EV battery recycling in Europe could cover a significant share of raw material needs in the automotive sector

Press Release

A study by Agora Verkehrswende, the Stiftung GRS Batterien (GRS Batteries Foundation), and Oeko-Institut quantifies the potential for raw materials recovery and underscores the need for action. Recycled materials could cover nearly 25 per cent of the demand for lithium, up to 50 per cent of the demand for nickel, and over 60 per cent of the demand for cobalt by 2040.

15 September 2025. The German government and the EU should work to establish a European recycling system for vehicle traction batteries. This is the key finding of a new study conducted by Oeko-Institut in cooperation with Agora Verkehrswende and the Stiftung GRS Batterien. According to the study, the demand for traction batteries in the EU will increase some six-fold over the next ten years, to about 1,200 gigawatt hours per year. This will further intensify global competition for critical battery raw materials, including lithium, nickel, cobalt, and graphite. By 2040, the development of robust battery recycling systems could supply nearly 25 per cent of the lithium required by the European automotive sector. Recycled sources could meet up to 50 per cent of demand for nickel, while this figure could exceed 60 per cent for cobalt.

"The traction battery is the centrepiece of the electric-vehicle value chain," says Christian Hochfeld, Director of Agora Verkehrswende. "It is becoming increasingly important to recycle battery raw materials. Greater recycling will strengthen the competitiveness of the German automotive industry, boost the strategic autonomy of the European market, and advance climate protection in road transport. In this way, the recycling of traction batteries is not only essential for environmental protection and waste management, but also of central strategic importance for the supply of raw materials to the economy."

The EU has already launched important initiatives to accelerate the development of battery manufacturing and recycling in Europe and to close domestic raw material loops. For example, the EU's Battery Regulation sets forth recycling targets for batteries placed on the market in Europe, while the Critical Raw Materials Act establishes quotas for the supply of critical raw materials. The EU's industrial strategy for the automotive sector is another important pillar in this regard. However, Agora Verkehrswende believes that additional action is necessary, including targeted support for pilot projects, the harmonisation of the regulatory framework within Europe, and the monitoring of material flows.

The Stiftung GRS Batterien helped to fund the study, which was undertaken by Oeko-Institut with the scientific support of the publisher, Agora Verkehrswende. Based in part on expert testimony from various sectors that was gathered during dedicated workshops, the study provides an overview of European value chains for lithium-ion batteries. It also models various scenarios for future advances in battery chemistry, along with the resulting demand for key raw materials such as lithium, nickel, cobalt, and graphite. Furthermore, it evaluates the pros and cons of various business models for the recycling of lithium-ion batteries in the EU.

Traction batteries without nickel and cobalt

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Based on the study's projections, the volume of used batteries is expected to rise substantially after 2030, as an increasing number of aging electric vehicles reach the end of their service life. In terms of battery engineering, the study assumes that lithium-ion batteries that rely on lithium iron phosphate as the cathode material will become increasingly important. An increasing share of lithium iron phosphate batteries will therefore lead to a reduction in the demand for nickel and cobalt. However, the demand for lithium and graphite will hardly change as a result of this technological trend.

The EU must significantly scale up battery recycling capacities while simultaneously expanding primary raw materials production and strengthening associated value chains. At the time of writing the study, the initiatives pursued by the EU and its Member States with regard to battery raw materials and their processing are insufficient to significantly reduce the EU's dependence on imports of raw materials and intermediate products from third countries in the coming years.

Business models for fulfilling battery collection obligations

The study analyses various business models for the recycling of lithium-ion batteries in the EU. According to the 2023 EU Battery Regulation, traction battery distributors – including vehicle manufacturers – are legally obligated to take back used batteries and comply with recycling quotas for lithium, cobalt, and nickel. As part of this Extended Producer Responsibility (EPR), manufacturers can manage this recycling directly (e.g. in their own facilities) or delegate it to a Producer Responsibility Organisation (PRO).

Analysis suggests that when vehicle manufacturers are less familiar with a national market, the more they will rely on service providers. Economies of scale in battery recycling are enhanced by greater manufacturer participation and higher battery processing volumes. However, supranational battery recycling systems face challenges due to divergent regulatory conditions, making their implementation complex and unlikely in the near term. To support large-scale battery recycling, the EU should harmonise legal frameworks in this area.

"Europe needs an industrial strategy that combines the production and recycling of traction batteries," says Kerstin Meyer, project manager at Agora Verkehrswende. "Manufacturers who focus solely on production will not be able to survive in the competitive global economy. The market is dynamic and growing rapidly. Developing recycling capacity means investing now in a new high-tech European industry."

The full potential offered by the recycling raw materials can only be realised if material loops are closed. It is therefore important to prevent used traction batteries and the recyclable materials they contain from being sent to non-EU countries. At the same time, the EU must ensure that sufficient recycling and processing capacities are available so that companies can fulfil their legal obligations within the EU.

The full study is available in German for download free of charge here. The English version was published on 5 February 2026 and can be accessed for free here.

About Agora Verkehrswende

Agora Verkehrswende is a Berlin-based think tank that seeks to promote climate-friendly mobility. Non-partisan and non-profit, it works together with key stakeholders in the fields of politics, business, academia and civil society to decarbonise the transport system. To this end, the think-tank team develops evidence-based policy strategies and recommendations. Agora Verkehrswende was initiated in 2016 by Stiftung Mercator and the

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European Climate Foundation.

About the Stiftung GRS Batterien

The Stiftung GRS Batterien is a non-profit centre of competence for producer responsibility and the circular economy. On the back of intensive R&D, it develops and implements sustainable take-back and recycling solutions for the battery industry that are geared towards future customer needs.

About Oeko-Institut

Oeko-Institut has been a leading independent research institute and consultancy for over 40 years. With offices in Freiburg, Darmstadt, and Berlin, it develops principles and strategies for the realisation of sustainable development – globally, nationally, and locally.

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