Environment

EU Battery Regulation Strategy

The EU's Batteries Regulation, enacted in 2023, primarily aims to enhance the sustainability of batteries throughout their entire lifecycle, from raw material collection to final recycling. Consequently, it introduces many new requirements related to existing supply chain compliance, carbon inventory, product carbon management, and specifications for the recycling ratios of raw materials.

To promote sustainable supply chain management and ensure regulatory compliance, Molicel has chosen the P42A battery for lifecycle evaluation. This helps us understand environmental and stakeholder impacts from raw material extraction to recycling and disposal, identifying significant issues in the energy component industry. Molicel combines procurement and R&D expertise with internal and external data, referencing the Ministry of Economic Affairs' Industrial Development Bureau and global academic journals. This rigorous approach enhances the precision and credibility of our findings.

Carbon Footprint

To meet regulatory demands for battery carbon footprint disclosures, Molicel conducted its first carbon footprint verification of P42A in 2023, achieving ISO 14067 certification. This involved quantifying lifecycle carbon emissions, identifying key sources, and creating reduction strategies. In 2024, Molicel plans to verify P45B and extend this scope to all products, establishing a comprehensive emissions database for ongoing carbon reduction.

Product life cycle management - P42A Battery Lifecycle

Mineral resource development

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Mineral refining

Raw material synthesis

Raw material extraction

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Processing and refining

Manufacture of primary materials

Manufacture of secondary materials

Energy resources | **Waste emissions**

Manufacture of primary components

+Positive electrode / −negative electrode

↓

STEP 1 - Winding

STEP 2 - Assembling

STEP 3 - Cleaning and packaging

STEP 4 - Formation

Energy resources | **Waste emissions**

Distribution and sales

Packaging material disposal

Transportation

Battery assembly and usage

Energy resources

Incineration

Landfilling

Chemical treatment

Recycling

Disposal of residual materials

Battery metal recycling

Recycling of secondary components /packaging materials

Energy resources

Reuse to extend product lifecycle

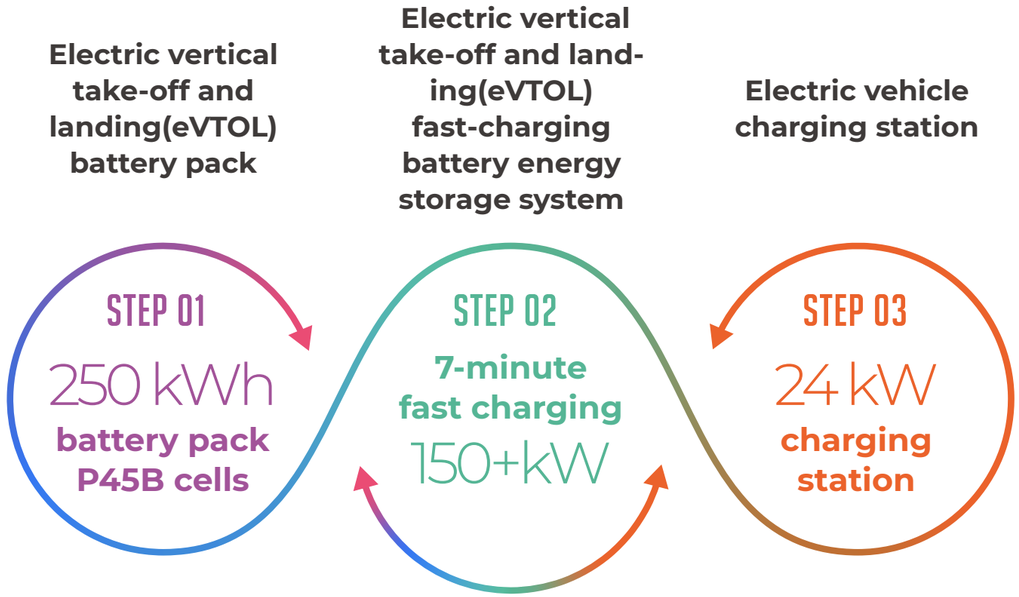
During the R&D process, Molicel is dedicated to realizing the green product concept by prioritizing using recycled materials to increase the proportion of recycled content in our products. Our products are designed and manufactured by international safety standards. Furthermore, Molicel is committed to enhancing the secondary use of batteries.

In the design and development of new batteries, we assess their health when it decline to 70-80% and consider repurposing them for other applications (such as UHPC ultra-high performance concrete energy storage cabinets - EnergyArkTM).

This strategy extends the battery lifecycle, maximizing resource utilization and product benefits.

eVTOL

High-power battery pack
for multi-lifecycle applications



Recycled raw materials in manufacture

Reuse of Raw Materials

Molicel is committed to manufacturing products that meet environmental standards, and requiring all finished products to pass relevant UL, UN, and IEC certifications while adhering to ISO 9001, fully complying with international regulations.

In our commitment to sustainability, we prioritize using green raw materials and steadily increase the proportion of recycled materials in our production processes.

By establishing a closed-loop recycling system for solvents, we have achieved a notable 90% recovery rate for NMP used in manufacturing. Additionally, we have transitioned some product designs from NMP systems to water-based systems to minimize environmental impact. Furthermore, Molicel has launched collaborative projects to recycle and reuse raw materials, such as repurposing excess materials from production lines.

These initiatives aim to enhance the recycling rate of battery materials, reduce resource consumption, and minimize waste during the manufacturing process.

Product Recycling

Molicel is continually dedicated to battery recycling strategies and follows green product operations.
At the end of 2023, to align with EU regulations and meet customer demands, Molicel launched a battery recycling program.

This initiative aims to establish connections with recyclers and material suppliers, starting with the recycling and reuse of cathode materials and gradually expanding to other raw materials and finished products. In addition, Molicel is investing in research on battery recycling processes and developing new technologies to transform waste materials into reusable materials.

Molicel also forges strong partnerships with customers to advance battery recycling mechanisms jointly. Besides, to achieve the circular economy, we collaborate with suppliers to explore further processing of waste batteries into black mass, which can be reintroduced into the manufacturing process.

Recovery Ratio- First Quarter Achievements of 2024

Successfully contacted
2 overseas recyclers
and sent samples for evaluation.

Obtained agreement from
the positive electrode material supplier
and facilitated connection between the supplier and potential recyclers in Taiwan

Achieved an 80% recovery rate
in trial recycling of waste electrode and slurry to black mass