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## New study calls for gear change in scaling sustainable EV battery recycling

**BERLIN, 27<sup>th</sup> November 2023** – A new study by Systemiq, titled 'Advancing Sustainable Battery Recycling: Towards a Circular Battery System,' sheds light on the environmental and social impacts of recycling of electric vehicle (EV) lithium-ion batteries and proposes ways forward to ensure a sustainable future for this rapidly growing global industry. Industry leaders BASF, GRS Batteries, Li-Cycle, Mercedes Benz, and Rock Tech Lithium provided financial support for the research, which drew expertise from an advisory council and external experts from TU Braunschweig, TU Clausthal, Fraunhofer IST, the Faraday Institution, Transport & Environment and WWF.

The study shows that the significance of EV battery recycling will grow as the global stock of EVs is forecast to expand to almost 350 million cars by 2030 [1]. Around 1.9m batteries annually are expected to reach their end of life by 2030, a number set to grow to 20m annually by 2040. [2] With the new EU Battery Regulation mandating a minimum level of recycled materials for EV and industrial batteries by 2031, the global EV battery recycling market is poised to grow from \$2.3 billion in 2022 to \$9.8 billion in 2028.[3]

Recycling not only ensures safe and responsible disposal but could also result in four times less greenhouse gas (GHG) emissions than the use of primary raw materials in batteries. This could save around one million tonnes/year of GHG emissions in the EU alone by 2030.[4]

However, battery recycling could also generate its own environmental and social risks and impacts. Traditional (pyrometallurgical) recycling methods are energy- and emissions intensive, while some studies have shown that alternative water-based (hydrometallurgical) methods can use around 20 litres of process water for every kilogram of LIB processed.[5]

**Tilmann Vahle, Director, Sustainable Mobility and Batteries at Systemiq, said:** "The global battery recycling industry is rapidly evolving, yet burdened with complexity. This study aims to improve understanding among non-specialists, urging collective action from industry, the public sector and civil society to manage environmental and social impacts and risks effectively to ensure that the industry has a strong and enduring license to operate and grow, for the benefit of the planet."

The study authors evaluate the most common sustainable battery recycling practices against key environmental and social impact indicators and propose **three priority action areas** to improve and ensure sustainability in battery recycling globally:

1. **Industry principles for sustainable battery recycling.** The study introduces ten industry principles along the battery recycling value chain, to be endorsed and implemented by companies operating in the business. This includes prioritising worker health and safety above all else; applying design and choice of battery recycling processes to minimise environmental impacts and maximise resource recovery and quality; rigorous supplier management; and optimising recycling operations for sustainability. Tilmann Vahle of Systemiq notes, "Recycling companies that adopt and endorse these principles with partners will lead the way in developing this emerging industry as one that is a driver of true sustainable economies."
2. **Global guidance for policy makers.** Recognising the varying legislative landscapes globally, the study provides universal recommendations for policymakers to enable sustainable battery recycling. While the EU and China have established legislative regiments and public action, the

study encourages other countries to follow suit, enabling investments, innovation, information access, and setting recycling targets.

3. **Pre-competitive multi-stakeholder programme.** The study calls for the establishment of a pre-competitive process that joins the industry with relevant stakeholders from civil society, academia and beyond, to address remaining knowledge gaps, ensuring industry alignment through clear standards, regulations, research and development (R&D), and guidelines.

**Aman Chitkara, Director, Government Relations at Li-Cycle, said:** "Recognition and broad adoption of sustainability practices and principles for battery recycling provide an important guide in the early stages of this industry. At Li-Cycle, we are committed to powering the energy transition with battery materials that are recycled in a safe and sustainable manner."

The study further highlights the critical role of broader circular economy practices in supporting a sustainable and circular battery system.

**Tobias Kind-Rieper, global lead of metals and mining at WWF, said:** "It is clear that battery recycling supports EV sustainability. However, battery recycling too carries inherent risks and impacts regarding sustainability issues that need addressing while taking into account the full lifecycle from battery design to re-use of recovered materials. That's why further action is needed to make it even better - and to ensure that now that the industry is scaling globally, it is truly set up for sustainability."

**Gavin Harper, Faraday Institution Research Fellow at Birmingham University, said:** "This study provides valuable insights into the complex dynamics of the evolving battery recycling industry. As we navigate the challenges and opportunities in battery recycling, this study contributes essential knowledge which Systemiq have co-created with industry and academia that can guide future research and innovation, ensuring the academic community's active engagement in shaping a sustainable and circular global battery system."

'*Advancing sustainable battery recycling: towards a circular battery system*' is available at <https://www.systemiq.earth/sustainable-battery-recycling>.

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#### **NOTES TO EDITORS**

##### **About Systemiq**

Systemiq, the system-change company, was founded in 2016 to drive the achievement of the Sustainable Development Goals and the Paris Agreement, by transforming markets and business models in five key systems: nature and food, materials and circularity, energy, urban areas, and sustainable finance. A certified B Corp, Systemiq combines strategic advisory with high-impact, on-the-ground work, and partners with business, finance, policy makers and civil society to deliver system change. Systemiq has offices in Brazil, France, Germany, Indonesia, the Netherlands, and the UK. Find out more at [www.systemiq.earth](http://www.systemiq.earth).

#### **References**

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