

Consortium

i-HeCoBatt is carried out by a highly focused consortium covering the whole relevant value chain of the EV batteries industry: A top automobile manufacturer (AUDI), a leading automotive components manufacturer (MIBA), an automotive data management software developer (DATIK), and an eco-design expert (LOMARTOV), supported by first order two European research centres (CEA, CIDETEC).



Abstract

i-HeCoBatt stands for Intelligent Heating and Cooling solution for enhanced range EV Battery packs.

i-HeCoBatt project industrialization enhances the heating and cooling system's efficiency through its design and development cost reduction.

To achieve so, i-HeCoBatt integrates an innovative heat exchanger that removes the currently used gap filler between the heat exchanger and the battery.

This design reduces weight and enhances the efficiency of the heating and cooling system. The generated temperature data feeds in the battery management control unit and an external early diagnostic and safety system are connected to the cloud. Different interfaces are created to access these data according to user profiles: designers, testers, maintenance teams or drivers.

The i-HeCoBatt technology targets EVs with a time to market of about five years.



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Thermal strategy to reduce impact on vehicle range

Enhancing thermal strategy imply to first measure and analyse the full thermal behaviour for the vehicle battery pack and then to build up a complete numerical model. This has been realized for i-HeCoBatt project using the CEA's facilities in Nantes (France) and CEA's expert team in Grenoble (France).

The first part has consisted in acquiring internal and external temperatures for different test profiles and external conditions. Several electrical profiles were imposed on the battery to fully define its thermal response, starting from the internal component, up to the entire system.

With the testing and modelling activity results, CIDETEC has developed a thermal management strategy to efficiently operate the heating and cooling system and reduce the impact of extreme conditions on the battery.

Miba FLEXcooler®: The innovative thermal management solution for batteries

i-HeCoBatt answers to the "Integrated, brand-independent architectures, components and systems for next generation electrified vehicles optimised for the infrastructure request" of the LC-GV-01-2018 topic.

The aim of i-HeCoBatt is to achieve a smart, cost bursting industrial battery heat exchanger to minimize the impact on full electric vehicle range in extreme conditions.

Smart, because new sensing functionalities are implemented in the thermal system in order to monitor the behavior of the whole battery pack thermal system.

Cost bursting, because expensive components of current state-of-the-art products are replaced by cost efficient components as well as the number of parts minimized.

Industrial, because it has been tested in a relevant simulated industrial environment, and produced through high-throughput manufacturing routes, following AUDI standards.

Printed Integrated Functionalities

Printed electronics stands for a revolutionary new type of electronics, which is thin, light, flexible, robust and inexpensive, and therefore suitable for mass production. Printed electronics allow to integrate temperature, leak, impact sensors, as well as heater coils, control and readout electronic into products and components. All these sensors are implemented in the heat exchanger and connected to a cloud data system developed by DATIK, with a suitable interface for each end user, to ensure optimal diagnostics and safety of the critical components in the vehicle.

Eco-design and Life Cycle Thinking

From the selection of raw materials up to the end-of-life stages, the whole life cycle of the new heat exchanger is Eco-designed, and Life Cycle Assessment methodology has been applied by LOMARTOV to optimise its environmental and economic performance.