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Europe's Battery Industry at a Crossroads

Deloitte Battery Maturity Assessment



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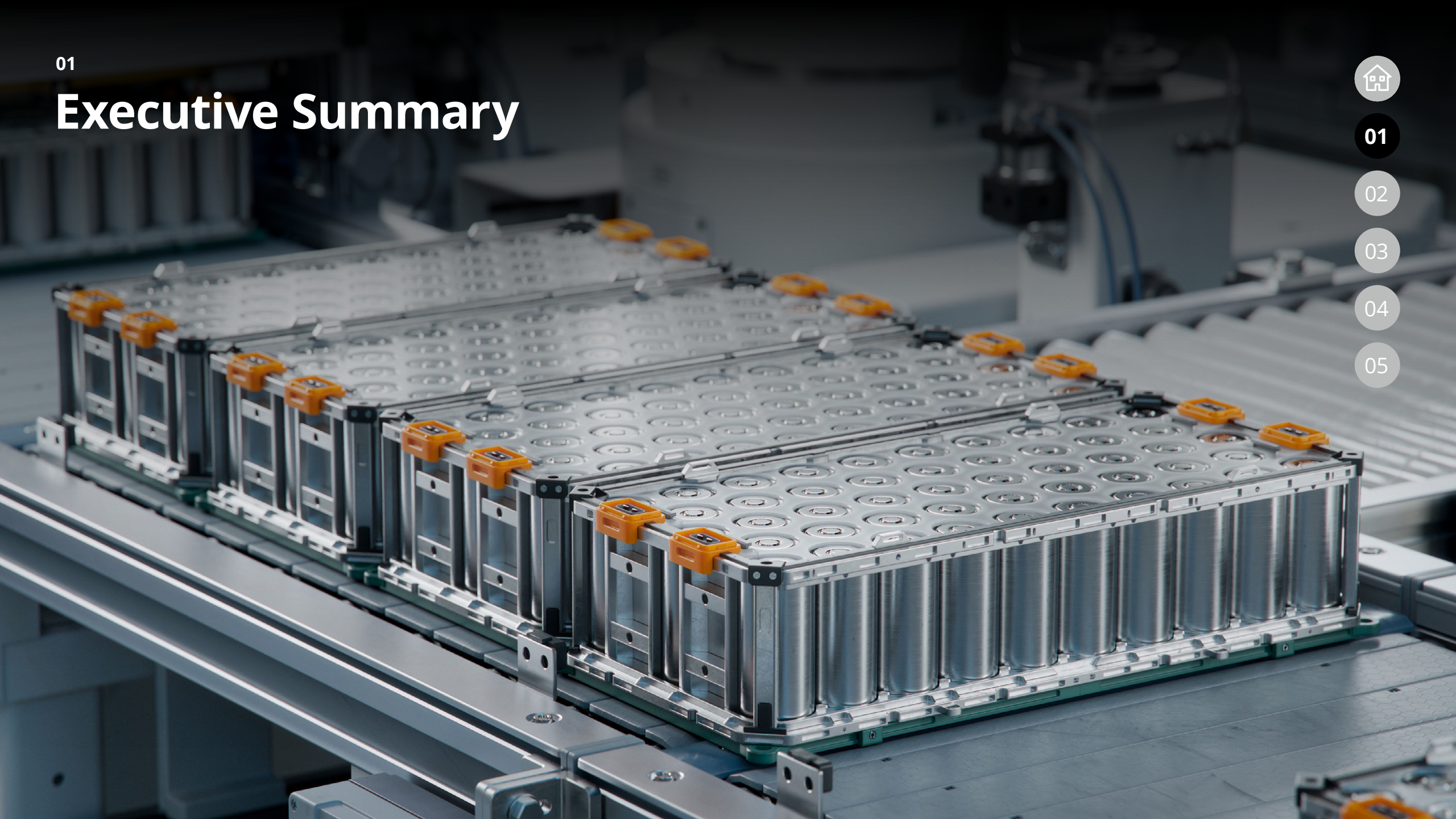
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Executive Summary



Europe's battery value chain is at a crossroads – ambition alone is no longer enough

Europe has laid the groundwork for a competitive battery industry. The task now is to scale up production, optimize existing processes and secure investment before more value creation opportunities move abroad.

Europe's window of opportunity in battery production is still open

The industry recognises the strategic imperative of a sovereign value chain, and Europe remains a compelling destination for future investment.

Batteries matter – no one is disputing that anymore. The challenge for today's suppliers is to turn intention into industrial performance. Companies and policymakers must therefore focus their efforts on creating an environment of investment certainty and building a scalable, resilient and cost-competitive production model.

This shifts the focus on EV batteries from a purely technological challenge into one of capital allocation and execution. It's time to move beyond simply building factories and secure start-up funding despite initial inefficiencies. It is vital to gain robust production experience before the next cycle of cell and production technology raise the bar once again.

Europe's EV battery value chain at a glance

> €10bn in profits
at risk of leaking to Asia

Only ~40%
of planned projects reach full execution

>80%
see bottlenecks in material and cell supply

~75%
experience process stability and efficiency gaps

Buying cheap battery cells from Asia is not a long-term solution
Europe is ramping up EV production, with more than 27m new EVs expected to roll off the production line by 2030. However, unless Europe scales up sovereign battery production, €10.5bn in value could be lost to Asia.

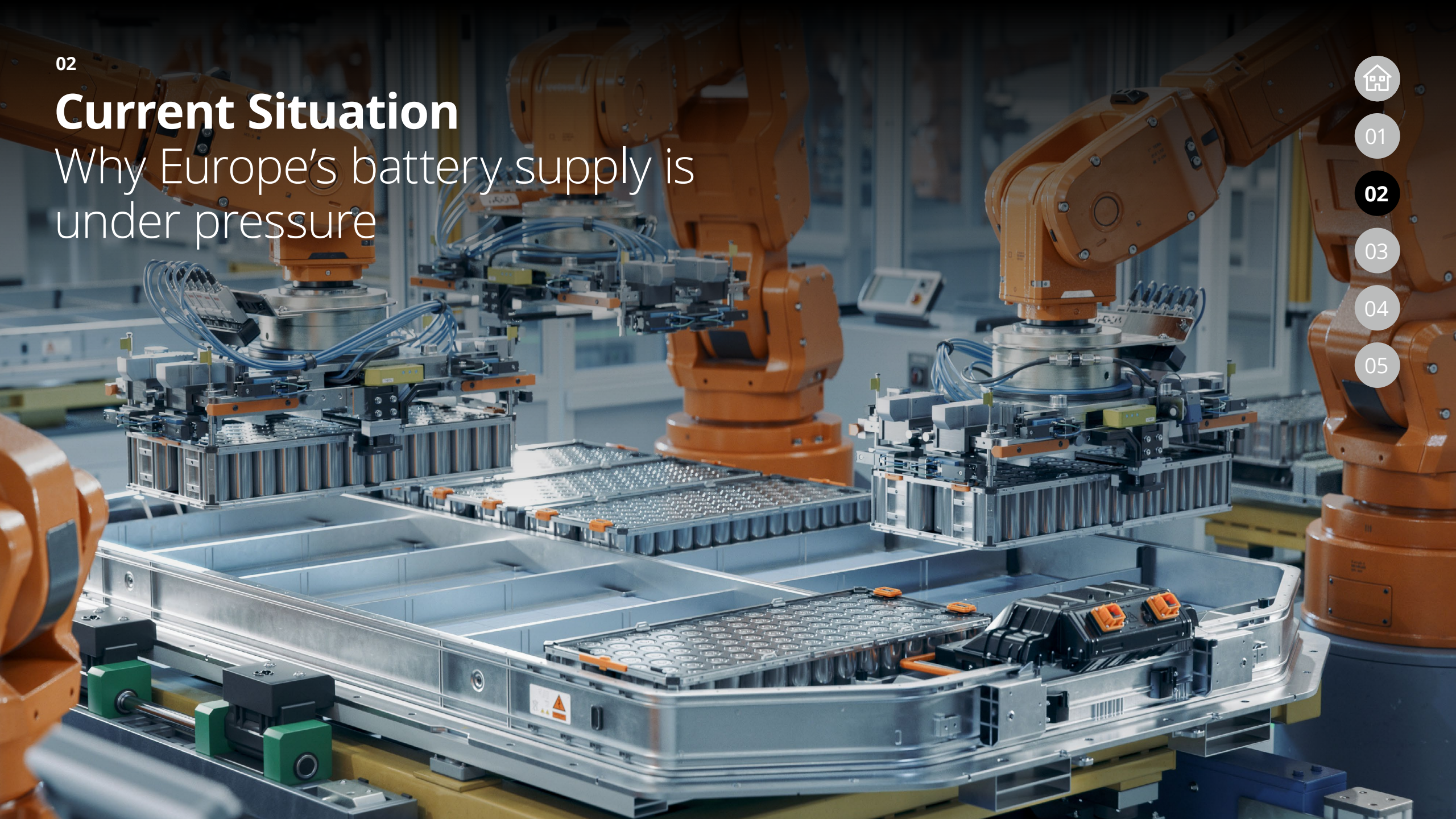
Europe has momentum, but execution is lagging
It is widely acknowledged that Europe needs a sovereign battery value chain. Yet market uncertainty and challenging cost structures are making it difficult for companies to take their projects from intention to full implementation.

The key to unlocking value is clear: move upstream
Although Europe has made progress in downstream battery activities, real competitive advantage comes earlier in the value chain. Material refinement and cell production are the critical control points driving cost, quality and resilience.

Europe is investing in R&D but falling short on industrialisation
Europe has the technology base to compete but is lagging behind in producing efficiently at scale. Overcoming process maturity and ramp-up challenges is vital before the next technology cycle kicks off.

Current Situation

Why Europe’s battery supply is under pressure



The battery value chain: The critical value drivers are upstream and midstream

The battery value chain is complex and fragmented, but tightly interconnected. Ultimately, it is the upstream and midstream phases that determine the economics and resilience of the entire downstream market.

Upstream and midstream processes drive value and performance

In an analysis of the battery value chain, it is tempting to focus on the most visible end stages, whether it is gigafactories or pack assembly. This might be intuitive in conventional vehicle production, where final assembly is the key integration point and throughput driver. In battery production, decisive levers such as value, yield, and performance generally come into play in the upstream and midstream process steps, long before final assembly. In other words, battery production is defined less by its final steps and more by upstream and midstream capabilities.

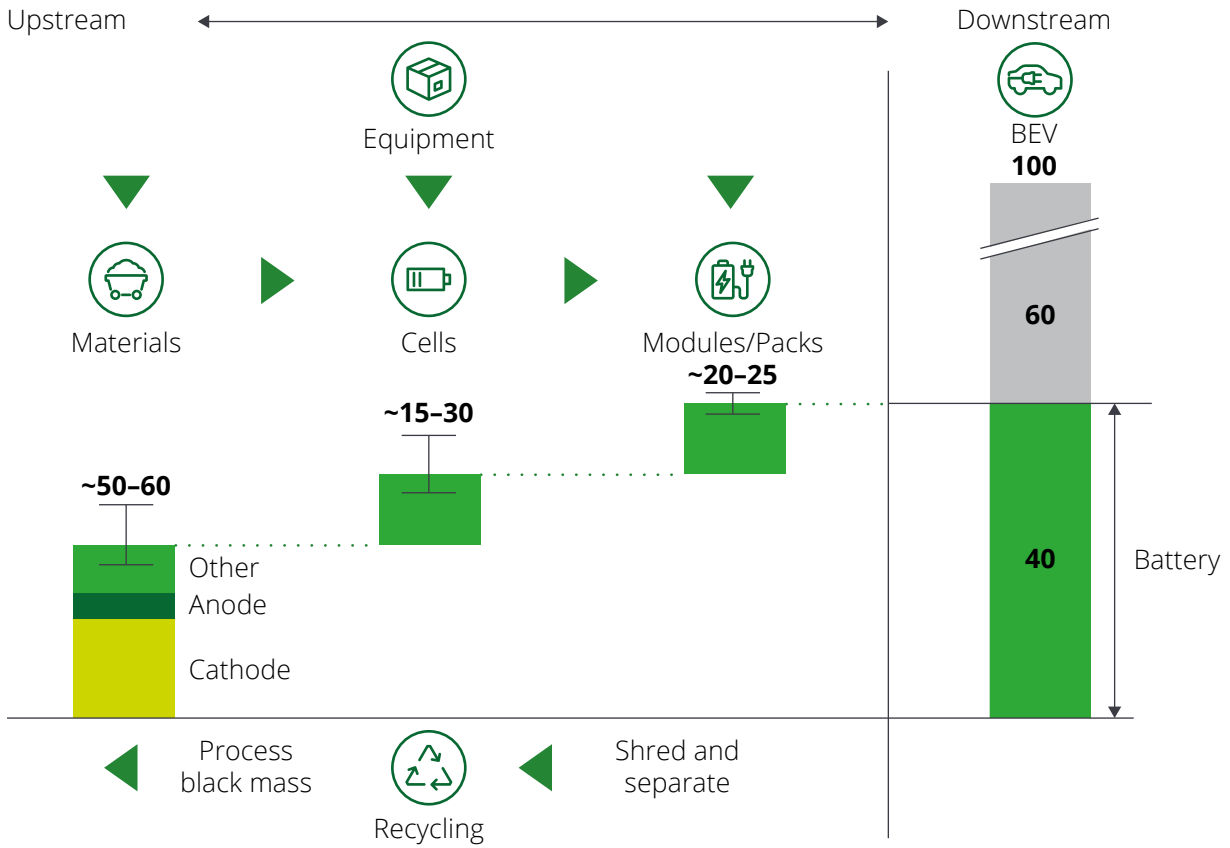
Process expertise drives competitiveness at scale

The battery value chain is complex, fragmented and highly interconnected, spanning raw material mining, chemical refining, active material composition, cell manufacturing and pack integration. Upstream material quality and processing yields directly affect downstream cell yield, scrap rates and costs as well as process stability during the ramp-up phase.

Pack integration is only responsible for around 20 to 25% of the value pool, while material supply (50–60%) and cell production (15–30%) account for the majority of value creation and differentiation.

Europe needs more than gigafactories to establish a mature battery ecosystem. The key to reducing dependency and achieving production at scale is a competitive, scalable infrastructure in the upstream and midstream sectors.

Value creation along the battery value chain (in %)



Based on US Department of Energy; Argonne National Laboratory, 2025: Estimated Cost of EV Batteries: 2019-2025; RWTH Aachen University, 2024: Comparative Cost Modeling of Battery Cell Formats and Chemistries on a Large Production Scale.; Deloitte, 2023: The role of battery costs in Automotive

Sovereign EU battery supply: Material refinement is a key bottleneck

While downstream activities are relatively well established in Europe, players across the value chain see cell production and material refinement as major obstacles to securing a sovereign European battery supply.

Is Europe on the right track?

Although Europe is taking steps to strengthen its battery ecosystem, much of the momentum remains focused on the most visible downstream steps, such as module and battery pack assembly. Expanding upstream and midstream capacity is progressing more slowly. The phase between cell production and module manufacture – as well as subsequent pack integration – appears to be the weak link in Europe's value chain.

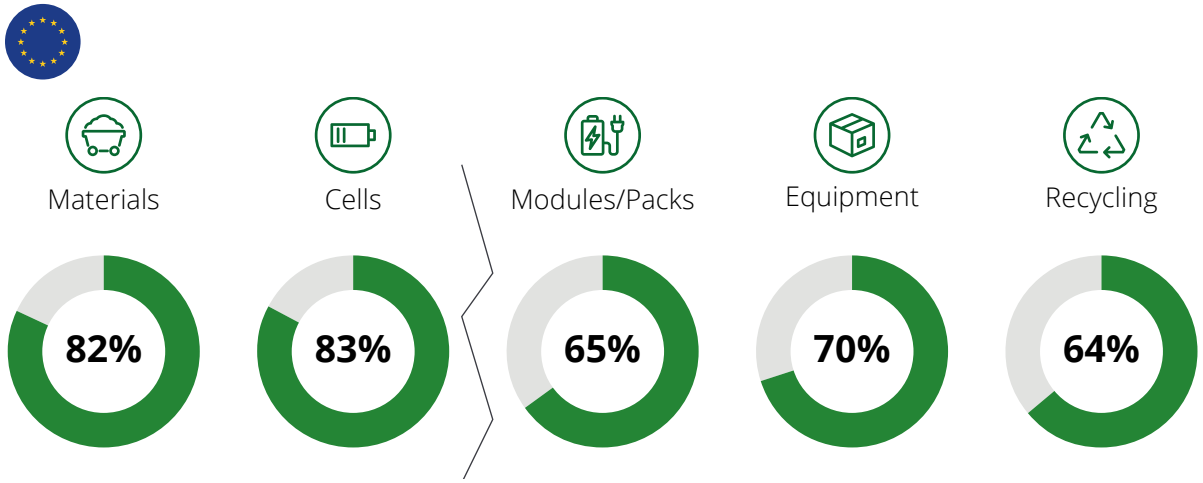
Module/pack integration alone cannot secure sovereignty

Over 80% of respondents across the value chain say the primary obstacle to sovereignty is material and cell supply, significantly higher than module/pack manufacturing (65%). While recycling could help bridge the material supply gap, refinement – the essential link between raw materials and cell production – remains a critical bottleneck.[1]

Ultimately, Europe still relies on non-EU supply chains to meet battery demand for vehicle production. That makes material processing a decisive factor in achieving a truly closed-loop value chain in Europe.

Where Europe's battery value chain breaks

Europe has made visible progress across the battery value chain, yet strategic dependencies persist. The decisive bottleneck is not downstream scale, but upstream industrial capabilities.



… agree that there is currently a supply bottleneck in this phase of the value chain.

Sources: Deloitte Analysis, Battery Maturity Assessment, 2026

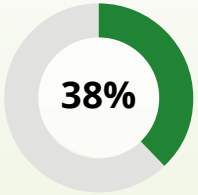
1) More details on battery recycling in Europe available in Deloitte France POV "Europe's hidden mine – Turning end-of-Life EV batteries into a competitive refining industry"

Companies along the value chain see Europe's battery business model at risk

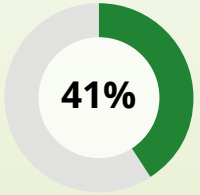
The availability of cheap Chinese battery cells may feel reassuring, but it is only a temporary fix. With growing concerns about long-term price competitiveness, players across the value chain fear that local capacity will not suffice.

Europe has gigafactories, but are they really European?

At first glance, the battery supply seems viable, as Europe is currently able to source cells from China at attractive prices even as it expands production capacity across the continent. We reported a significant increase in EV battery cell production volume in Europe in 2025, up 28% over our 2024 analysis. However, the share of gigafactories owned and operated by Asian companies remains at 98%.



of participants do not believe Europe will be able to buy battery cells at competitive prices in the future



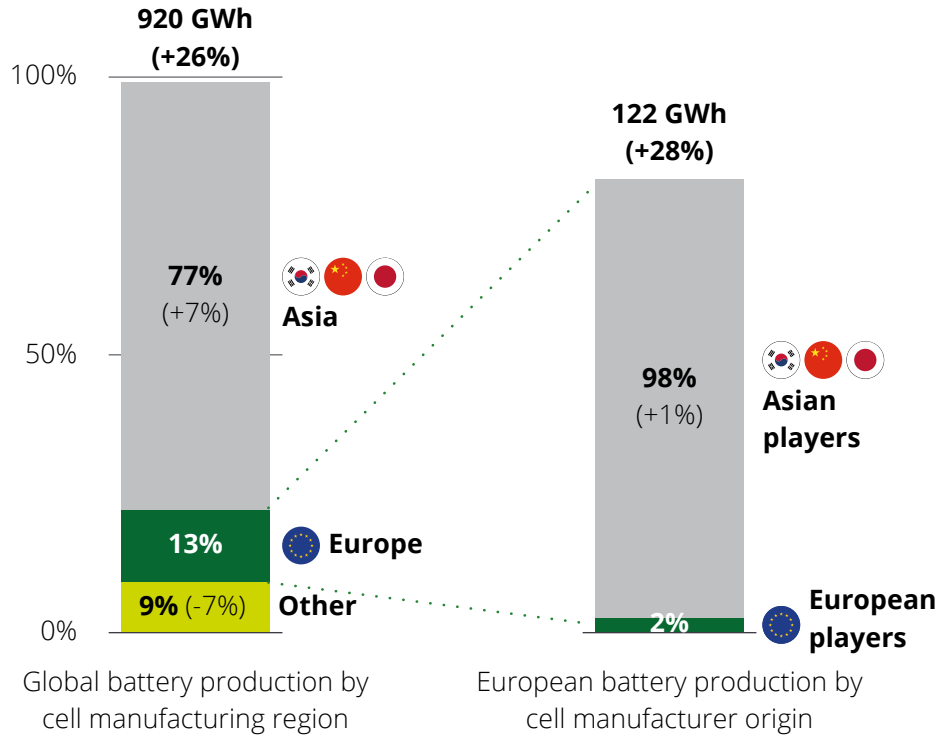
of participants believe that EU demand cannot be met by European companies alone

Will this business model be viable in the future?

Rising geopolitical tensions and strategic competition raise serious questions about the long-term viability of sourcing cheap battery cells from Asian manufacturers. Our survey confirms that industry leaders see this business model as highly vulnerable – especially since domestic capacity cannot currently meet demand.

Today's global EV battery production capacity

(2025, % of production capacity in GWh)



Global battery production by cell manufacturing region

European battery production by cell manufacturer origin

+/- % | Change compared to 2024 analysis

Sources: Deloitte Analysis, GlobalData, 2026

Up to €10bn in profits at risk of leaking to Asia by 2030

Despite growing EV production, limited domestic cell and refining capacity combined with strong Asian ownership continues to divert battery value creation and profits away from European industry towards Asia.

Profit pools are leaking to Asia – putting €10.5bn at risk

With roughly 27.8 million EVs forecast to roll off European production lines by the end of the decade, we could see as much as €10.5bn in profits diverted from the European automotive industry to Asia as a result of sourcing non-European battery cells. Given the fact that even domestic production of battery cells in Europe relies mainly on imported raw materials and production equipment as well as foreign labor, the total loss of value for European industry is estimated in the region of €100 to 150bn by 2030.

Profits originate upstream – and that is where we need to act

This is mainly a structural problem, now that China exercises almost complete control over the critical upstream bottlenecks in the value chain – where most profits are generated. As a result, stakeholders across the value chain are coming to the same conclusion: European downstream capacity alone cannot guarantee long-term sovereignty and competitiveness.

But where does Europe stand? And what areas need immediate action to build a truly European battery value chain?

European EV production forecast until 2030

27.8m
EVs produced in Europe

1,950 GWh
Required battery capacity

~ €10.5bn in profits
in battery cell production and material refining at risk of leaking to Asia by 2030



Source: Global Data 2026, Deloitte Market Analysis

Battery Maturity Assessment

Measuring the maturity of Europe's battery value chain



Deloitte Battery Maturity Assessment: What is limiting a truly European battery value chain?

We conducted a comprehensive survey of European decision-makers across the battery value chain from material refinement to recycling to assess the current maturity of these industries and identify current roadblocks.

Deloitte's Battery Maturity Assessment: Methodology

The Deloitte Battery Maturity Assessment offers a comprehensive evaluation of Europe's battery value chain, covering the full spectrum from material refining to recycling. It analyses the state of the industry as a whole as well as its technological readiness in an effort to identify key bottlenecks and enablers for building a competitive ecosystem. The survey sample is drawn from European-based companies.

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Responses across the entire value chain

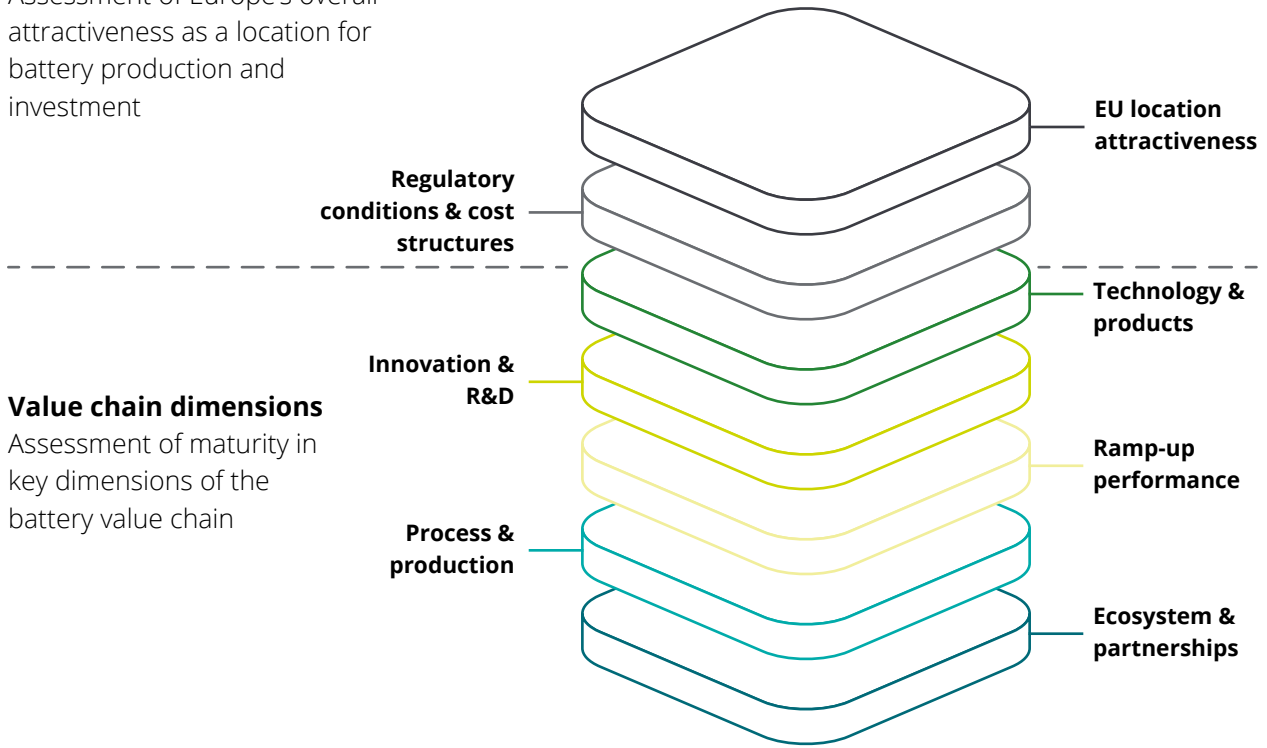
13
European countries

17%
Respondents at CxO level

44%
Respondents at Director/ Head of Department level

Holistic state of the industry
Assessment of Europe's overall attractiveness as a location for battery production and investment

Value chain dimensions
Assessment of maturity in key dimensions of the battery value chain



Europe is strategically important – but operationally risky

The majority of companies in the battery value chain prefer Europe as a location for future battery investment. However, they recognise the strategic importance, many decision-makers hesitate to commit to concrete investments.

Respondents prioritise investment in European battery infrastructure

The companies in our survey acknowledge that the current business model of buying precursor materials and cells on the global market and focusing on downstream process steps is at risk. This has convinced them of the need to invest in a European value chain. The majority of companies in our survey say Europe is their top investment location for upcoming projects.

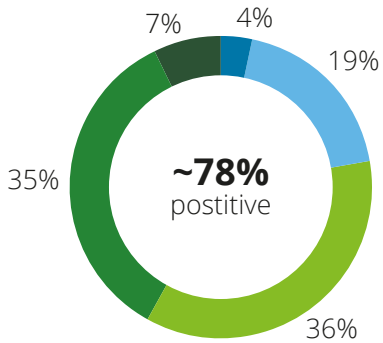
Volatile demand has slowed down project execution in the past

Looking at past and current project execution, about 38% of our respondents state that they have fully completed their planned pipeline projects. At least ~25% of their project plans were never completed, while a further ~35% were either scaled down or only partially completed. The key reasons for this are volatile demand and an inability to compete with the global market leader, followed by a lack of production expertise. Insufficient funding, by contrast, is only seen as a minor obstacle.

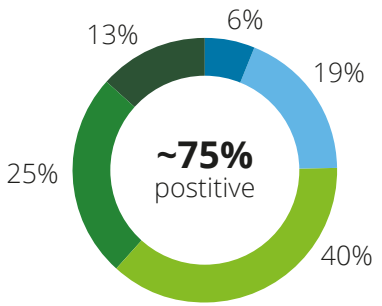
Uncertainty around future investments and upcoming projects

Despite a general willingness to invest in Europe, only about two-thirds of the companies in our survey are considering new projects within the next 3 years. 35% already have detailed plans, but the majority are uncertain about future investment decisions. Unattractive cost structures and regulatory uncertainty are holding them back from making concrete investment decisions today.

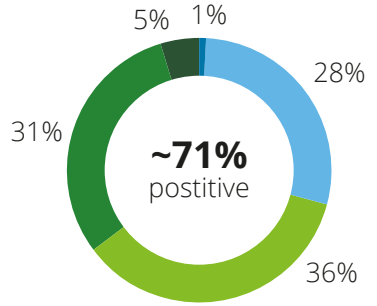
Companies are prioritising Europe for their battery projects and investments over the next 2 to 5 years



The need for investment in Europe is widely acknowledged; however, execution lags behind plans and uncertainty is preventing decisive action

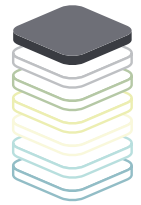


report that they have successfully completed planned battery projects in the last 3 years



report that they have concrete project and investment plans for the next 3 years

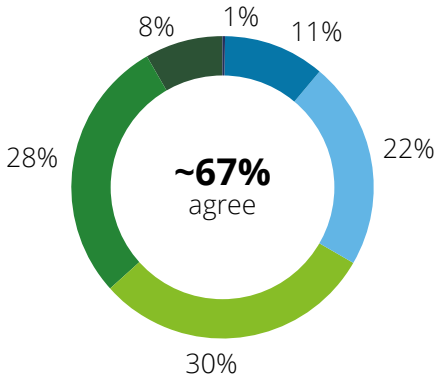




High costs and regulatory uncertainty are stalling investment decisions

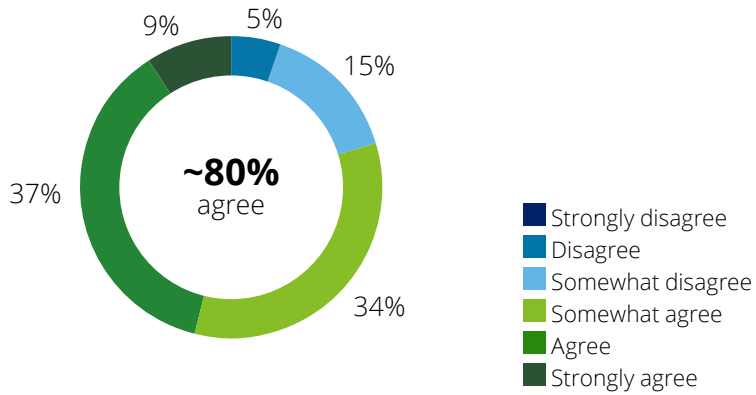
Investors are reluctant to fund battery projects in Europe due to regulatory complexity and strategic uncertainty of the automotive industry. These barriers are proving to be just as challenging as the region's uncompetitive cost structure.

The current cost structure poses challenges for a domestic European battery industry



Regulatory conditions impact project execution even more than unfavourable cost structures.

The current regulatory framework negatively impacts battery projects in Europe



From strategy to execution: The location factor is a major hurdle

Investment readiness in the European battery value chain remains limited, for two main reasons: an inability to compete on costs and regulations that act as obstacles rather than accelerators. Although structural cost barriers (energy, labour, CAPEX and ramp-up costs) are widely acknowledged, companies highlight uncertainty surrounding future regulatory decisions as a key planning risk.

Many companies recognise the need for investments in Europe's domestic battery value chain, yet they are reluctant to move from strategic planning to execution due to regulatory constraints.

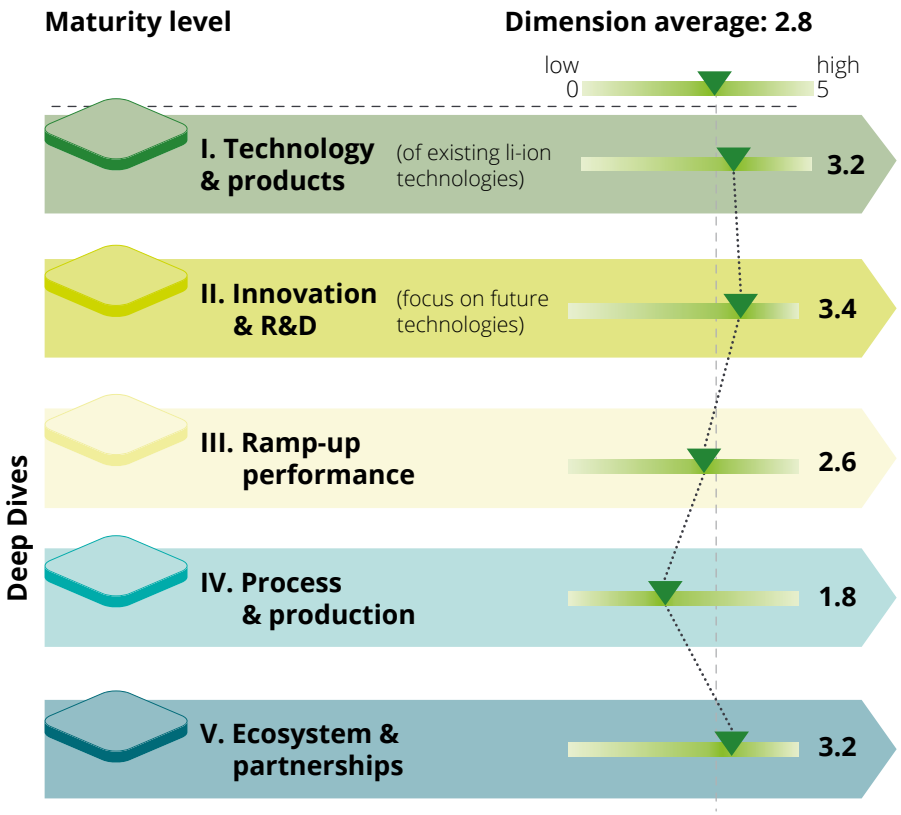
Where companies see the need for action:

When asked what would incentivise investments in battery projects, the respondents' priorities are clear:

1. **Faster approval processes (70%)**
2. **Stable fleet regulations/demand (54%)**
3. **Operationalized clean tech roadmap (51%)**

The fundamentals are in place – mastering the leap from R&D to efficient production at scale is key

Although the industry has the core foundations in place, from workforce and knowledge to strong R&D, the key challenge for the future is moving from development-stage technology to stable, efficient production at scale.



Low – indicates insufficient European capabilities
High – indicates European sovereignty

Key findings: Where Europe's performance is already strong

The most critical gap in Europe's global competitiveness is in the **upstream stages of** refinement and cell production. Product maturity downstream is already competitive.

EU companies have strong R&D performance and **ample investment in next-generation technologies,** boosting their technological maturity and innovation.

While most EU **companies have met their ramp-up targets (at least in part),** it has come at **a cost far exceeding forecasts.**

European companies don't have the same level of **process maturityas global market leaders, resulting in concerns that** they may **never catch up.**

Although collaboration is well-established in the European ecosystem, it remains largely **focused on R&D rather than operations.**

Europe's challenge is not building plants – it is surviving the first months of ramp-up

While the companies in our survey are generally able to achieve their stated goals, they are put off by the high price of ramping up. The main issues are precursor materials, delayed commissioning and a lack of experience.

Most have mastered the ramp-up phase – but at what cost?

The high cost of ramping up production is the core challenge for most companies. While speed and quality issues are considered less critical, the high expenditure involved puts pressure on business cases and operational cash flow. As a result, our respondents see OPEX support as a key area for government subsidies in the battery industry.

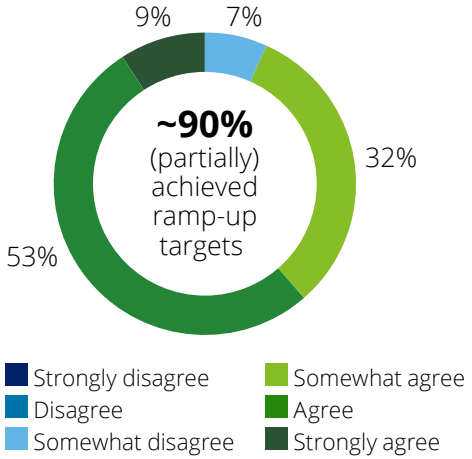
External factors are the main cause of failed ramp-ups

Precursor materials, delayed line commissioning and a lack of practical experience in the setup and operation of battery production lines are the main reasons for failure. In contrast, yield stabilisation and low OEE are under control and only play a minor role.

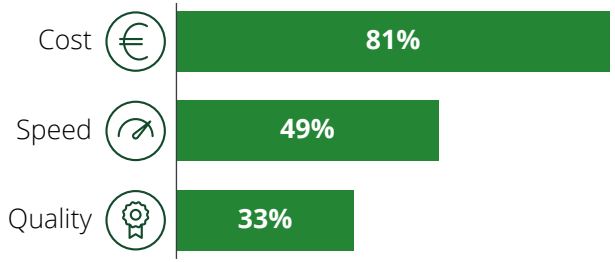
Surviving ramp-up is only the first step

Navigating a costly ramp-up phase and meet target production volumes is a major milestone. The question remains whether these plants can sustain the operational maturity and output efficiency they need to compete on a global scale.

Ability of companies to achieve targeted ramp-up speed & output



Factors preventing ramp-up & commissioning success



OPEX support for ramp-up operations is seen as the **top priority** for subsidies.

Key challenges companies facing during production ramp-up

1. **Problems with precursor material (57%)**
2. **Delays in production line commissioning (51%)**
3. **A lack of practical production experience (48%)**

Process maturity and efficiency remain key roadblocks for competitive European production

Although the ramp-up is broadly under control, many see the current level of process maturity as a critical obstacle. Companies are concerned about losing ground to global leaders in both refining and cell production.

Process maturity as the critical bottleneck

Most companies see ramp-up execution as expensive but achievable, yet many still struggle to deliver mature, efficient production at scale. 75% of the companies in our survey see a significant process maturity gap that limits their production efficiency relative to global market leaders.

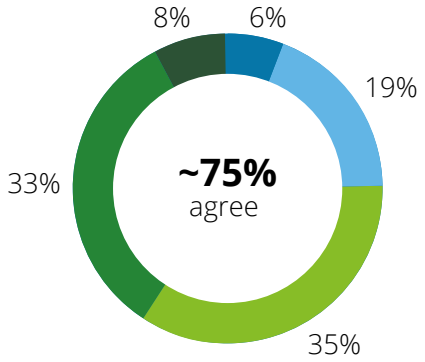
Companies fear losing ground in global competition

Confidence in process performance varies significantly along the value chain. Pack production, recycling and production equipment are considered relatively mature areas. In material refinement and cell production, by contrast, companies see significant efficiency gaps. This feeds into a wider fear of losing ground and not being able to catch up with competitors.

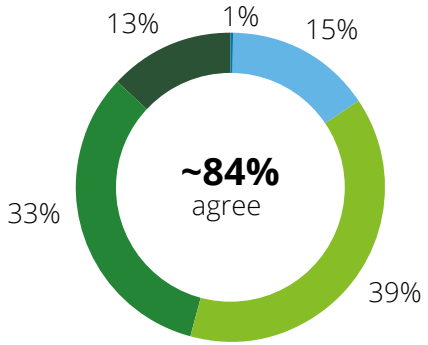
Now is the time to catch up

Over 80% of the experts in our survey recognise the urgent need to invest in production processes. Europe cannot afford to wait for the next battery technology to start catching up. Gaining practical experience and mastering basic production capabilities now is the start of an ongoing learning process that will lay the groundwork for future success.

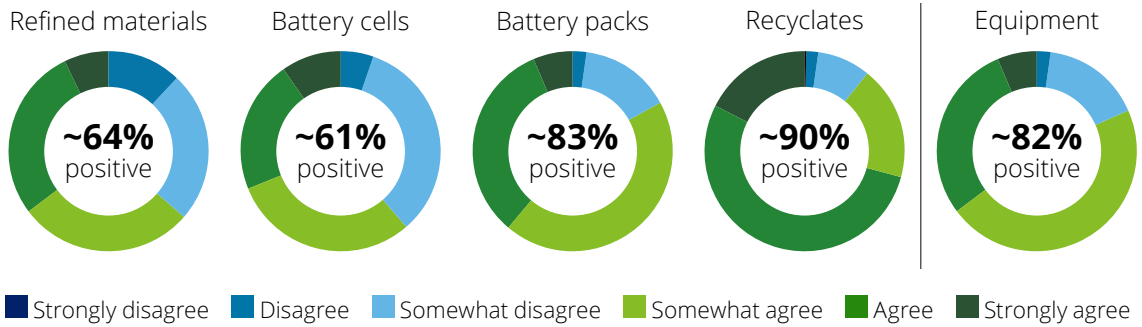
Europe is seriously lacking process stability and efficiency



Europe must urgently invest in process maturity to master future technologies



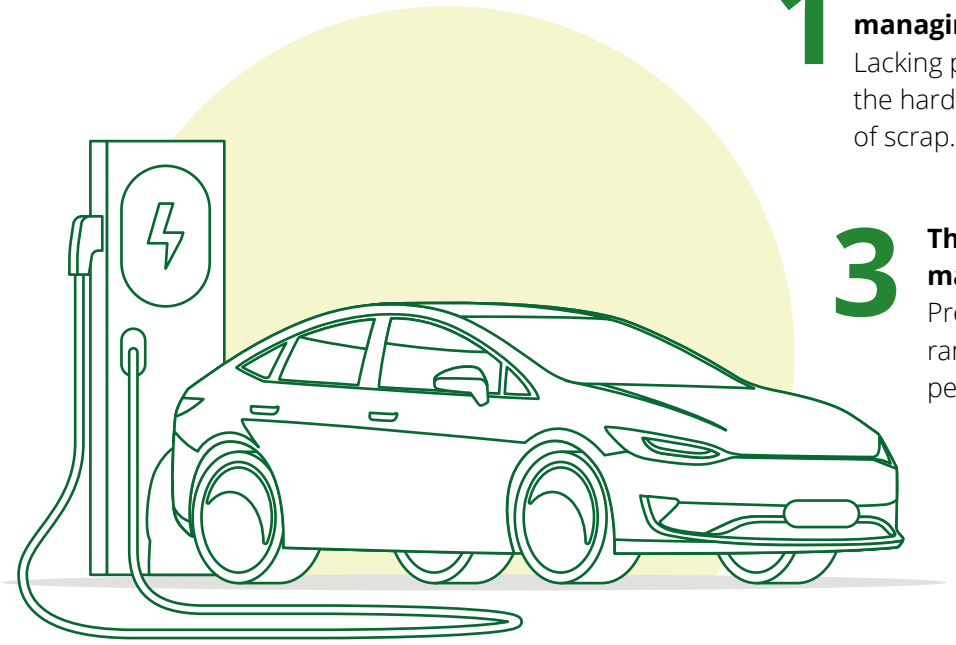
Will Europe be able to close the process maturity gap with global leaders?



Assessment summary: Where is the critical path in the value chain?

Mastering the battery challenge goes beyond cell production. Main drivers of efficiency, quality and performance are found in the transition from material refinement to cell production - That is where Europe is losing ground

What we are hearing from battery leaders:



1 **Most European companies excel at managing technology, innovation and R&D.**
Lacking practical experience, they have to learn the hard way from operational failure and tons of scrap.

2 **The task now is to increase process maturity and master production at scale.**
If Europe does not master existing production processes, it will never scale next-gen battery technology.

3 **The key to Europe's success is effectively managing the entire upstream process chain.**
Precursor materials are the leading cause of ramp-up issues and a key factor in product performance.

4 **Companies are willing to invest in battery production projects in Europe.**
But in order to stimulate investment, Europe needs to stabilise regulatory policies and market demand.

5 **Public and private funding can act as an accelerator but only if it is allocated strategically.**
OPEX support for the cost-intensive ramp-up phase would be the best approach.

The fundamentals are in place but now is the time to act.

Key Action Areas

What steps Europe's battery industry must take to compete



Europe’s battery industry at a crossroads

Europe’s battery industry is at an inflection point: it must either translate insights into action to compete in next-generation battery technology or accept dependence on non-EU suppliers as an inevitability.

1. Process maturity and output efficiency are holding Europe back
Our study shows that process maturity lags behind global competitors, particularly when it comes to material refinement and cell production – a major threat to Europe’s battery independence. Investing in the upstream value chain is urgent and essential.

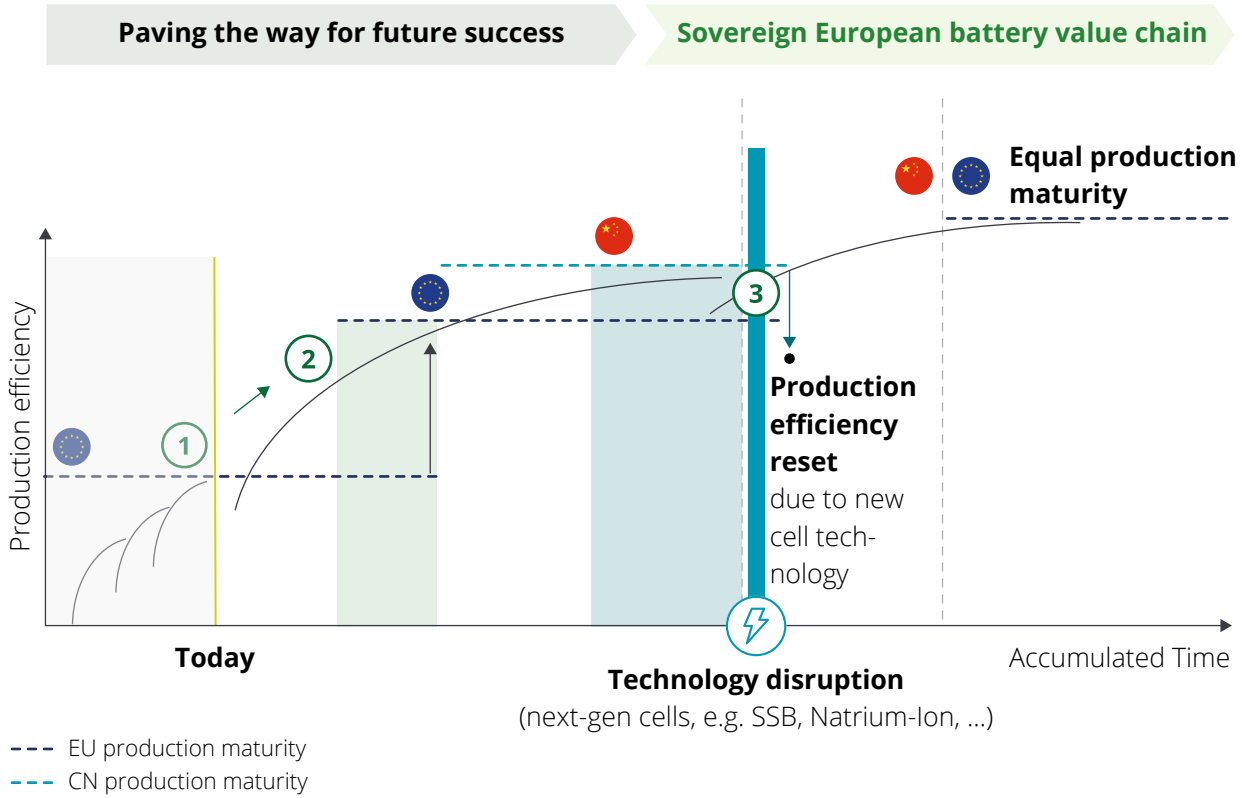
2. Europe must invest in process maturity and production experience now – before the next-gen technology drops in
The window of opportunity is still open to gain hands-on production experience and develop mature production lines. Otherwise, companies risk losing out to global competitors.

3. Disruption sends production efficiency back – but fundamental capabilities will remain
Investments in production expertise and maturity today will pay off in the future, enabling Europe to compete with global leaders when scaling next-generation batteries.

“Europe’s battery future will not be decided in the lab. What really matters are the first 10,000 tons of material, the first 12 months of ramp-up and the first yield crises at scale.”

Harald Proff, Global Automotive Lead

Illustrative visualization of Deloitte's view on production maturity in global competition



Now is the time to lay the groundwork for future technologies – decisions delayed today will determine dependence tomorrow.

Winning the battery race is a challenge of capital allocation, not technology

Taking joint action across the public and private sectors is vital. Failure to make decisions today will ultimately become a decision against European sovereignty tomorrow.



Public

Pool demand to clear a path for investment decisions
Without coordinated demand, companies simply cannot justify such large-scale investments. The fragmentation of national markets creates uncertainty, which ultimately leads to inaction. The visibility boost that comes from aligning demand across Europe will drive rather than delay investment decisions.

Share risk to turn hesitation into commitment
A lot of projects fail due to unmanageable risk exposure, not a lack of capital. Unless public and private stakeholders actively share risk, the only rational response for companies is to wait. And in this context, waiting means losing ground to regions that take more decisive action.

Adopt a strategic investment mindset
Treating batteries as short-term financial investments leads to repeated delays and underinvestment. What Europe needs is a joint commitment to the kind of long-term thinking that underpins infrastructure – the best way to move from analysis to action and avoid systematic underinvestment.

Private

Secure funding across the full lifecycle
Building production capacity is just the beginning. Sustaining operations through ramp-up and early inefficiencies is equally critical – yet often underfunded. Without a capital structure that extends beyond initial CAPEX, companies will not be equipped to weather market volatility and delayed profitability.

Build an advantage in industrialisation
The competitive frontier has shifted from innovation to execution. Success will depend on the ability to scale production, stabilise yields and compete on price under real operating conditions. Companies that master industrialisation will define the market.

Protect at-risk enterprise value
Battery investments are more than just growth opportunities; they are the key to protecting the sizable capital already committed to electrification. Without a competitive battery sector, much of the automotive industry's EV investment is at risk of becoming stranded. Scaling up domestic production is, therefore, a defensive imperative.

Enable decisive action to build a competitive battery industry

We help public and private stakeholders turn ambition into concrete decisions, delivering execution at scale across investment, partnerships and industrial operations.



Investment & Risk Strategy

Deloitte creates the transparency required to move into commitment by structuring investment cases, forecasting demand and quantifying risk.

Key capabilities:

- End-to-end investment cases with capital allocation and financial steering
- Funding and subsidy support
- Scenario analysis across different regions
- Structuring of demand mechanisms such as offtakes and pooling logic
- Quantification and mitigation of price, supply and ramp-up risks



Partnerships & Ecosystem

Deloitte designs and orchestrates partnership models that allow companies to share risk, access capabilities and jointly scale.

Key capabilities:

- Definition of value chain positioning
- Design and set-up of joint ventures and strategic partnerships, incl. legal clarification
- Structuring of capital and risk-sharing models
- Integration of public funding mechanisms
- Development of long-term offtake and demand structures



Industrialisation & Ramp-up

Deloitte makes sure that committed investments result in stable production, competitive costs and scalable operations.

Key capabilities:

- Establishment of ramp-up and industrialisation governance
- Digital production twin, incl. commissioning and predictive performance management
- AI-driven optimisation of key KPIs, e.g., throughput and yield
- Automotive-ready process qualification
- Connected supply chain steering

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Contacts



Our Battery Center of Excellence – Key Contacts



Harald Proff
Partner
Global Automotive Lead
hproff@deloitte.de



Benedikt Schlüter
Manager
Supply Chain & Network Operation
bschlueter@deloitte.de



Tobias Vogel
Manager
Supply Chain & Network Operations
tvogel@deloitte.de

Co-Authors



Aled Walker
Partner
Automotive Lead Belgium
alewalker@deloitte.com



Samuel Galbois
Partner
Monitor Deloitte France
sgalbois@deloitte.fr

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This study is part of a broader series of publications by Deloitte EMEA's Battery Center of Excellence.

Further Battery Publications:



Deloitte Belgium
Drivers & Projections for EV Battery Recycling



Deloitte France
Europe's Hidden Mine

More battery content to come over the next month with comprehensive insights and guidance on mastering Europe's battery challenge.

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