HORIZON EUROPE BROKERAGE 2026

CLUSTER 5
CLIMATE, ENERGY & MOBILITY

14 January 2026

online

Greenet

The network of Horizon Europe Cluster 5 National Contact Point.



AI- and Digital-Twin-Enabled Sustainable Economic Dispatch with WBG Smart Inverters for Life-Cycle-Optimized, High Power Quality PV/Battery/Fuel-Cell Hybrid Systems

GREENET Brokerage Event

14th January 2026

Mohamad Alaaeddin ALALI

ENSEA, Graduate Engineering School, France

The GREENET project has received funding from the EU Horizon Europe programme under Grant Agreement No 101069604

Project presentation

Topic to be addressed:

Cross-sectoral solutions for the climate transition

Sustainable, secure and competitive energy supply

Efficient, sustainable and inclusive energy use

Identified call, open to other suggestions

Call Name : Cluster 5 Call 03-2026 (WP2026-2027) : opening 18/12/2025, deadline 31/03/2026

Topic Code : HORIZON-CL5-2026-03-D3-21

Topic Name : Hybrid AI-Control Framework for a next-generation grid-scale energy storage and system integration

Project presentation

Project description :

The project proposes an innovative, scalable, economic, efficient, better-controlled, resilient, and green power system structure

Objectives & originality : To the best of our knowledge, this is the **first integrated structure** of its kind (**4 patents, license and marketing, startup creation : under discussion**)

This project is structured around five core objectives

1- AI forecasting & digital twin: Develop AI-models to predict PV generation and demand, and build an AI digital twin of battery and electrolyzer storage systems for life-cycle management.

2- WBG smart power conversion: Design SiC/GaN smart inverters with improved power quality, exploring (i) a WBG two-level inverter and (ii) a multi-active-bridge (MAB) architecture.

3- Resilient low-carbon grid operation: Optimize storage dispatch with RES and H_2 sources to improve grid reliability/resilience while reducing environmental impact.

4- AI-driven sustainable dispatch: Implement a generic AI & digital-twin-based sustainable economic power dispatch that minimizes cost and extends asset lifetime of the over all chain.

5- Embedded AI inference engines: Apply algorithm–architecture co-design to deliver energy-efficient inference engines from the trained models.

Project presentation

Profile of the partners sought :

Academic Partnership

- **QUARTZ Laboratory, ENSEA, France :** The project is coordinated by Mohamad Alaaeddin Alali (Associate Professor-HDR diploma, QUARTZ/ENSEA; former Full Professor, University of Aleppo), a specialist in active filtering, power electronics and optimal energy management.
- **ETIS Laboratory, ENSEA, France :** AI and embedded-AI,
- **GeePs Laboratory, CentraleSupélec, France :** WBG components and MAP structure, (1 patent, 1 Ph.D. thesis)
- **IRDL, Université Bretagne Sud, France :** Electrolyzers and Batteries storage systems, (1 Ph.D. thesis)
- **University of L'Aquila, Dept. of Information Engineering and Computer Science, Italy :** Supervision and Nonlinear Control, (2 Ph.D. thesis)
- **Université de KIEL, Germany :** Group Leader Battery Systems & Power Electronics

Project presentation

Profile of the partners sought :

Industrial Partnership

- **IMEON ENERGY/France :** French leader in self-consumption solutions. They design and manufacture smart inverters specifically for solar self-consumption with storage. (1 Ph.D. thesis, license & marketing)

- **KURYBEES/France :** Digital Twin for batteries. Kurybees develops generic, modular strategies tailored to different applications such as light mobility, stationary storage, and electric vehicles, building on common and flexible principles. (1 Ph.D. thesis)

- **OLENERGIES/France :** Intelligent Digital Twin. Olenergies aims to become a European reference player in stationary and onboard energy storage. (1 Ph.D. thesis)

Climate and Energy Topic

Specific contribution to the topic:

The project will deliver :

- **High-frequency WBG SAF validation:** Demonstrate ≥100 kHz operation for two SiC/GaN SAF architectures: (i) a WBG two-level VSI and (ii) a multi-active-bridge (MAB) converter.
- **Joint techno-economic & lifetime optimization:** Co-optimize economic dispatch and asset lifetime across PV, batteries, and H_2 storage under variable generation/demand and grid constraints.
- **Trustworthy, adaptive AI control:** Provide calibrated uncertainty, online adaptation to drift, and coordinated multi-loop control (harmonic filtering, MPPT, H_2 flow, estimation).
- **AI-enabled digital twin for storage:** Integrate a battery/H_2 digital twin with energy-efficient AI for sustainable life-cycle management and grid services.
- **Embedded real-time deployment:** Run the AI models on smart-inverter hardware with minimal power and memory footprint.

Contact details!

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https://scholar.google.com/citations?user=chM2p1oAAAAJ&hl=en

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Thank you for your attention

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