



Relevance documents

Manufacturing industries

Why should we get started with this topic?

The demand for Li-ion batteries is growing rapidly, especially due to the electrification of mobility. The use of Li-ion batteries in consumer electronics and energy systems is also exploding. It is expected that 11 million tons of Li-ion batteries will reach the end of their life between now and 2030. How do we deal with this in a circular manner? [\(1\)](#)

Circularity reduces the negative impact of raw material extraction for batteries and offers business opportunities. There is a risk of raw material scarcity, dependence and various threats to the environment and human rights [\(1\)](#)

What is the interest of companies?

For manufacturers of products with batteries, it is of great importance to guarantee the availability of raw materials (covering risks in security of supply). It is important for chain partners in recycling to retain as much value as possible in the batteries to be recycled. [\(2\)](#)

Are there national any initiatives?

There is a Dutch national initiative to promote (safe) recyclability of batteries. The initiative is led by the Dutch Ministry for the environment and focuses mainly on missing or hindering legislation and regulations. [\(3\)](#)

Batteries and energy storage

Improving the value chain of batteries

In short

There is a rapid increase in the use of especially Li-ion batteries in consumer mobility, electronics and energy systems. These chains are still mostly linear, so that new raw materials become more difficult to obtain and, at the same time, there is a threat of a large mountain of waste. There is a social and private interest in closing the chains for accumulators and batteries more effectively. For the producers of battery systems and devices, there are opportunities to increase security of supply and reduce price volatility, while for the processing industry there are many opportunities in value creation through reuse and recycling. It is therefore a crucial time for circular business models.



CIRCO

Relevance documents

Manufacturing industries

Is there relevant legislation?

The sector plan for batteries and accumulators (sector plan 13) of LAP3 applies to waste processing and recycling. This describes the minimum requirements for safe and responsible processing of waste flows consisting of accumulators and batteries [\(4\)](#).

In addition to this, the Circular Risk Management for lithium-ion energy carriers applies. The circular sets additional requirements aimed at safe transport and storage of specific lithium-ion energy carriers. This is mainly related to fire safety [\(5\)](#).

Furthermore, a start has been made on European legislation relating to sustainability requirements. The proposal includes objectives for recycled content, collection and the provision of chain information in the form of passports. The aim of the proposal is to drastically reduce the climate footprint of batteries and increase the degree of circularity [\(6\)](#).

Is there a producer responsibility?

There is increasing producer responsibility, partly due to the announcement of new legislation.

Is there social demand or pressure?

The environmental impact of battery production is becoming more influential as batteries play an important role in the energy transition. The increasing awareness of our climate problem increases the demand for electrification and attention for environmentally friendly production.

Public procurement (circular procurement)

There are various ways in which accumulators and batteries can be part of a tender process. Think of the purchase of electrically powered vehicles or energy storage systems. By means of the Circular Procurement Guideline, the government is attempting to set more circular criteria in tender processes. [\(9\)](#)



Specific environmental impact of the sector

The production of batteries and accumulators is an energy-intensive process. The necessary raw materials have to be mined, which requires a lot of energy. Reprocessing the raw materials and producing the batteries also requires a lot of energy. More than 2/3 of the energy consumption is in the production process of energy storage systems. The remainder is mainly in raw material extraction and reprocessing. [\(7\)](#)

Looking at the environmental impact of the entire battery life cycle, most of the impact is in the use phase. This is mainly due to the energy requirement to charge the energy carriers. If we only look at production and waste processing, by far the most impact is in the extraction of raw materials and the production of the batteries. Recycling the batteries can avoid some of this impact, but great potential remains untapped. Substantial environmental benefits can be achieved with reuse and life extension [\(8\)](#).



Experience within CIRCO

Two CIRCO projects on this theme have already been completed. One trajectory focused on battery use in mobility (including batteries from electric passenger cars), while the other focused mainly on batteries for light e-mobility. There are also many other product groups for which batteries are relevant. Think of consumer electronics, cordless tools, ICT hardware and emergency power supplies [\(10\)](#).

Market opportunities and threats

The industry's biggest threat is its dependence on raw materials. The production of batteries and accumulators requires many raw materials, many of which are considered critical raw materials. Raw materials that are threatened with depletion, that are limited in availability for (geo)political or human rights reasons, or that are subject to strong price volatility. The growing mountain of waste from batteries, which coincides with the increasing demand, can also be seen as a threat. At the same time, these threats also offer opportunities for the sector. By keeping batteries and accumulators in operation for longer and by focusing on repair and overhaul, it is possible to reduce both the environmental impact and the dependence on raw materials. [\(1\)](#)



Business relevance

In the linear chain, the various chain partners have a different relevance for getting started with circularity. Battery manufacturers and the processing industry are faced with socio-political pressure to become more sustainable, but also with risks in security of supply and price volatility. At the back of the chain there is an enormous low-value mountain of waste. Recycling companies have a great interest in valuing these waste flows as much as possible, but then there must be buyers for reused battery packs or recycled raw materials [\(2\)](#).

Requested knowledge / knowledge gaps

There is a great need for knowledge in the field of battery design and production. There are many manufacturers in the Netherlands that purchase batteries as semi-finished products. For maximum influence in the chain, there is a strong need to reach the producers of the batteries themselves.

Sources / reads

- (1) Dutch Circular Manufacturing Programme (in Dutch) [Uitvoeringsprogramma Circulaire Maakindustrie](#)
- (2) Value chain and company interests (in Dutch) [de presentatie van BBC](#)
- (3) Strategic approach Dutch government (in Dutch) [Batterijen van de Rijksoverheid](#)
- (4) Legislation (in Dutch) [regels voor afvalverwerking van batterijen en accu's uit LAP3](#)
- (5) Safety requirements (in Dutch) [Circulaire risicobeheersing lithium-ion energiedragers](#)
- (6) Announced EU legislation '[New EU regulatory framework for batteries](#)'
- (7) Environmental impact of batteries and used resources used, by [Porzio et al, 2021](#)
- (8) Environmental impact of batteries in electric vehicles, by [Li et al, 2014](#)
- (9) Circular manufacturing by Dutch governments (in Dutch) [Leidraad Circulair Inkopen](#)
- (10) [CIRCO training batteries for mobility](#) (Jeannette Levels-Vermeer & Linda Louwisen)

Key stakeholders

SBI 2720, 3314, 3324, 3812, 3822, 45201, 45203, 2910, 2931, 2640, 2751, 2824

CIRCOconnect partners for this topic



More information?

CIRCO Expert team

Contacts for manufacturing industries:

Jeannette Levels-Vermeer
jeannette@circonl.nl

Gerwin Beukhof
gerwin@circonl.nl

CIRCO Trainers (NL)

Jeannette Levels-Vermeer
Linda Louwisen

File batteries and energy storage (NL):
[Energieopslag Batterijen - Google Drive](#)

Suggestions?

[Suggestions for relevance documents](#)



CIRCO

info@circonl.nl
www.circonl.nl