SUCCESS STORY

SafeLIB
Safety Aspects of Lithium-Based Traction Batteries Including the Qualification for Second Life Applications

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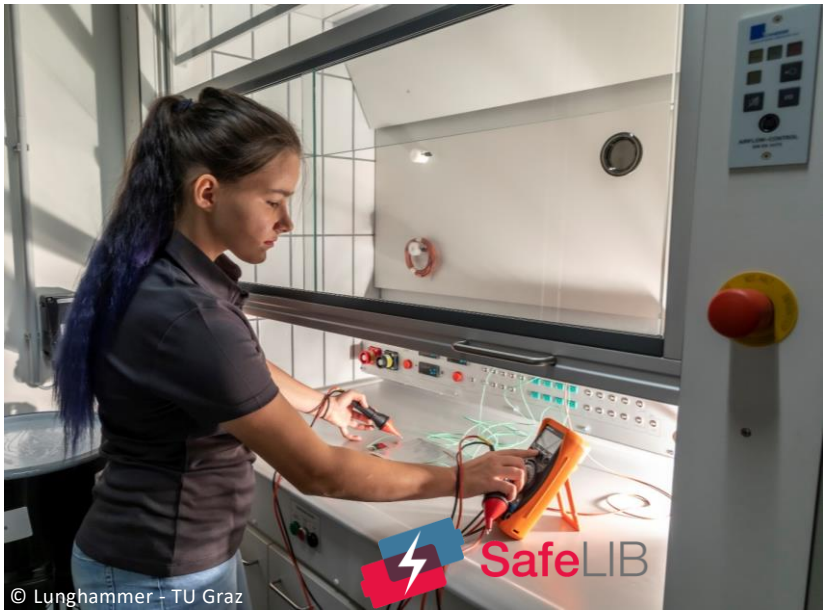

2ND-LIFE BATTERIES: A NEW LIFE FOR ELECTRIC VEHICLE BATTERIES

ELECTRIC VEHICLE BATTERIES CAN BE REPURPOSED FOR NEW APPLICATIONS. HOWEVER, MANY CHALLENGES HAVE TO BE ADDRESSED, ABOVE ALL SAFETY.

Lithium-ion batteries (LIB), commonly used in electric vehicles (EVs), degrade over time, reducing the potential drive range which is directly related to the useful battery capacity. Typically, EV batteries are supposed to be replaced when the remaining useful capacity reaches 80%. Batteries removed from EVs still retain a high value. Therefore, instead of disposing or recycling them, batteries can be reused in another, less demanding application, giving them a second life.

Repurposing batteries for new applications in a second life not only reduces the environmental impact of batteries but also increases their economic value and allows new markets and business models to emerge.

In order to enable a second life, it is essential to identify potential 2nd-life applications and evaluate them from a technical perspective as well as consider the business conditions, the legal framework and especially the safety aspects.

Where will one come across 2nd-life batteries in the future?

The identification of potential 2nd-life applications is the result of an extensive literature review combined with an interview conducted with experts and stakeholders from several companies and the main European electrification, battery and automotive clusters.

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A list of more than 60 potential mobile or stationary 2nd-life applications was generated, ranging from industrial vehicles to marine applications, energy storage systems (ESSs) and many other sectors, which proves the great potential and versatility of 2nd-life applications.

Which 2nd-life applications are the most promising?

The focus was turned to eight specific applications that were selected according to the great interest encountered in the scientific literature and by industry. The specific applications are both mobile (forklifts, pallet trucks, automated guided vehicles (AGVs), golf carts) and stationary (buffer ESSs at charging stations, commercial and industrial ESSs with peak shaving purposes and industrial ESSs with renewable firming purposes).

After an in-depth technical, economic, legal and safety analysis conducted in cooperation with external experts on the specific applications, the most promising ones were identified. The analysis resulted in AGVs as a mobile application and industrial ESSs with renewable firming purposes as a stationary application Both applications are appealing as they belong to fast-growing markets, especially when combined with LIB.

These most promising applications were subsequently subjected to a validation process by investigating whether other, more suitable energy storage systems than LIBs exist. The result was that the use of LIBs is not only suitable but generally the optimal solution.

What about safety?

The research has shown the great potential of the use of 2nd-life batteries in various industrial sectors. However, there are still many challenges to be addressed, especially in terms of safety, as it is crucial that high safety standards are guaranteed during the second life as they are in the first life. Therefore, it is essential to intensely investigate 2nd-life batteries and their implementation in the selected most promising applications.

Project coordination
Ass. Prof. Dipl.-Ing. Dr. techn. Christian Ellersdorfer
Emanuele Michelini (Story)
Vehicle Safety Institute

T +43 (0) 316 873 –30318
christian.ellersdorfer@tugraz.at

SafeLIB
Vehicle Safety Institute, VSI
Inffelgasse 23/I
8010 Graz
T +43 (0) 316 873 30301
office.vsi@tugraz.at
https://www.tugraz.at/en/projekte/safelib/home/

Project partner

- Audi, GER
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