

ZIGOR TAKES PART OF MESSIB EUROPEAN PROJECT



Multi-Source Energy Storage System Integrated in Buildings”

ZIGOR CORPORACIÓN takes part of Messib European project, which has started on 1st January 2009. More exactly, last 16th January, the kick-off meeting of the entitled project “**Multi-Source Energy Storage System Integrated in Buildings**”, took place in Acciona Infraestructuras facilities, which is the leader of the project.

The overall objective of MESSIB project is **the development, evaluation and demonstration of an affordable multi-source energy storage system (MESS)** integrated in building, based on new materials, technologies and control systems, for significant reduction of its energy consumption and active management of the building energy demand.

This new concept will reduce and manage smartly the electrical energy required from the grid favouring the wider use of renewable energy sources. It will reduce raw material use for thermal performance and improve indoor environment, the quality and security of energy supply at building level, including Cultural Heritage buildings.

MESS is composed by two thermal and two electrical storage systems, integrated with the building installations and a control system to manage the building energy demand.

The MESSIB principles are:

1. Rational use of thermal energy for primary energy savings and for increasing the indoor confort.
2. Improvement of electrical energy storage in combination with RES to shift the demand with the production and to optimise the use of low cost “off-peak” power from the grid.
3. Integration of the technologies in the building.

Messib PROJECT has been funded by European Commission through its **7th Framework Programme, in the Cooperation area and within Theme 4 “Nanoscience, Nanotechnologies, materials and new production technologies”**. The total grant for this 4 year project with a total of 24 partners from all over Europe, is around 9 million euros.

Besides **ZIGOR CORPORACIÓN**, other organisations from the Basque Country are also participating in this project, FUNDACIÓN TEKNIKER-IK4 and LABEIN-TECNALIA. ZIGOR is leading work package 3, **“Electrical Energy Storage Technologies for buildings: Flywheels and Batteries”**.

The overall objective is to design, develop, evaluate and manufacture a new Electrical Energy Storage System composed by:

- A new lightweight and high strength orthotropic composite wheel for FW system in buildings with improved kinetically storage capabilities and electrical performance
- An improved and compact Vanadium redox Battery, VRB in buildings for long-term electrical storage.

ZIGOR will focus its effort in the PROJECT, on the development of power electronics conversion systems, which will allow both energy storage technologies, the absorption and release of energy from and to the grid (or other renewable energy sources).

On one hand, ZIGOR approaches the development of a smart reversible AC/DC converter (F&B GEN), which allows communications with flywheel electronics on discharge side.

The electric grid has no substantial storage capacity, so there has to be an instantaneous balance between generated electric power and stochastic demand. The lack of storage capacity makes electricity delivery a just-in-time process at its extreme .

Energy storage technologies do not generate electricity but can deliver stored electricity to the electric grid or an end-user. They are used to improve power quality by correcting voltage sags, flicker, and surges, or correct for frequency imbalances. Storage devices are also used as uninterruptible power supplies (UPS) by supplying electricity during short utility outages.

Energy storage has a strategic value in the electrical networks of the future. Storage must allow reduce the spinning reserve and cope to demand peaks, through electricity, heat and cool storage in the moment of low demand, and release it in periods of higher demand or higher price.

Research and development activities have been developing focus on energy storage technologies including advance solutions on battery, flywheels, superconducting magnetic energy storage, compressed air energy storage and super-capacitors . However, although there are several demonstration projects, in Europe neither of these technologies has reached the level of commercial exploitation. Reliability and cost are the two critical factors for their final boom.

Power electronics is an essential technology for controlling electrical energy flows between the source and the load, according to load requirements. Therefore, power electronics is responsible for the reliability and stability of the overall system. Optimisation of the overall electric system is important for make it cost-effective.

ZIGOR develops highly efficient and reliability conversion systems. When power electronics converters are operating, the heat generated because of the losses in the switches has to be dissipated using a thermal management system. In general, power converter has efficiencies around 95%, so the challenge is developing power electronics converters that can reach efficiencies of 99%.

On the other hand, reliability is related to the capacity to keep conversion system working under its security conditions. Keep system temperature in a suitable generally means, less likely to fail. Therefore, it must be need to work with an efficient thermal management, using cooling systems to be able to dissipated the heat generated an keep junction temperatures of power devices below the limit.