Circular economy — Understanding the big picture

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Alelion white paper | March 2023

Alelion

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There are different interpretations and components that can be encompassed within the concept of a circular economy. For Alelion, it's fairly simple – prioritizing the product's sustainability through technical, environmental, and financial lenses. In this white paper, we will clarify what Alelion means when we refer to circularity in our business practices.

Why – The definition of a circular economy

A circular economy is an economic model that aims to keep resources in use for as long as possible, extracting the maximum value from them before they are recycled. It is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural ecosystems.

Most of the materials required for sustainable transitions are finite. That's why circular models are necessary for the transition to become a reality. We see it as the antidote for the old buy-use-dispose model in the form of extended use, reuse, and recycling.

How – Circularity by Alelion

Given that we continuously work with these finite resources, we must have a clear focus on optimization to increase the utilization rate to the max. Optimization involves several perspectives, ranging from being able to calculate a TCO (total cost of ownership) to create a product that is technically capable of a long extended life, and perhaps more than just one life. This is created with modularized design, thoughtful material choices, efficient production based on green electricity, and a circular service offer (see fig. 1).

As a battery system producer, we are required to create a well-thought-out product where we, already in the design phase have a clear strategy on how the product is optimized for use, extended use, and finally for disassembly for recycling. But this is not enough; a line of services on top of this product is required to optimize the use and impact of the most difficult factor of all – behavior.

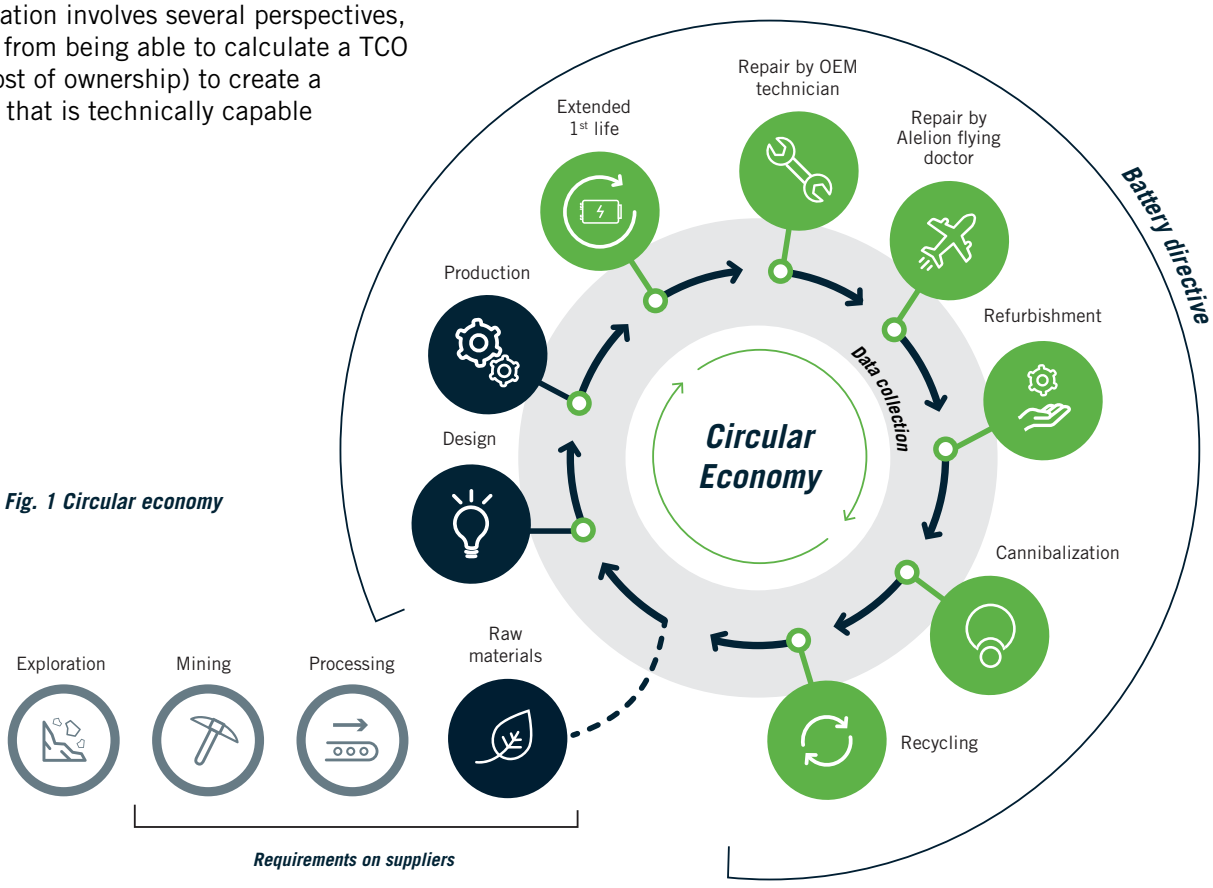
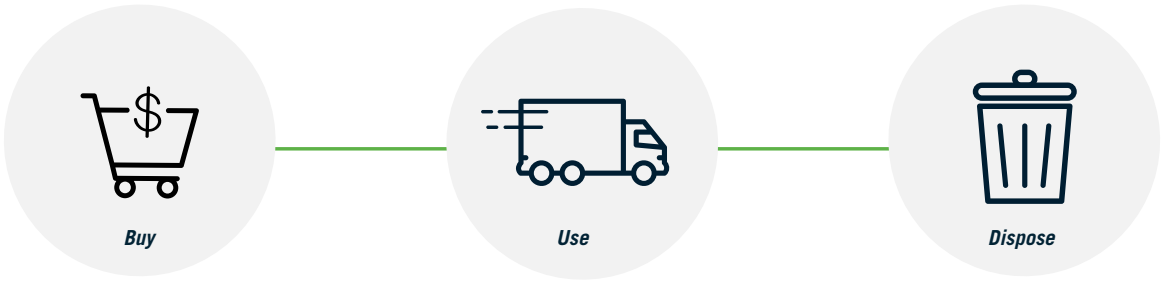


Fig. 1 Circular economy

Fig. 2 Linear economy



Analyzing and mapping battery system data for improved circularity

One of the most common questions we get from our customers, and even our customers' customers is, "What is the lifetime expectancy of my battery system?". The answer is based on how you drive, charge, and expose the battery to temperature variations. Analyzing and mapping collected battery system data in a structured way is essential to understanding lifetime expectancy.

Alelions' main mission is to create a product that has not only one use but also extended use, an opportunity for upgrading, and is finally designed to be efficiently recycled and thus close the loop. By doing this, we support business models and services that help regulate behavior and encourage increased lifespan in various ways.

What – The entire value chain is affected

Understanding that the entire value chain affects the battery's lifespan is the next key in our circular model. This requires control and knowledge of how everything from the transport of the batteries to intermediate storage, installation, and commissioning, to operation affects the lifespan. Operation is followed up by controlling data collection, analyzing behavior, and using subsequent services. The most circular valuable thing Alelion can do is to optimize the lifespan of the battery system in off-highway vehicles.

Today, Alelion is primarily focused on first life extension and the services that come with it (see fig. 2). Evaluations of activities to extend lifespan are done in collaboration with our *friendly users* in a smart way to show the value it will bring to them and their customers. A prerequisite is to set realistic criteria and requirements from both a financial and technical perspective and being able to establish a SOH (state of health) measure that is based on many years of experience and system knowledge that has an accuracy to rely on. It´s also important to demonstrate to customers the value of a refurbishment with a well-founded calculation.

Who – Different paths to becoming circular

In our way of seeing it, there are two paths to circularity, each with its own set of challenges:

1. ***The natural path – those that emerge from the transformation, such as battery manufacturers, cell manufacturers, and car manufacturers with a fully electric platform as their only platform. Along this path main challenges often relate to market, timing and access to capital.***

2. ***The transformative path – those who need to create a transition from fossil fuel-driven production, such as established car manufacturers, engine manufacturers, and others. The major challenges here are culture, mindset, and specific knowledge.***

Circularity entails various certifications, directives, and business models, and has a strong impact on the entire value chain of the product. Moving into this transition when a company has built its entire business and way of working on a linear model will be costly. However, delaying the necessary transition will cost even more. We believe that companies best equipped to make a circular transition are capital-strong companies with progressive insights into their own shortcomings and have the courage to take the leap and ask for assistance and guidance.

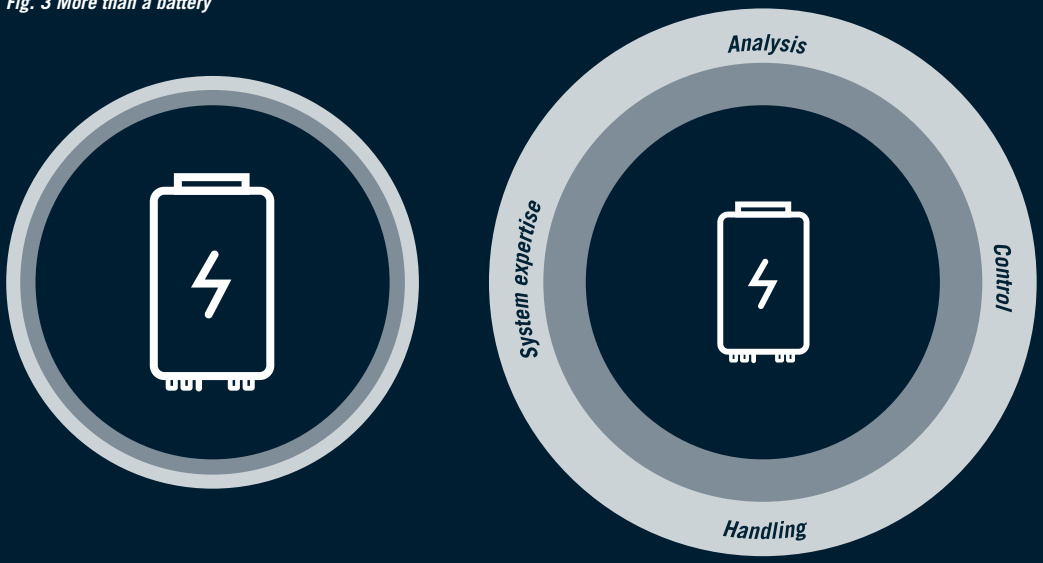
Knowledge and transparency are key issues in this context. Knowledge to see the entire value chain and what it means for the company and the product, and transparency enough to be able to ask for help when needed.

The transition to circularity within our line of business faces several challenges, including achieving financial viability, as well as social and corporate cultural barriers, where knowledge is an important foundation.

According to estimates from the World Economic Forum, global battery production needs to increase by a factor of 19 to accelerate the transition to a low-carbon economy. To enable the transition to clean energy, it is a strategic necessity for the EU to ensure the development and production of batteries. The aim is to achieve a 90% reduction in transport-related greenhouse gas emissions by 2050. To make sure that this becomes reality, off-highway must abandon its traditional linear perspective and dare to enter the circular one with partners who have the strategy, system experience, courage, and progressiveness to think innovatively.

The aim is to achieve a 90% reduction in transport-related greenhouse gas emissions by 2050.

Fig. 3 More than a battery



Alelion – Sharing knowledge and experiences

Alelion is an established developer, manufacturer, and supplier of advanced battery systems for off-highway vehicles in a number of different segments. With more than 15 years of experience, we now share our key learnings in a series of white papers.

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