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TEMPEST





### **ABOUT US**

TEMPEST develops and matures a new generation of safe-by-design, recyclable, high performance, and lightweight batteries by providing a holistic approach to next-generation lithium battery technologies, evaluating solutions for batteries, which will strengthen the overall positioning of Europe in the global batteries market, and increase its independence on outside markets.

TEMPEST brings advanced, module-free battery systems, optimised using artificial intelligence algorithms through three different demonstrator battery types (compact, large-scale, and stationary).

TEMPES

### **OBJECTIVES**

- Develop next generation cell technologies for multiple demonstrators and applications.
- Develop new architectures and designs for improved safety, thermal management, and performance.
- Improve the circularity of batteries through improved design and recycling methods.
- Develop and implement new models for the optimisation of batteries.
- Develop sustainable value chains and exploitation strategies.





# **TECHNOLOGICAL IMPACTS**





## **ENVIRONMENTAL BENEFITS**

- Reduction of greenhouse and aerosol production by 62%
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- Reduction of energy loss and range increasing up to 52%
- Up to 78.7 tons CO<sub>2</sub> removed per battery pack and year
- Reduction of energy loss and range increase of up to 57%
- Reduction of overall energy load up to 72%





# **TECHNOLOGY**

### PERFORMANCE

- Cell-to-pack
  architectures
- Next-Gen Lithium cells & Solid State cells



#### SAFETY

- Guided-wave Structural Health Monitoring for defect detection.
- Flame retardant/resistant materials & coatings.
- New thermal management techniques and Battery Management Systems.
- Impact resistant all-composite housings.



#### SUSTAINABILITY

- Reversible joining to facilitate repair and separation of bonded components.
- H2-based recycling methods for extracting, recovering and transforming the components of the cells.
- Digital tools for develop synergistic gains in performance and efficiency

TEMPÉS

# **IMPLEMENTATION**

2. CELL/PACK DESIGN AND OPTIMISATION

Design all the pack subsystems

Establish the parameters for manufacturing evaluation, demonstration key performance indicators and technology readiness level criteria

#### 1. DEMONSTRATOR SPECIFICATIONS AND CIRCULARITY MODELS

#### 3. MATERIALS, MODELLING, TESTING,STANDARD VERIFICATIONS

Define materials in modelling; those models and the simulation process; the test to be applied for the characterisation and proceed to verify them

Perform testing and verification of methods for the disassembly of the battery systems, its sustainability, refurbishing and recycling.

5. RECYCLING AND REUSE

#### 4. MANUFACTURING

Develop methods for the assembly, structural health monitoring (SHM) and battery management system (BMS) integration for the battery systems and evaluate the scale-up feasibility in preparation for eventual transfer to gigafactory-scale production



## **CONSORTIUM**





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### **GET CONNECTED**



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