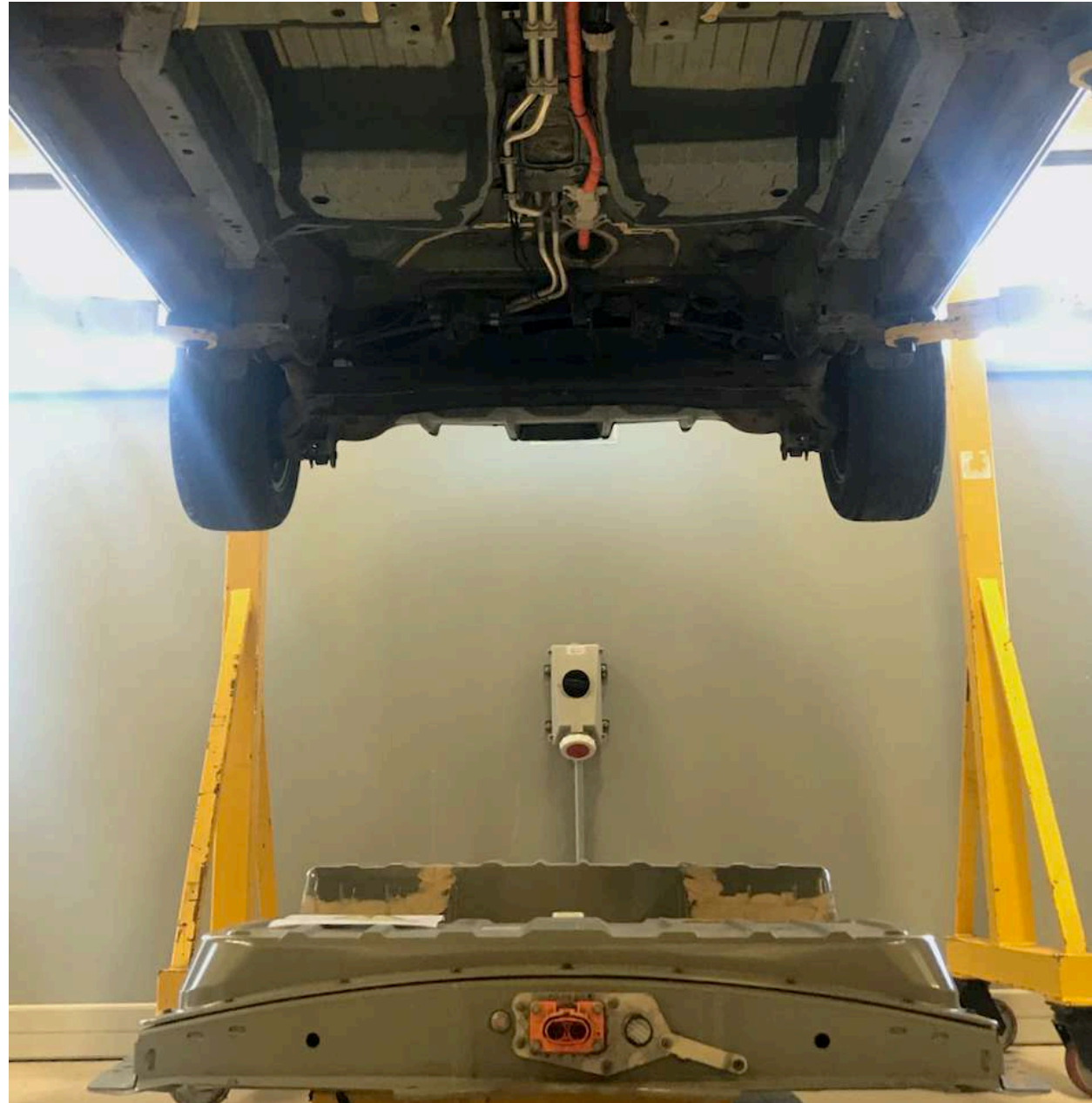


The European end-of-life market for lithium-ion batteries

Overview
BATMAN workshop
Oslo 1 September 2021

Hans Eric Melin
Circular Energy Storage



About Circular Energy Storage

- Leading provider of lifecycle data for the lithium-ion battery market
- Subscription of data and analysis and bespoke consulting services such as custom reports, strategy and business development and due diligence
- Over 200 customers throughout the entire battery value chain in North America (42%), Europe (37%) and APAC (18%)

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 **greentechmedia:** **Chicago Tribune**

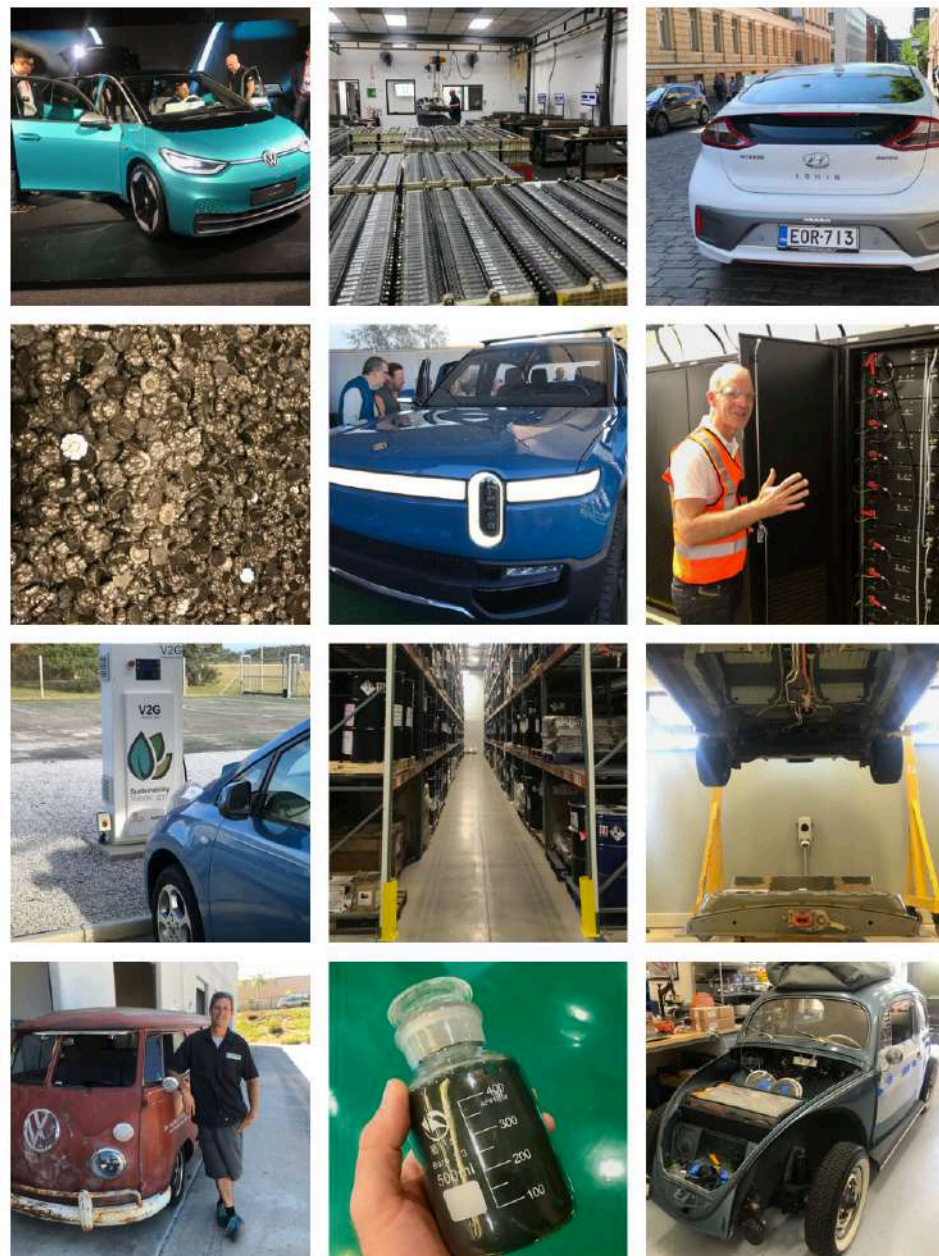
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Global implications of the EU battery regulation

[HANS ERIC MELIN](#), [MOHAMMAD ALI RAJAEIFAR](#), [ANTHONY Y. KU](#), [ALISSA KENDALL](#), [GAVIN HARPER](#), AND [OLIVER HEIDRICH](#) [Authors Info & Affiliations](#)

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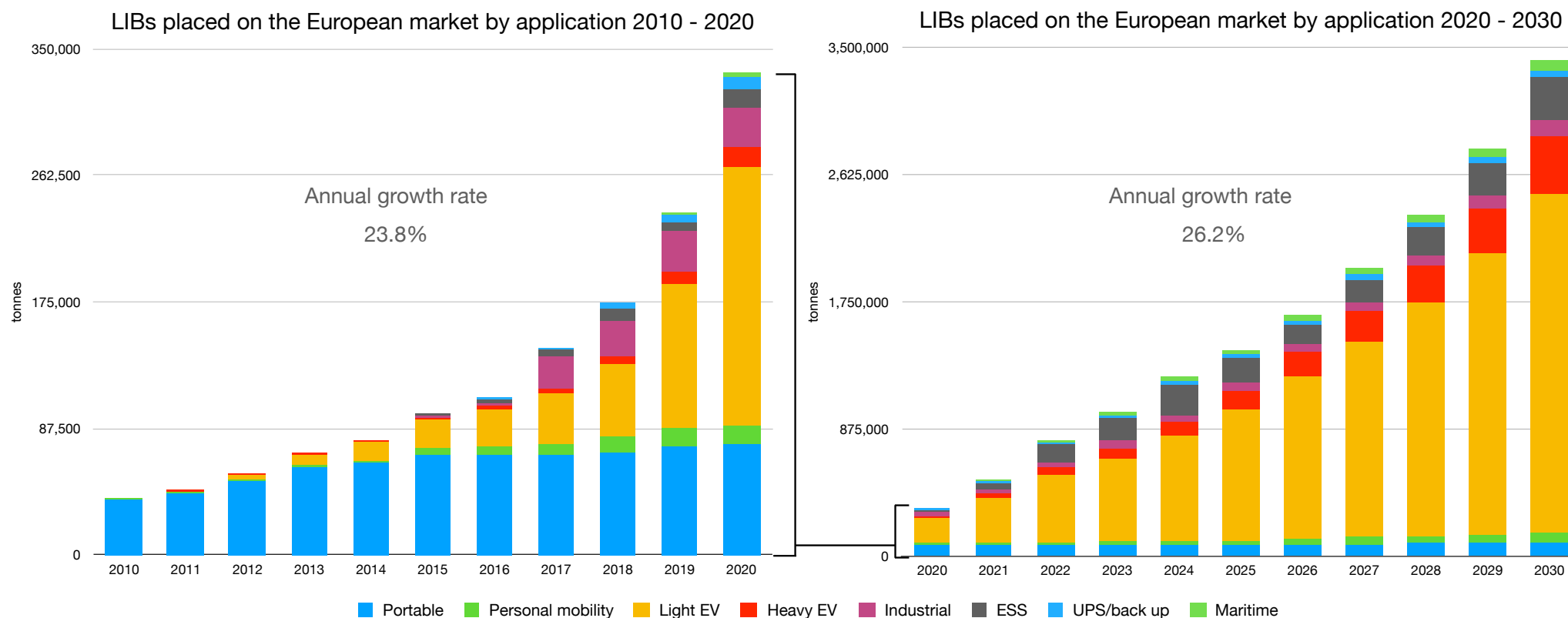
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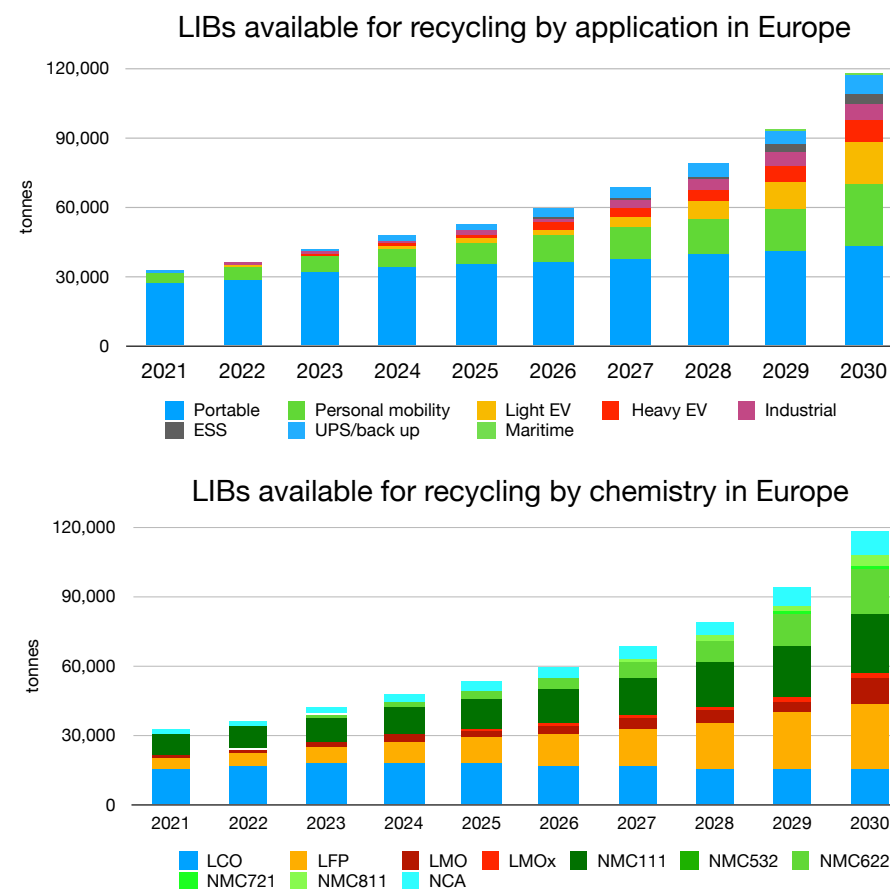
Analysis | [Published: 07 September 2020](#)

Circular economy strategies for electric vehicle batteries reduce reliance on raw materials

[Joris Baars](#), [Teresa Domenech](#), [Raimund Bleischwitz](#), [Hans Eric Melin](#) & [Oliver Heidrich](#) ✉

Electric vehicles have become the largest LIB application and will completely dominate the market the next 10 years

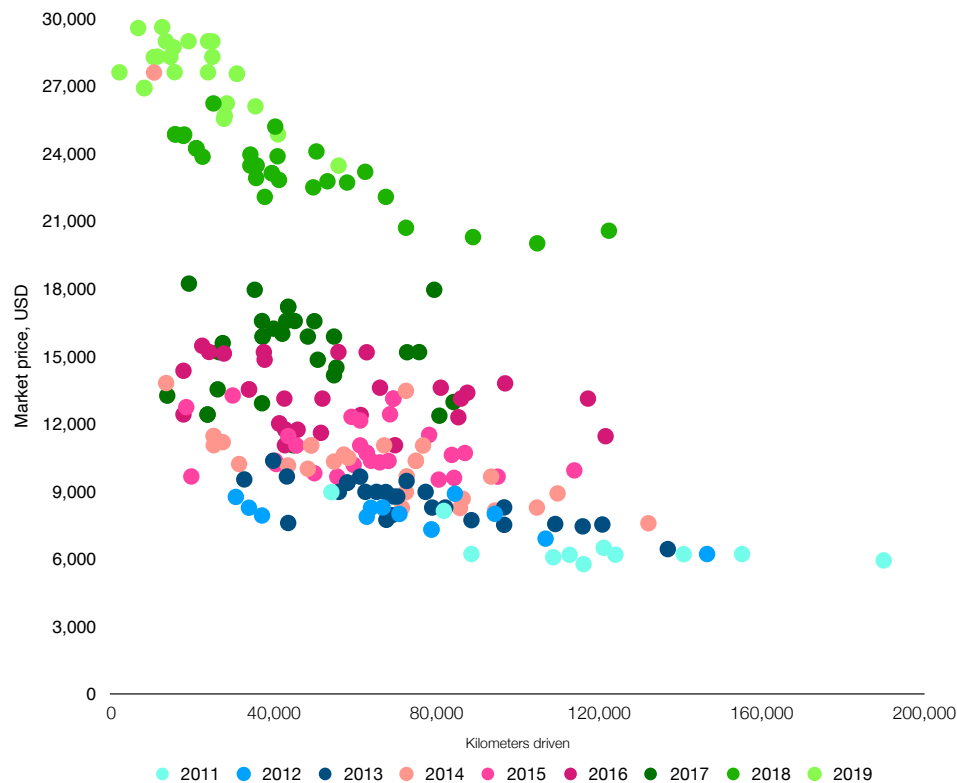




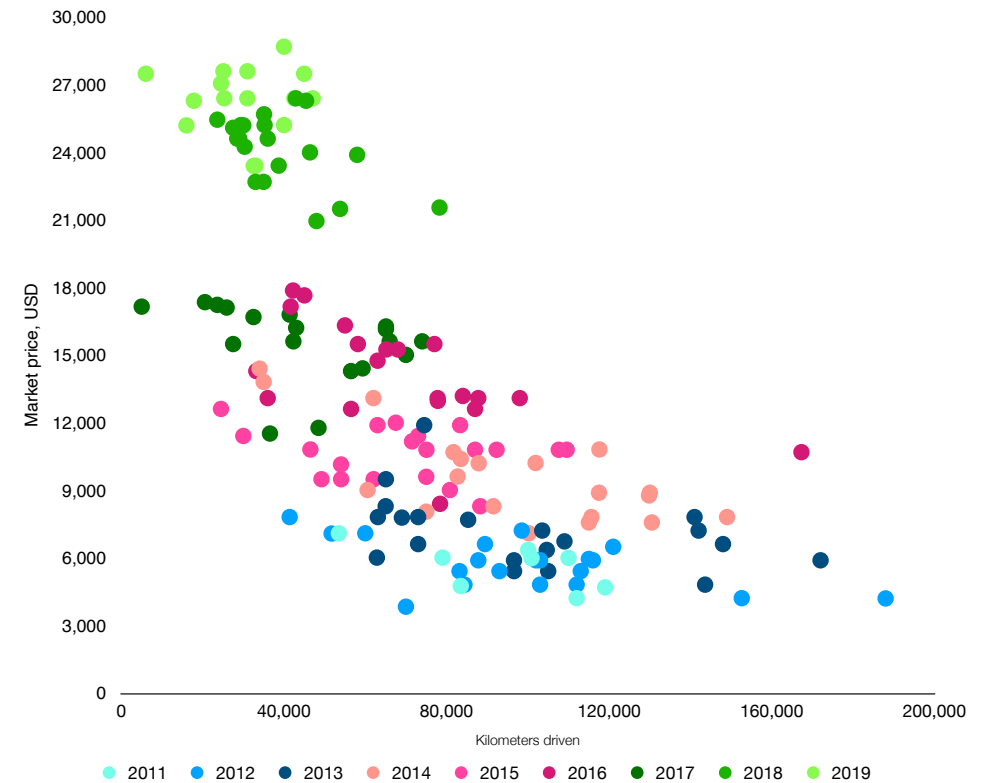


Values for EVs have depreciated faster than for ICE vehicles but are still far from the scrap values

Prices Nissan Leaf in United Kingdom, USD, Augst 2021

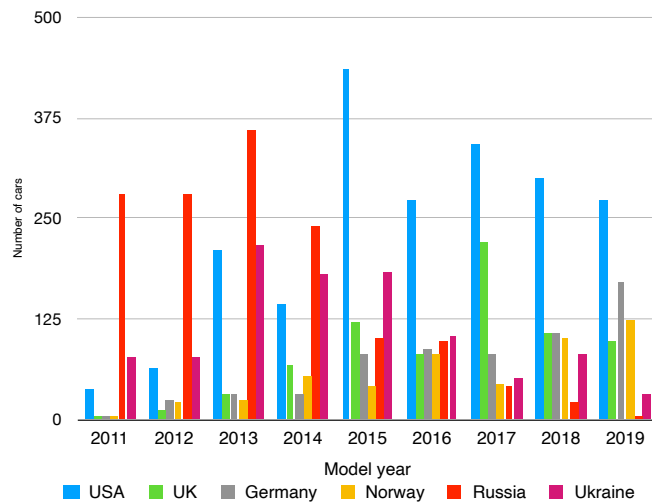


Prices Nissan Leaf in Norway, USD, Augst 2021

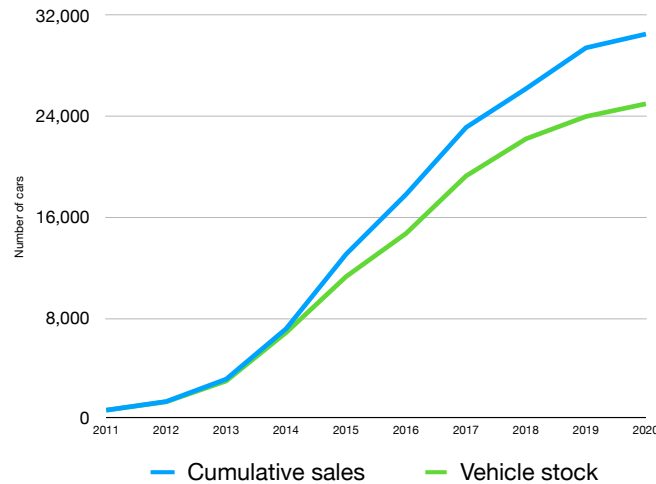


Applications and their batteries are exported

Available used Nissan Leaf on leading car websites in selected countries (Aug 2020)



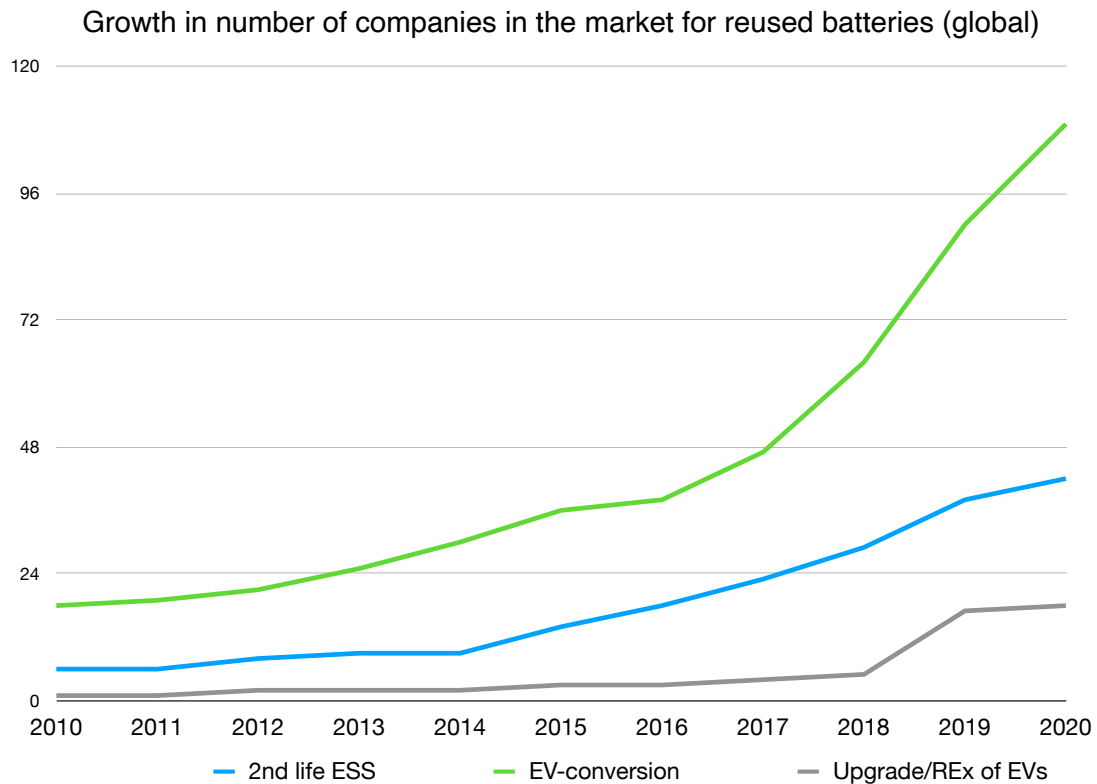
Nissan Leaf Sales vs Stock, UK



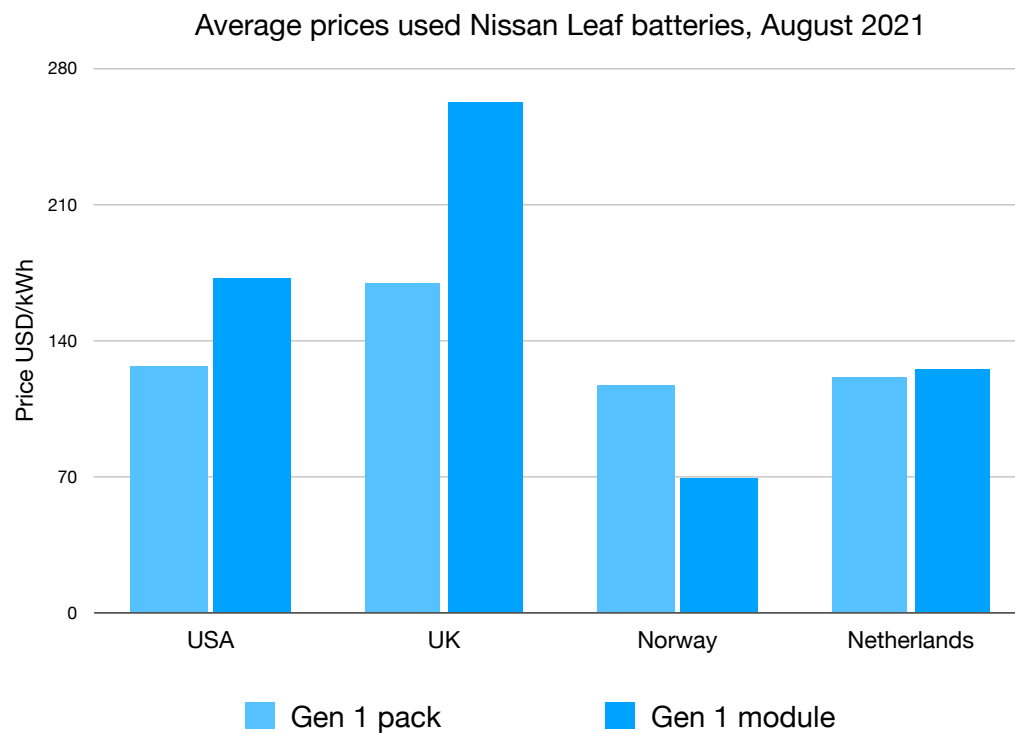
Largest importers of used EVs (Dec 2020)

	Total stock	Sales new EV in 2019	% Import used vehicles of stock
Ukraine	30,000	300	92%
Jordan	20,000	200	90%
New Zealand	19,000	980	73%
Russia	12,000	400	90%
Sri Lanka	8,000	50	90%
Georgia	5,000	50	90%
Costa Rica	1,500	100	60%
Colombia	1,500	200	30%
Dominican Republic	1,500	20	80%
Chile	1,400	50	30%

If batteries can be reused, most of the them will be – but not always in the expected applications



Values for used EV batteries are continuously high for packs and modules from high volume vehicles



Alternative sources of materials will be the main feedstock for recyclers the next 10 years

Production scrap



Batteries from test vehicles and R&D



Unsold batteries

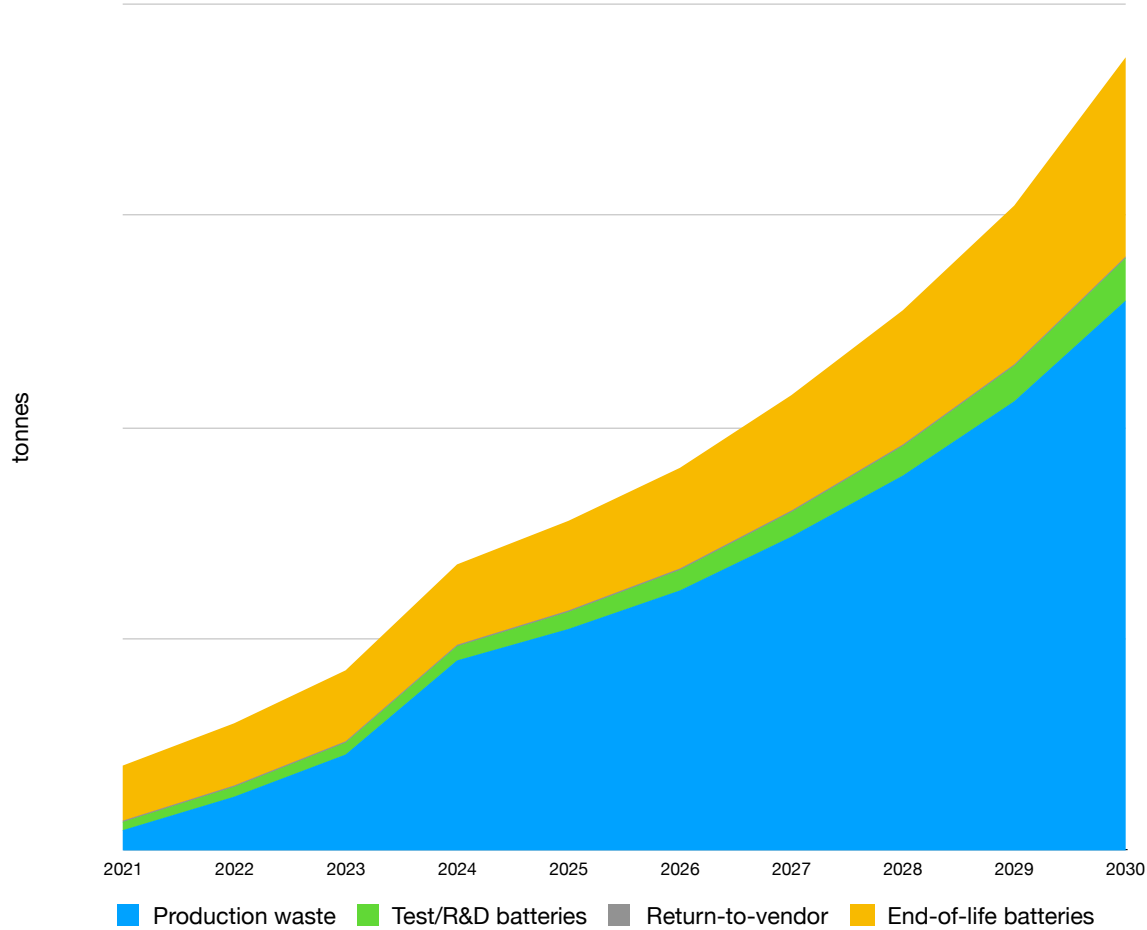


Recalls

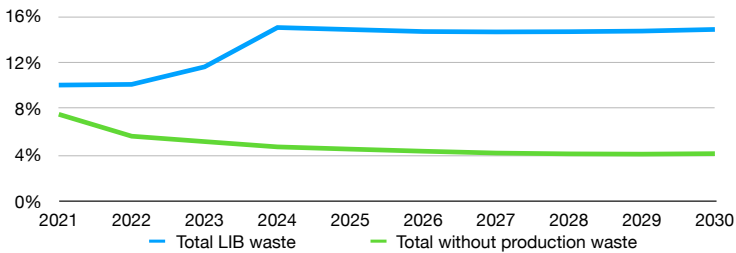


Lithium-ion batteries placed on the global market

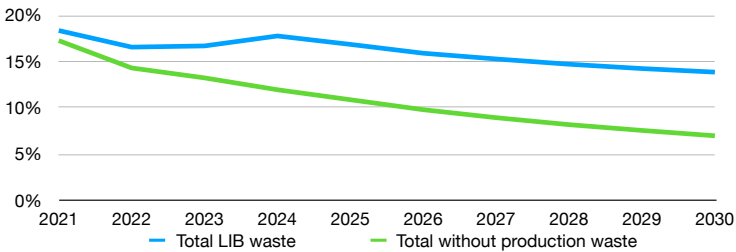
Total volume of LIBs available for recycling in Europe



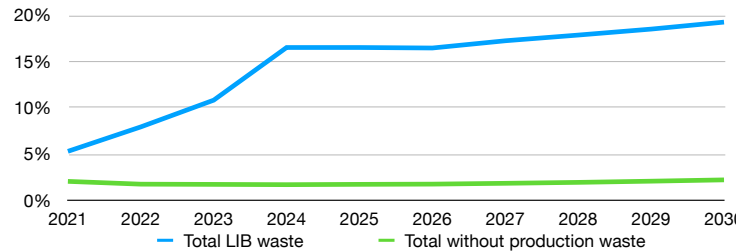
Lithium av. for recycling (100% recovery rate)/Lithium POM



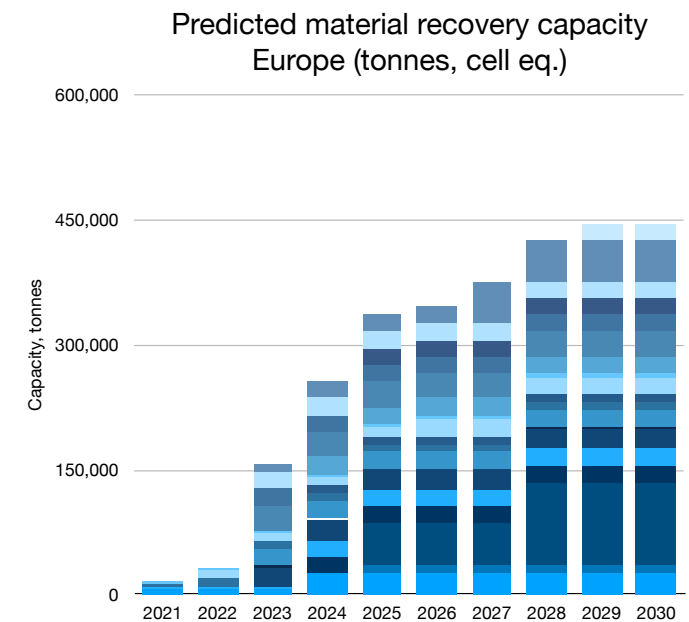
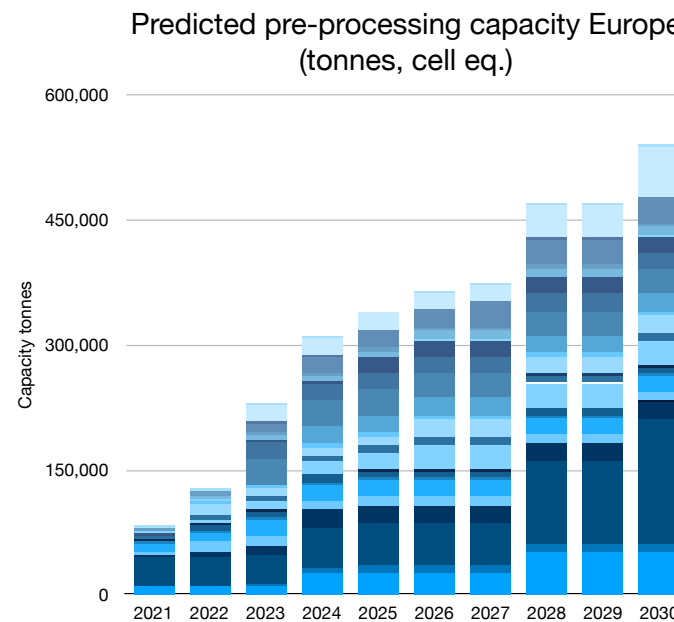
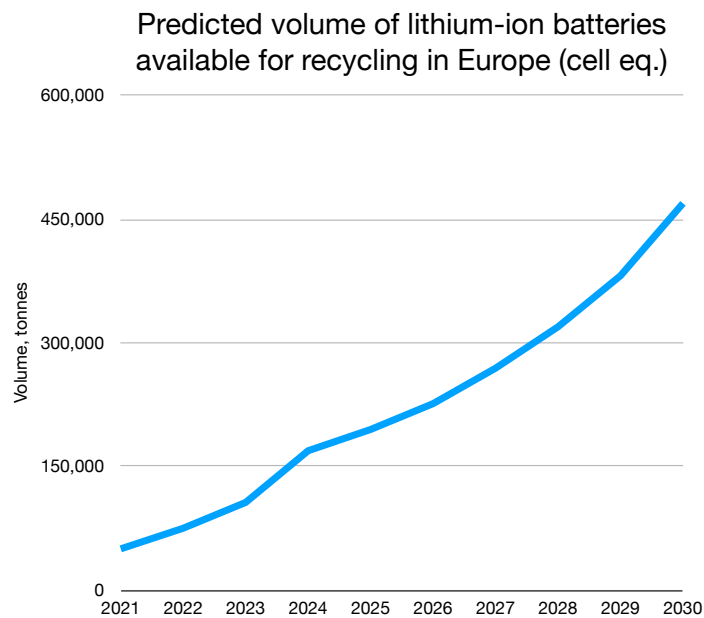
Cobalt av. for recycling (100% recovery rate)/Cobalt POM



Nickel av. for recycling (100% recovery rate)/Nickel POM

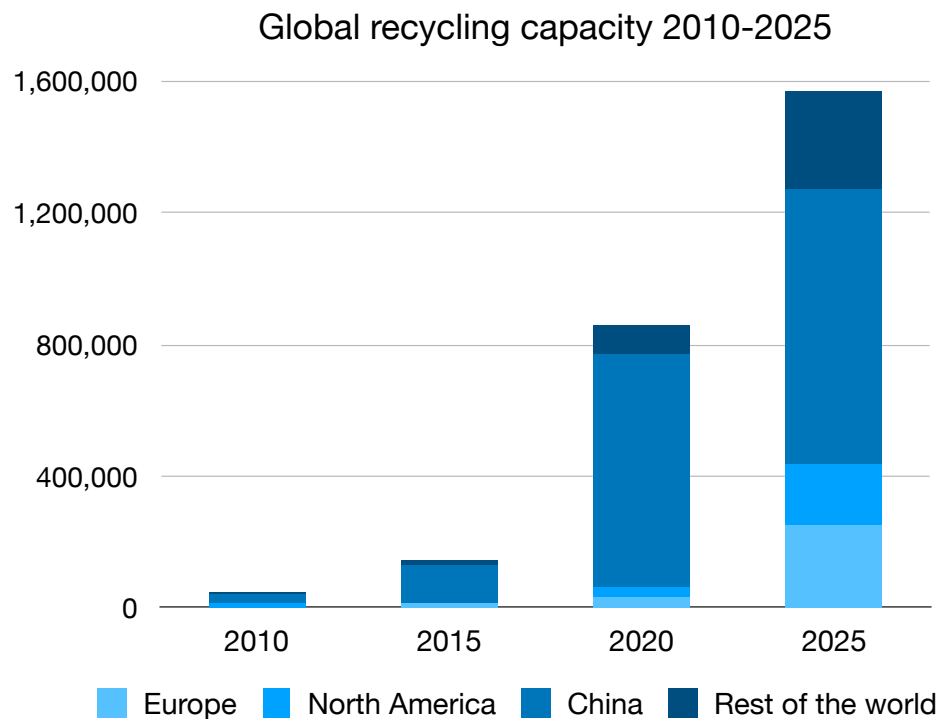


Significant capacity for both pre-processing and material recovery – over or on par with expected recycling volume



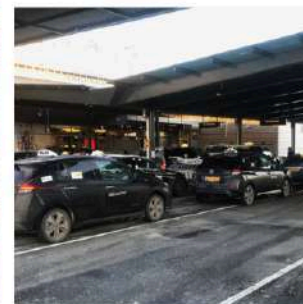
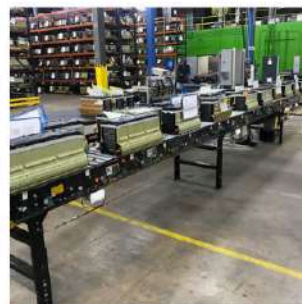
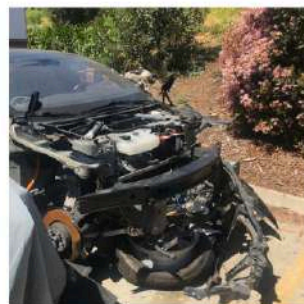
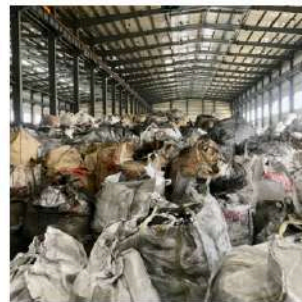
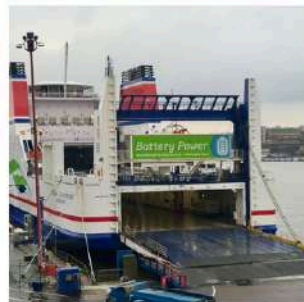
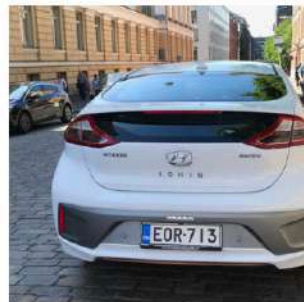
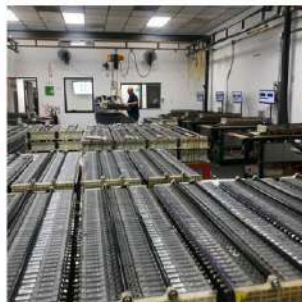
Issues to consider for future supply and demand for recycled materials

Will materials be recycled in Europe?



Will cars be made in Europe?





Thank you!

hanseric@circularenergystorage.com

