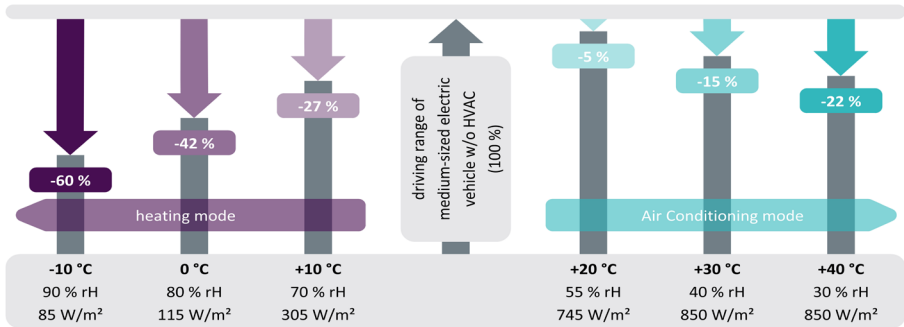


THE QUIET PROJECT

Qualifying and **I**mplementing a
user-centric designed and
Efficient **T** electric vehicle

MOTIVATION

- Limited driving range of e-vehicles compared to conventional fuel vehicles
- High energy consumption of auxiliary components and modules
 - **Heating** and **Air Conditioning** systems
 - 60 % reduction of driving range in cold weather conditions
- Reduction of global CO₂ emissions
- Increase of passenger comfort



OBJECTIVES

QUIET aims at developing an improved and energy efficient electric vehicle with a driving range increased by 25 % under real-world driving conditions. This is achieved by exploiting the synergies of a technology portfolio in the AREAS of:

- User-centric design with enhanced passenger comfort and safety (**AREA I**)
- Lightweight materials with enhanced thermal insulation properties (**AREA II**)
- Optimised vehicle energy management (**AREA III**)

AREA I

expected **energy** reduction through thermal and energy management
10 %



vehicle validation platform

(B-segment HONDA Fit EV)



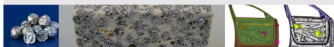
AREA III

expected **energy** reduction through optimized cabin heating
10 %



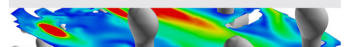
AREA II

expected **weight** reduction of lightweight vehicle components
20 %



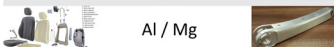
AREA III

expected **energy** reduction through novel AC with PCM storage
15 %



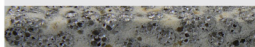
AREA II

expected **weight** reduction of lightweight seats
10 %



AREA II

expected **energy** reduction through thermal insulation
20 %



AREA II

expected **weight** reduction of lightweight windows
30 %

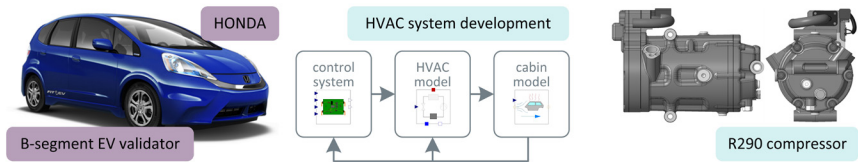


Al / Mg

RESULTS

The developed technologies are integrated and qualified in a Honda B-segment electric vehicle (EV) validator. QUIET provides a series of breakthrough technologies that enable lowering the energy consumption for heating and cooling while reducing the weight of the entire electric vehicle validation platform, resulting in an electric **driving range increased by 25 %**.

- Implementation of an **innovative air conditioning system based on the refrigerant R290** (propane), that has a significantly lower global warming potential compared to the standard refrigerant R134a.



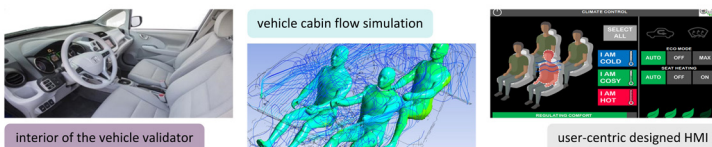
- The heating of the vehicle is done by the air conditioning system working in heat pump operation mode combined with a Phase Change Material (PCM) thermal storage system.



- **Infrared heating panels** in the near field of the passengers enhance thermal comfort and reduce heat-up times by 15 %, and therefore the energy consumption.
- The **internal structures of the seats** are redesigned and manufactured from lightweight materials like aluminium or magnesium.
- Vehicle doors are manufactured by using a combination of glass- or carbon-fibre composite materials with a novel aluminium-hybrid foam. **The weight of the doors is reduced by 20 %** while optimizing the noise and vibration properties.



- Development of a **Human Machine Interfaces (HMI)** which is specialised on EVs and which allows the user to interact with the **user-centric designed thermal and energy management**.



GENERAL INFORMATION

- Topic: Electric vehicle user-centric design for optimised energy efficiency
- Topic identifier: GV-05-2017
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- Project total cost and total EU contribution: 6,998,955.00 EUR



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