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Energy storage lithium titanate power supply

Overview

What is a hybrid energy storage system (Hess)?

This research is the first to present a three-tier circularity assessment of a “Hybrid Energy Storage System” (HESS), which integrates 1 st and 2 nd life batteries and BEVs. Four different battery technologies were assessed, namely Lithium Titanate, Lead-acid, Lithium Iron Phosphate and Sodium-ion.

What is three tier circularity of a hybrid energy storage system?

Three-tier circularity of a hybrid energy storage system (HESS) assessed. High 2nd life battery content reduces environmental and economic impacts. Eco-efficiency index results promote a high 2nd life battery content. Lithium titanate (LTO) HESS has the lowest environmental and economic impacts. LTO HESS balances eco-efficiency index.

What is the cycle life of a lithium ion battery?

The cycle life of the LTO battery is assumed to be 18,000 cycles [19]; the cycle life of the LFP battery is assumed to be 2500 cycles [49]; the cycle life of the Na-ion battery is assumed to be 2000 cycles [50] and that of the Lead-acid battery is assumed to be 1500 cycles [19].

Does lithium iron phosphate contribute to the MEP impact?

Despite this, it has been shown that lithium iron phosphate utilised in LTOs provides a low contribution to the impact of other lithium based battery technologies [40]. The production of nano-scale titanium dioxide for LTO technology contributes to high nitrate concentrations in aquatic systems, which contributes to the MEP impact [88].

Does lithium iron phosphate affect the environmental impact of lithium based batteries?

Due to the current low technology readiness level of LTOs, sparse data is available with respect to their environmental impacts. Despite this, it has been

shown that lithium iron phosphate utilised in LTOs provides a low contribution to the impact of other lithium based battery technologies [40].

Are repurposed LTO batteries good for the environment?

Although, as shown in Table 1, the price of a repurposed LTO battery is the highest of the four technologies, the high cycle life of the LTO battery technology results in fewer battery replacements over the 15-year period that was assessed, therefore leading to a lower environmental impact overall.

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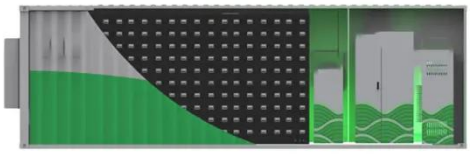

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