

## At a glance :

Development of a prefabricated lightweight Sound Absorbing Panel with integrated energy storage capabilities.

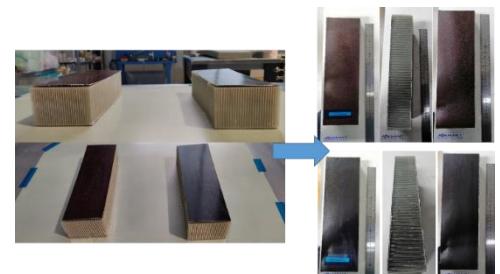
**Keywords:** Supercapacitors, construction, integrated power bank, energy storage, buckypaper electrodes, flame retardant nanoparticles, prefabricated composite panels.

## Context:

Pleione Energy participates in OASIS as an End-user of the energy industry, providing its expertise and capabilities to develop energy storage devices (supercapacitor cells) for integration in prefabricated sound absorbing panels for the construction industry. Specifically, the prefabricated sound absorbing panels can not only absorb sound waves to reduce general noise, clarify speech and limit reverberation in walls within enclosed areas, but also charge electrical devices.

## Challenge:

The partnership between Pleione Energy and OASIS service providers consists of the entire process chain - from CNT based electrode materials, through energy cell production, novel “green” composite panel design and manufacture through to integration in the final part. This includes the validation of real parts in a demonstrator wall panel. The innovative step is the combination of composites and novel energy storage materials into a durable, high-performance and cost-effective product.

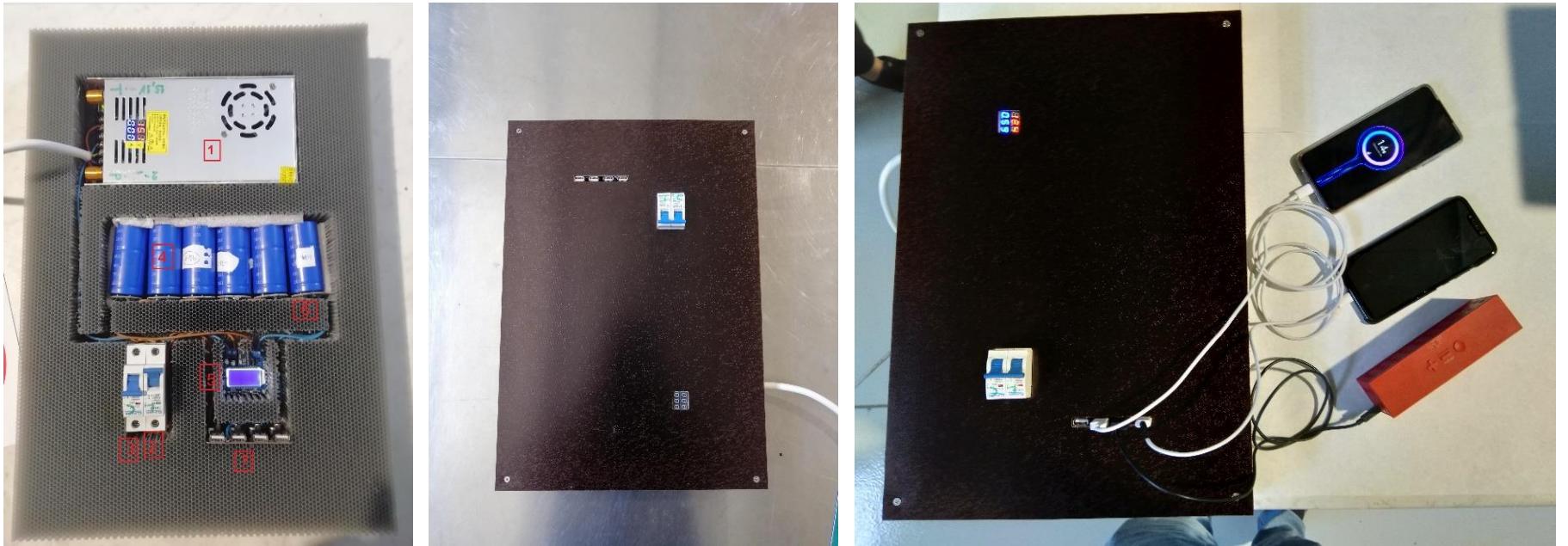


## Results:

Buckypapers (BP) provide essential improvement potentials for the development of energy storage systems! Thus, energy storage electrode materials based on BPs with and without modifiers have been developed. Electrochemical testing and morphological characterization of the novel nano-based electrode materials and various substrates and electrolyte/current collectors has been carried out at pouch cell level. Supercapacitor cells with optimized electrolyte levels have exceeded **2000 operational cycles**.

A supercapacitor power bank electrical design was completed prior to the development of a multiple cell demonstrator circuit. The manufacture of prefabricated lightweight panels based on eco-friendly / recyclable fibre reinforced composites materials has been demonstrated. Production trials of flame retardant nanopowder in flax prepreg materials was developed prior to the manufacture of the panels.

# Prefabricated sound absorbing panels with integrated energy storage devices



*Demonstrator panel with integration of Pleione's supercapacitor module to the final Supercapacitor Power Bank*

## Conclusion:

Pleione is very satisfied with the work that has been done by the different OASIS Pilot Lines. This collaboration leads to a new product with significant unique selling points.

The final demonstrator successfully combines prefabricated lightweight panels with an integrated Buckypaper (BP) based energy storage system, with improved performance in terms of durability and energy storage

The energy storage system is designed for safe and compact integration in prefabricated panels with increased fire resistance.

The OASIS partners have provided solutions from electrode materials, through energy cell design and production, to composite panel design and manufacture. The collaboration has enabled the successful investigation and integration of these components in a technology demonstrator wall panel.

## OASIS Technique:

- PL#3: Magnetics and Flame-retardant nanoparticles
- PL#4: Buckypapers
- PL#6: functionalised prepregs

## Characterization Services:

- Microstructure
- Thermal characterisation and testing
- Mechanical characterisation and testing



Get in touch today for further details:

E-mail: [info@project-oasis.eu](mailto:info@project-oasis.eu)

