

Building more **reliable** and **performant batteries** by embedding **sensors** and **self-healing** functionalities to detect degradation and repair damage via advanced **Battery Management System**

# PHOENIX PROJECT OVERVIEW

Dr. Joris de Hoog, Project Coordinator, VUB



Funded by  
the European Union

This project has received funding from the European Union's research and innovation programme Horizon Europe under the grant agreement No. 101103702 and the involvement in No. 101104022 (Battery 2030 CSA3).

# WHAT IS THE NEED?

## A European battery:



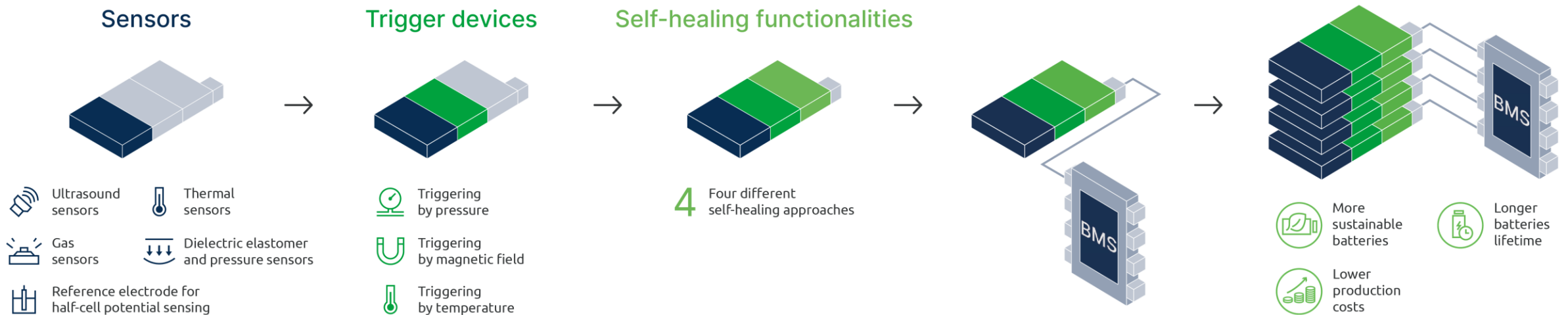
## WHAT IS OUR APPROACH TO IT? PHOENIX



Building more reliable and performant batteries by embedding sensors and self-healing functionalities to detect degradation and repair damage via advanced Battery Management System

# OUR CONCEPT

The PHOENIX project explores integrating self-healing, sensing, and triggering functionalities into batteries to prolong their lifespan and prevent degradation.



# OUR METHODOLOGY



**DEVELOP:** Create self-healing battery materials and sensors to detect degradation early and trigger repair. Use various sensing technologies and tailored triggering mechanisms



**VALIDATE:** Test triggering mechanisms and degradation detection in single-layer and multilayer cells. Validate self-healing triggers through electrochemical testing.



**ASSESS:** Develop the Battery Management System (BMS) and assess manufacturing, recycling, and sustainability. Evaluate competitive advantages and environmental impacts.

# OUR OBJECTIVES



**Develop materials providing self-healing capabilities**



**Create and develop various types of sensors**



**Develop triggering devices that can activate the self-healing process**



**Create a self-contained solution**



**Detect and address critical battery degradation**



**Assess the sustainability of the developed battery technology**



**Implement an adaptable approach to mass production processes of battery cells**



**Contribute to the growth of a sustainable battery manufacturing industry in EU**

# OUR EXPECTED RESULTS



**Develop and implement magnetic, thermal and pressure triggering**



**Design and implement the mechanical, electrical, thermal and gas sensors**



**Demonstrate Gen 3b and 4a batteries with increased anode capacity and excellent capacity retention after numerous cycles**



**Significant capacity retention of the demo pouch cell after multiple cycles at a moderate charging rate**



**Develop a fully integrated BMS**



**Lower the specific costs of the self-healing battery compared to the reference battery**



**Achieve a high recycling efficiency that demonstrates the recyclability of self-healing components**

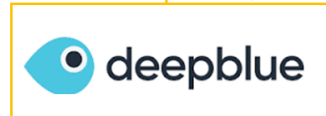


**Prospective Life Cycle Assessment of future batteries**

# OUR CONSORTIUM





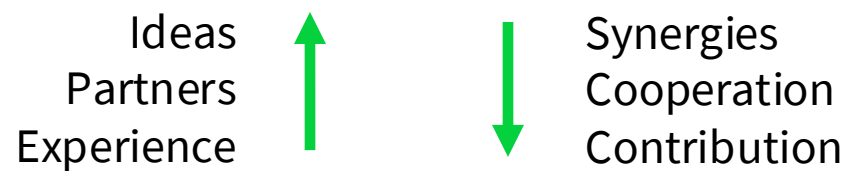




# PROJECT GENERAL INFORMATION

- Duration: 4 years (48M)
- Start date: 1st May 2023 (M1)
- End date: 30th April 2027 (M48)
- Budget: 4.9M €
- Call: HORIZON-CL5-2022-D2-01

# STRATEGIC VISION BEHIND PHOENIX: BUILD SYNERGIES



BATTERY  
2030+

Thank you for your attention!



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Phoenix Smart Batteries



[www.phoenix-smartbatteries.eu](http://www.phoenix-smartbatteries.eu)

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