PROJECT PARTNERS

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Instituto Madrileño de Estudios Avanzados en Energía. IMDEA-Energy (Spain)

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The HESCAP Project

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PROJECT SPONSORED BY

SEVENTH FRAMEWORK PROGRAMME

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The HESCAP Project

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HESCAP

New Generation, High Energy and Power Density Supercapacitor Based Energy Storage System

FP7 - ENERGY
Contract No. 241405

1 April 2010 -
30 September 2013

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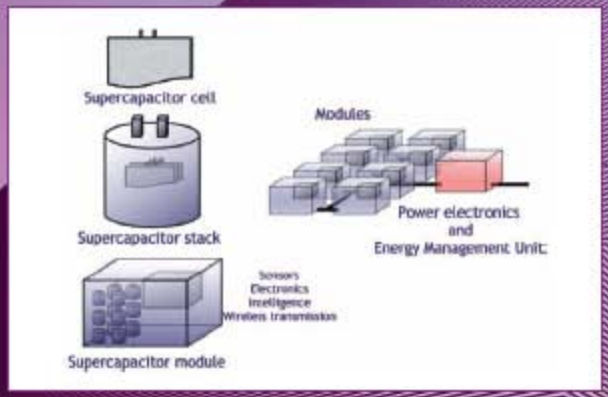
RATIONALE

Energy storage is recognised as a key element for energy networks in the near future. Regarding to traction energy networks, and to the drive-trains of hybrid or full-electric vehicles, it is widely accepted that the use of Energy Storage Systems (ESS) can lead to energy savings, installation cost savings and improved reliability and quality of the local electricity grid. This kind of networks needs ESS capable of storing and releasing energy in the power range from a few hundreds of kW up to 1MW, with a high duty cycle to manage frequent starts and stops.

Dealing with these applications, and among other ESS, supercapacitors appear as a very promising energy storage technology due to their high power density, high efficiency and very long life cycle. However, it is necessary a step forward in increasing the energy density in order to cover the whole range of specifications and to be fully competitive regarding to the cost of the stored kW-h, mainly over batteries.



The HESCAP Energy Storage System

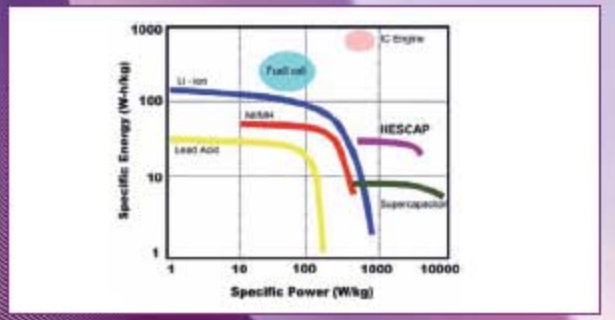
OBJECTIVE

The objective of this project is to develop a supercapacitor based energy storage system, capable of storing ten times more energy than the reported State of the Art technology, while keeping the high power density, long life cycle and production cost of currently available supercapacitor systems.

This will lead to a large reduction in the overall cost of the stored kW-h, and as a consequence, a costeffective improvement of the reliability, efficiency, security and environmental impact of the energy networks, either for stationary or dual-use applications.

This novel approach is based on the recent developments related with the applications of nanoparticulate metal oxides in this new generation supercapacitors.

Such materials have shown an amazing behaviour not only in terms of intrinsic specific capacitance, but also in their positive effects on the capacitance of conventional carbon electrodes, when they are deposited as nanoporous coatings.



Ragone plot of several electrochemical systems compared to an internal combustion engine

EXPECTED IMPACT

The main impact of the energy storage system, developed in the HESCAP project will be a drastic reduction of the volume and weight for a given energy rate, together with a reduction of the cost of the stored kW-h, in the five applications selected that require shortterm power delivery and high duty cycle:

- Voltage stabilization support to the electric smart grids.
- Uninterrupted power for critical substation loads.
- Reduction of the variability of photovoltaic (PV) systems and small scale wind turbines in distributed generation systems and micro-grids.
- Railway energy networks, for both stationary (voltage stabilization) and on-board (autonomous traction) power systems.
- Hybrid and full-electric vehicles and their charging networks.

INDUSTRIAL ADVISORY PANEL

The specifications for every application will be established together with members of an Industrial Advisory Panel (IAP), made up of representatives of industrial companies that are leaders in the energy and transport sector and that have signed an agreement of collaboration with HESCAP project. Moreover, they will provide their expertise to keep the objectives focused on the European energy storage industry and will help in the dissemination of the results of the project.