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**The European ENERGETIC project will develop the next-generation Battery Management System (BMS) for optimizing batteries’ systems during their first and second life utilisation**

## INTRODUCTION

Last month of July 2023, EU founded project Next Generation Battery Management System Based on Data Rich Digital Twin (ENERGETIC) was launched in Strasbourg. The initiative is funded by the European Commission and awarded as a Horizon 2020 program with a grant of 4,1 million euros from European Commission and £310.502 + £387,963 from the UKRI and is coordinated by INSA Strasbourg (Institut National des Sciences Appliquées, Strasbourg). The project will involve 12 partners from 6 countries - France, Luxembourg, UK, Estonia, Serbia, Germany. The project started on the 1st of June 2023 and will run for 39 months.

ORIGIN OF THE PROJECT

This project was born by the willingness of achieving ambitious decarbonization targets set by the EU roadmap towards a climate-neutral economy by 2050, which necessitates a substantial expansion of renewable energy sources. Energy storage improves grid flexibility and allows higher penetration levels of renewable energy sources to create a decarbonised and more electrified society by means of leveraging second-life batteries. Battery management plays an essential role in ensuring efficient and safe battery operation. As set in the EU Strategy for Energy System Integration, the share of renewable energy should reach 40% by 2030 (up from initial target of 32%). This implies the share of renewable energy in the electricity mix of around 65% in 2030.

The cost-effective energy storage is a crucial element for achieving European Green Deal targets, clearly representing an enabler to contributing to the security of the electricity supply in the EU. Thus, it improves grid flexibility and allows higher penetration levels of renewable energy sources to create a decarbonised and more electrified society while contributing to the diffusion of distributed generation and following a sustainable and circular approach, for instance, by means of leveraging second-life batteries. In fact, a battery’s first life lasts between 10-15 years and is likely to retain more than two-thirds of its usable energy storage. Depending on their condition, used EV batteries can be repurposed for up to additional 10 years in “second-life cases” such as stationary energy storage, also known as the battery’s “second life”.

However, current battery management systems (BMS) typically rely on semi-empirical battery models (such as equivalent-circuit models) and on a limited amount of measured data. Therefore, the ENERGETIC project aims to develop the next generation BMS for optimizing batteries’ systems utilisation in the first (transport) and the second life (stationary) in a path towards more reliable, powerful, and safer operations. The ENERGETIC project contributes to the field of translational enhanced sensing technologies, exploiting multiple Artificial Intelligence models, supported by Edge and Cloud computing.

ENERGETIC’s vision not only encompasses monitoring and prognosis of the remaining useful life of a Li-ion battery with a digital twin but also encompasses diagnosis by scrutinising the reasons for degradation through investigating the explainable AI models. This involves the development of new technologies of sensing, combination, and validation of multiphysics and data-driven models, information fusion through Artificial Intelligence, Real-time testing, and smart Digital Twin development. Based on a solid and interdisciplinary consortium of partners, the ENERGETIC R&D project develops innovative physics and data-based approaches both at the software and hardware levels to ensure an optimised and safe utilisation of the battery system during all modes of operation.

The ENERGETIC project aims at developing the next generation BMS for optimizing batteries’ systems utilisation in the first (transport use case) and the second life (stationary use case) in a path towards more reliable, powerful, and safer operations. To do so, the ENERGETIC project contributes to the field of translational enhanced sensing technologies, exploiting multiple AI models, supported by Edge and Cloud computing. This will enable the path to future services based on data provided through the Cloud.

CONSORTIUM
ENERGETIC is coordinated by INSA Strasbourg, that is part of INSA Group the largest network of engineering schools in France and gathers a pertinent and strong consortium of 12 partners from 6 different countries - France, Luxembourg, UK, Estonia, Serbia, Germany.

[INSA Strasbourg](https://www.insa-strasbourg.fr/fr/) (Institut National des Sciences Appliquées, Strasbourg), [CAPGEMINI](https://www.capgemini.com/fr-fr/) (altran prototypes automobiles), [SnT (](https://www.uni.lu/fr/)universite du Luxembourg), [EDF](https://www.engie.fr/) (Electricité De France), [HKA Hochschule karlsruhe](https://www.h-ka.de/en/), THIL (tajfun hil drustvo sa ogranicenom odgovornoscu za istrazivanje), [TalTech (Tallinna Tehnikaülikool](https://taltech.ee/en/)), [POWERUP](https://powerup-technology.com/), [FORSEE POWER](https://www.forseepower.com/), [BATH University](https://www.bath.ac.uk/), [ZABALA Innovation](https://www.zabala.fr/), [FEMTO-ST](https://www.femto-st.fr/en) (Université de Technologie de Belfort – Montbeliard, [COVENTRY UNIVERSITY](https://www.coventry.ac.uk/cuc/).

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