



PROJECT VEHICLE

Advanced lithium-ion battery/supercapacitor hybrid energy storage system (HESS) with synchronous reluctance machine for electric vehicle applications





LEADING INSTITUTIONS IN ENGINEERING

working together for more powerful and longer-lasting batteries in electric mobility.

Hochschule Karlsruhe

- Development of an energy management system using realistic driving cycles

Hochschule Trier

- Development of diagnostic in situ tools for capacity, battery health and aging of lithium-ion batteries
- Development, validation and refinement of the holistic battery model for lithium ion batteries

INSA Strasbourg

- Combined optimization of HESS: Sizing and energy management based on artificial intelligence
- Advanced control of a synchronous reluctance machine in electric vehicle applications

KEY INFORMATION

- Total budget: 997 000 €
- Implementation period: 01 October 2019 – 30 September 2022

A CHALLENGE FOR THE AUTOMOTIVE INDUSTRY

The energy storage system used in electric or plug-in hybrid vehicles remains the weakest link in the powertrain system: It is very expensive, limited in range and slow to recharge. Efforts in optimising energy storage technologies have resulted in trade-off between sizing, battery lifetime and total cost of ownership (TCO). An innovative approach is the hybridization of energy storage technologies.

VEHICLE

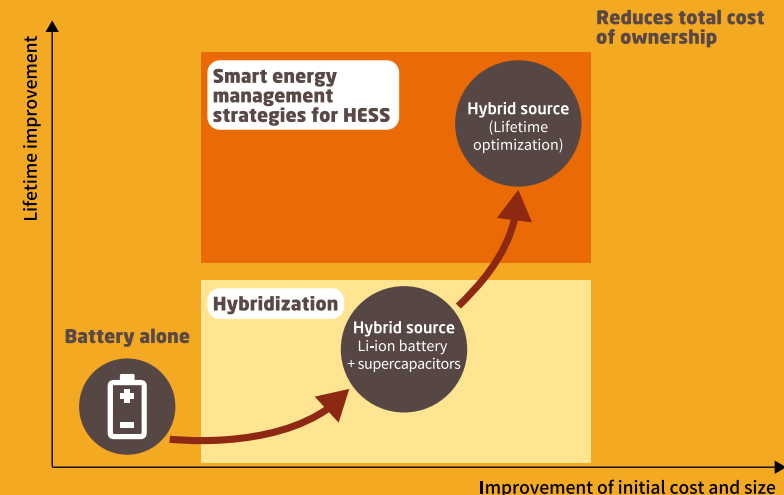
develops tailored solutions for energy storage systems in electric vehicles:

- Hybridization of lithium-ion batteries and supercapacitors will optimize energy storage in terms of specific power and energy density.
- Intelligent energy management strategies based on artificial intelligence and real life testing will improve the lifetime of batteries.
- The use of an advanced synchronous reluctance machine without permanent magnets and high power density reduces the total cost of ownership.

THE COMMON OBJECTIVE IS TO OPTIMIZE THE TOTAL COST OF OWNERSHIP OF ELECTRIC VEHICLES

- A wider distribution of clean technologies will reduce greenhouse emissions.
- The combination of a synchronous reluctance machine and HESS reduces the use of rare earth minerals

Hybrid energy storage system (HESS)



CONTACT

- Tedjani Mesbahi, scientific coordinator
tedjani.mesbahi@insa-strasbourg.fr
 - Gregor Hoogers, scientific contact in Germany
g.hoogers@umwelt-campus.de
 - Tim Harder, project manager
tim.harder@insa-strasbourg.fr
- www.vehicle-project.org



European and regional funding



Dépasser les frontières :
projet après projet
Der Oberrhein wächst zusammen,
mit jedem Projekt



Fonds européen de développement
régional (FEDER)
Europäischer Fonds für regionale
Entwicklung (EFRE)



Co-financing partners



Associated laboratories



Associated industrial partners

