Eco-design and Validation of In-Wheel Concept for Electric Vehicles

Fact Sheet

Project information

EUNICE

Grant agreement ID: 285688
Status
Closed project

Start date
1 September 2012
End date
31 August 2015

Funded under:
FP7-NMP

Overall budget:
€ 4 845 811

EU contribution
€ 2 907 097

Coordinated by:
FUNDACION TECNALIA RESEARCH & INNOVATION
Spain

Objective

Promotion of Electric Vehicles is strategic for the European Community, but nowadays battery performance is still poor and all forecasts for near future transport electrification suggest that A-B class EV cars with limited range are the first step to develop. Even in the actual economic crisis, global demand of A-B class cars is expected to grow by about 5.3% in 2010, with a positive sale scenario in the next years. In-wheel electric motor architecture holds major advantages for these A-B class, allowing high modularisation of the vehicle architecture, increased interior space and improved driveability. However, current existing solutions for in-wheel motor are still in prototype phases, resulting in non-existence of A-B class EV car commercialized and equipped with in-wheel motor, even though the predicted market for this technology is 100K vehicles for 2015.

The main objective of this proposal is the design, development and validation of a complete in wheel motor assembly prototype (electric motor, power electronics, reduction gear, structural parts and wheel), based on a McPherson corner suspension topology, to meet the defined car top level specifications. The main technical risks associated with the use of an in-wheel concept are the thermal stress under extreme operation conditions, vehicle dynamics, driveability, safety and durability. The proposed baseline concept
will be based on an air cooled motor in wheel concept, with conventional airflow driven by vehicle, and forced airflow provided by an innovative wheel design. Detailed specifications of extreme operation conditions will be defined and validated by the OEM, during the project, including the hot day-cold day conditions, representative of vehicle extreme use. During the assembly and testing phase, the aspects related to vehicle dynamics, driveability, safety, user acceptance, reliability, previously defined, will be validated with the motor in wheel prototypes installed in a test vehicle. In addition, aspects as eco-design, LCA of the concept and components, dismantling and recyclability of key materials and rare earths will be considered during the in-wheel concept design.

**Field of Science**

/natural sciences/mathematics/pure mathematics/topology

/social sciences/social and economic geography/transport

/social sciences/economics and business/business and management/commerce

/social sciences/social and economic geography/transport/electric vehicles

**Programme(s)**

FP7-NMP - Specific Programme "Cooperation": Nanosciences, Nanotechnologies, Materials and new Production Technologies

**Topic(s)**

GC.SST.2011.7-7. - Advanced eco-design and manufacturing processes for batteries and electrical components

GC.NMP.2011-1 - Advanced eco-design and manufacturing processes for batteries and electrical components

**Call for proposal**

FP7-2011-GC-ELECTROCHEMICAL-STORAGE

See other projects for this call

**Funding Scheme**

CP-IP - Large-scale integrating project

**Coordinator**
### Participants (13)

<table>
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<tr>
<th>Organisation</th>
<th>Address</th>
<th>Activity type</th>
<th>EU Contribution</th>
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<tbody>
<tr>
<td><strong>FUNDACION TECNALIA RESEARCH &amp; INNOVATION</strong></td>
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