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Battery innovations for a sustainable future

A conversation with
Gilles Moreau
Co-Founder & Chief Sustainability Officer
Verkor

Conversations
FOR TOMORROW

GILLES MOREAU

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Verkor

BATTERY INNOVATIONS FOR A SUSTAINABLE FUTURE

VERKOR

In 2020, Gilles Moreau co-founded Verkor, a French battery startup, with the sole ambition of fast-tracking low carbon battery production for the European market. Gilles, an electrochemist with a background in stationary energy storage, was previously Co-Founder and Battery Lead at Lancey Energy Storage and, as Project Manager at the French Alternative Energies and Atomic Energy Commission (CEA), worked on various French and European lithium-ion battery projects.

VERKOR AND THE GIGAFACTORY

What led you to co-found Verkor?

Gilles Moreau: My early work focused on fuel cells, particularly during my time at Renault, where I worked on hydrogen-powered vehicles. Over time, as Renault's focus shifted to electric mobility, my expertise expanded into batteries.

I've worked with large corporations such as 3M and Faurecia [now Forvia], as well as in European research projects including COBRA, a major EU-funded battery initiative. But I wanted to build something from the ground up. In 2016, I launched my first company, integrating batteries into demand-response energy solutions.

That experience laid the foundation for Verkor, which I co-founded in 2020. Our mission was to develop high-performance, low-carbon batteries for Europe. My remit at Verkor includes open innovation, sustainability, and strategic partnerships, as well as securing major funding from the French government and the EU, which amounts to nearly €650 million to date.

Gilles Moreau,
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Verkor has established a gigafactory in Dunkirk with a capacity of 16 GWh per year. What's the roadmap for scaling production?

Gilles Moreau: We have the capability to expand the site to incorporate up to three gigafactories, each with a 16-GWh annual capacity, meaning we could scale to 48 GWh per year. But right now, the battery industry is going through cyclical fluctuations, so we are taking a strategic, demand-driven approach to scaling. That said, we already have the infrastructure, talent, and government support in place to move quickly if demand strengthens.

Verkor currently focuses on nickel manganese cobalt oxide (NMC) pouch batteries, but there's growing interest in lithium iron phosphate (LFP), sodium-ion, and even solid-state technologies. How do you decide which chemistry to pursue?

Gilles Moreau: The biggest driver of battery chemistry choices isn't technical superiority. It's customer demand. Our approach has always been flexible and customer-driven. We began with NMC pouch batteries because that's what our customers – particularly Renault – needed. However, we actively research and develop alternative chemistries, including LFP, sodium-ion, and sodium-sulfur batteries.

If a major automaker commits to sodium-ion, for instance, they have the supply chain strength to make it commercially viable. Availability and cost of raw materials also play a role, but large OEMs [original equipment manufacturers] can secure materials at scale.

Market trends also have a strong influence. A few years ago, everyone was talking about solid-state batteries. Now, LFP and sodium-ion are generating buzz. The key is to make data-driven decisions to stay ahead of the curve.

Can gigafactories be adapted for new chemistry?

Gilles Moreau: The most efficient approach would be to build a dedicated gigafactory for the new chemistry. Our current factory is optimized for NMC batteries. While some adaptations are possible, a full transformation would be costly and inefficient.

In the long run, we see the industry moving toward specialized gigafactories, tailored to different chemistries. This will allow for maximum efficiency and performance optimization.

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From an automaker's perspective, what are the key factors influencing battery selection?

Gilles Moreau: The number one factor is cost. But beyond that, automakers look at:

1. Energy density – the more energy a battery can store per kilogram, the better.
2. Charging speed – faster charging is a major competitive advantage.
3. Safety – this is critical, especially as regulations tighten.

However, market trends and public perception also influence decision-making. Right now, LFP batteries are gaining traction, largely due to the narrative created by Chinese manufacturers. A few years ago, everyone was fixated on solid-state batteries. Before that, it was hydrogen fuel cells.

While we aim to make rational, science-based decisions, we also need to stay aware of industry momentum and customer expectations.

THE BATTERY SUPPLY CHAIN

How do you ensure transparency in your supply chain?

Gilles Moreau: For a truly sustainable battery industry, traceability is crucial. It's not just about where materials come from, but also about how they are processed and transported.

> "For a truly sustainable battery industry, traceability is crucial"

We use advanced data collection methods to track raw materials from the mine to the final battery pack. The challenge is ensuring data integrity. This is where AI could play a big role.

AI could help detect data inconsistencies, identify risks like human rights violations, and improve overall transparency.

Do you see opportunities for global collaboration in areas such as recycling and standardization?

Gilles Moreau: Absolutely. The battery industry needs more global cooperation in several key areas:

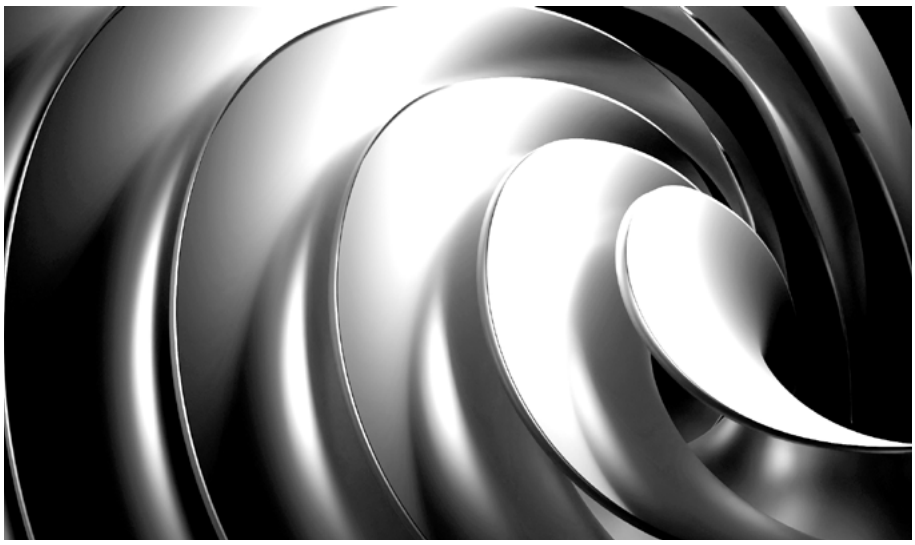
> "The battery industry needs more global cooperation "

1. Recycling and circular economy – we must create efficient, scalable recycling processes to recover and reuse materials.
2. Supply chain transparency – standardized frameworks would help ensure ethical sourcing and sustainability.
3. Manufacturing standards – aligning processes across countries would improve efficiency and reduce waste.

Collaboration is essential, not just between companies, but also with governments and regulators. If we work together, we can accelerate innovation with minimal environmental impact.

How do you manage the challenges of sourcing materials for battery manufacturing?

Gilles Moreau: Managing the supply chain is complex. Right now, it's easier to set up global partnerships and work on scrap materials to manufacture batteries. But when it comes to second-life batteries, the process involves distributing resources across various players and geographies. So, the challenge is not just technical, but also about coordinating multiple stakeholders. For example, in Germany, automakers are working together to try to establish a more streamlined value chain.



REUSING AND RECYCLING BATTERIES

What are your thoughts on battery recycling and upcycling?

Gilles Moreau: I'm not a big fan of second-life batteries. My main concern is that, while it seems appealing to reuse batteries for 15 years, you'd still need to establish new mining operations to support the battery's life over that extended period. Sourcing critical materials such as lithium, nickel, and cobalt will only become more difficult in the future. So, while recycling could play a role in the overall circular economy, I believe we need a new approach to ensure sustainability and reduce dependence on extraction.

How could a financial model such as a buyback program work in this context?

Gilles Moreau: One possibility would be a financial mechanism where, when a consumer buys a car, part of the cost is associated with the eventual buyback of the battery. This way, the battery's value is secured from the outset, and the recycling process is signposted and streamlined. The idea would be to work with trusted third parties, such as banks, to create a financial instrument that could guarantee the buyback process, ensuring that the materials don't end up in less sustainable markets. This model could also include recurring revenue for customers, providing insurance or guarantees on their batteries' lifecycles.

Could you elaborate on the challenges of making the battery industry fully circular?

Gilles Moreau: Battery products have the potential to be fully circular. Materials such as nickel, cobalt, lithium, and graphite can be separated and recycled – up to 98% of the important materials. But the process requires energy, and it's expensive. Still, circularity is achievable. The comparison with traditional mining is worth noting, too. Shredding a battery and extracting materials is far more efficient than mining raw materials such as copper, where the concentration is much lower. Despite its complexity, this makes the battery recycling process more appealing in some ways.

> **Battery products have the potential to be fully circular "**

SHREDDING A BATTERY AND EXTRACTING MATERIALS IS FAR MORE EFFICIENT THAN MINING RAW MATERIALS

BATTERIES AND EUROPE

Can you share your thoughts on potential alliances within the European battery industry?

Gilles Moreau:: Europe is currently dependent on Asian suppliers for many of its battery components, which poses a challenge, particularly in terms of sustainability. We've been discussing this topic with companies such as Schneider Electric, which has tried to bring together a consortium of equipment suppliers, but their efforts have met with limited success. If we could establish a European alliance of both small and large companies, we could not only reduce our dependence on Asia but also develop turnkey solutions that could push us ahead of Chinese competition. The opportunity is there, but it requires collaboration and leadership.

How could governments accelerate the development of the European battery supply chain?

Gilles Moreau: France is keen to support battery recycling and circularity. The government could incentivize partnerships and financial solutions, for example by offering a green bond that allows manufacturers to secure materials for battery production. If car manufacturers such as Renault could buy back used batteries, it would reduce the upfront cost for consumers and create a more sustainable loop.

"Europe is currently dependent on Asian suppliers for many of its battery components"

How do you see the long-term evolution of the battery supply chain in Europe?

Gilles Moreau: For European battery manufacturing to become self-sustaining, we need to significantly increase collaboration and investment in both technology and infrastructure. This includes investing in gigafactories for battery cell production and, importantly, establishing a robust supply chain for raw materials. The EU and individual governments are starting to take the issue seriously, but we must reduce reliance on foreign suppliers, especially from Asia, and develop more resilient and sustainable practices around recycling and material recovery. If we succeed in this, we can achieve not just sovereignty in battery production but also lead the way in creating a more sustainable circular economy.

> **"For European battery manufacturing to become self-sustaining, we need to significantly increase collaboration and investment in both technology and infrastructure"**

LOOKING AHEAD

What do you anticipate in terms of opportunities, challenges, and market trends over the next five to 10 years?

Gilles Moreau: I believe recycling will shape the future of the industry. But, from our perspective, it's not all about long-term projections. Our focus over the next two to three years is on executing the current plans, delivering on operational excellence, and ramping up production as quickly as possible.

What do you see as the biggest hurdles the battery industry must overcome?

Gilles Moreau: The main hurdle is executing on the current plan: scaling the factory, bringing in the right talent, and ensuring that we optimize production processes. In terms of talent, we're investing heavily in bringing valuable experience from other markets. The pace of industrialization, especially when it comes to scaling battery factories, is also a huge challenge. We need to address talent shortages and skills gaps quickly, and that's going to be a major focus for the next few years, as well as disseminating best practices.

We're at a point where we need to execute well on the plans in place. There's a lot of potential, especially in recycling and new technology. Once we get the basics right, we can start thinking about the longer-term trends and innovations.

Gilles Moreau
Co-Founder and
Chief Sustainability Officer,
Verkor

"The main hurdle is executing on the current plan: scaling the factory, bringing in the right talent, and ensuring that we optimize production processes"

Conversations FOR TOMORROW

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