

BATTERY VEHICLES

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The automotive industry is a significant contributor to global energy consumption and greenhouse gas (GHG) emissions and so the recent rapid growth of battery electric vehicles (BEVs) necessitates research into the life-cycle impacts of vehicle electrification. While studies focusing on the use phase of the life cycle have reported that BEVs help to reduce GHG emissions, the production phase of the life cycle in some regions of the world has been suggested to have a negative environmental impact. However, little is known about the environmental impact of BEV production in China, which is now the largest BEV manufacturer and market. Han Hao and colleagues at Tsinghua University, China, have now analysed the energy consumption and GHG emission from BEV production in China, showing that in the production phase BEVs do not offer environmental benefits compared to internal combustion engine vehicles (ICEVs).

The researchers consider the whole vehicle production process in their analysis, including production and transformation of the essential materials, assembling of vehicle components, and transportation of those materials and components. Both the energy consumption and the GHG emissions from BEV production are found to be approximately 50% higher than those of ICEV production. The researchers also show that the manufacturing of the Li-ion battery accounts for 13% of the total energy consumption and 20% of the total GHG emissions. Greater weight and the different weight distribution of the materials in BEVs compared to ICEVs also contribute significantly to their greater environmental impact. Therefore, to reduce the negative environmental impact, it is recommended to improve the existing vehicle manufacturing and recycling techniques, as well as to optimize the energy structure for electricity generation in China.

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