EU support for battery R&I under one roof: As demonstrated by world-class Asian players, innovation is key to competitiveness. Be it for product or for process innovation, for current or next generation of battery chemistries, Europe needs a strong battery R&I ecosystem and the necessary public support.

Looking towards the next MFF, we call for the continuation of BATT4EU as a dedicated battery partnership in the next Horizon Europe programme (FP10). This lab-to-market battery partnership should cover the full battery value chain and serve the relevant battery chemistries enabling all relevant battery applications (not just EVs, not just ESS). This call for continuation of BATT4EU is echoed by various Member States in the recent EU SET Plan's thematic vision on batteries. The R&I options to consider in a future batteries partnership are found in BEPA's Battery R&I Blueprint.

Focus on key priorities for battery innovation: developing and maturing a diversified portfolio of advanced chemistries and cell formats built on European machinery, while driving down the energy intensity and cost of cell manufacturing.

To accelerate this transition, AI and digitalization must be rapidly deployed across battery discovery, development and production. Simultaneously, Europe must advance high-purity, cost-efficient recycling routes - particularly for low-value chemistries - alongside battery designs optimised for longevity and repairability. Finally, innovation must unlock Europe's domestic primary raw material supply by advancing lower-impact extraction, processing and refining capabilities to battery-grade purity.

4. STRENGTHENED TRADE DEFENCE MECHANISMS

Launch an anti-subsidy investigation into Chinese batteries to raise ultra low tariffs: Other jurisdictions have adopted higher tariffs to protect homegrown industry. EU tariffs on Chinese OEMs have worked (following the anti-subsidy investigation in 2024): Western carmakers moved production to Europe and Chinese manufacturers have started to onshore.

Extend the logic of the EV tariff framework to utility-scale storage and key components: including cells, power conversion systems and BMS, where dominance reflects state-backed overcapacity, not comparative advantage. Phase in tariff-rate quotas, keep them under review as European alternatives come online, and prepare safeguards against retaliation.

Turn the Foreign Subsidies Regulation into a standing, proactive screen rather than a case-by-case tool: assess cumulative foreign influence across segments, strengthen call-in powers over below-threshold acquisitions, and set standards for unduly advantageous tenders. Where it has been used, it has worked – bidders withdrew once investigations opened.

Use the WTO security exception: The EU has never enacted GATT Article XXI, which would give a legal basis for security-grounded measures protecting defence-relevant battery supply.

Sequence export restrictions on end-of-life batteries, scrap and black mass: with the build-out of domestic processing – not ahead of it, or the material is stranded.

5. DEFENCE-INDUSTRIAL SECURITY: WHAT EUROPE SHOULD ASK OF NATO AND THE EU

Defence demand is small but patient. Being less price-sensitive and tolerant of long qualification timelines, it signals standards no commercial buyer can match. It will not be the primary offtaker, but it can anchor the industrial base before the wider market does.

Write Allied-origin and security criteria into EU and NATO battery procurement: and exclude high-risk third-country suppliers from critical energy and defence systems. European defence procurement currently lacks explicit requirements to source from non-Chinese suppliers.

Use the 2026 revision of the Defence and Sensitive Security Procurement Directive: to extend "Buy European" direct-award clauses to batteries, BMS and storage components. Align EU and NATO security standards across civilian and defence procurement, and steer Allied defence-backed investment into midstream and storage projects.

Time to act

The Commission has the authority to simplify state aid rules, deploy targeted trade defence mechanisms and design a robust industrial strategy. This includes tailored tariff regimes and robust market protection against heavily subsidised imports. Policymakers must move past ideological hesitation on subsidies and deploy a simple but punchy framework to rebuild and protect Europe's industrial backbone.

As Europe's battery sector faces severe headwinds, immediate action is critical to secure this strategic value chain before the window of opportunity closes for good.

About the Backbone Coalition

The Backbone Coalition is focused on strengthening Europe's battery value chain. It brings together expertise across industry, investment, energy and security to build support for the policies and investment needed to scale a competitive European battery sector.

The Coalition believes that batteries are a strategic gateway technology for Europe, underpinning secure electricity grids, industrial capacity and defence. It is working to reduce Europe's exposure to concentrated supply-chain dependencies, strengthen European and trusted allied production, and ensure that public policy creates the demand, investment conditions and resilience needed to compete in the electrified economy.

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