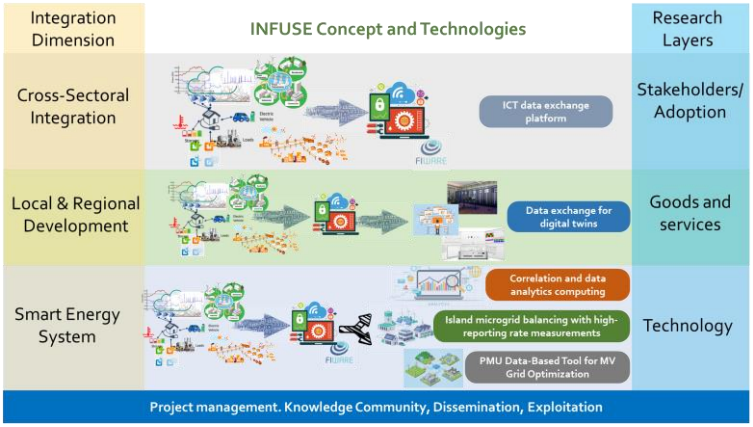
INFUSE

Information Fusion of Multi-Vector Real-Time Data Streams for Energy Management in Emerging Power Grids

INFUSE project revolves around the development of a comprehensive data integration framework within a cross-platform software ecosystem, making use of the FIWARE open-source APIs and specific data formats capable of seamlessly integrating diverse data sources with varying reporting rates (including PMUs, smart meters and other contextual sensors). Additionally, the project will focus on an intelligent edge-computing engine for processing and correlating information from various sources using data analytics enabling real-time anomaly detection, predictive maintenance, and energy control, contributing to enhanced energy transfer in emerging (low inertia) power grids. Integration with real-time digital simulation tools using data from the crossplatform showcasing developmental opportunities across various demonstration sites and scenarios, based on The Project developed digital twins (on heterogeneous hardware-in-the-loop simulation platforms: e.g. Typhoon HIL, RTDS).



Project Duration

25.03.2024 – 28.02.2026

Project Budget

Total Budget: € 443,647

Funding: € 383,629

Project Coordinator

UNTSPB Politehnica Bucharest (Romania)

Project Partners

- National Institute for Research and Development in Electrical Engineering - ICPE-CA (Romani)
- Vysoke Uceni Technicke v Brne (Czech Republic)
- ELVAC SOLUTIONS s.r.o. (Czech Republic)

Project Website

www.infuse-project.eu

Contact

Project Coordination on behalf of UNTSPB Politehnica Bucharest

Radu Plamanescu

radu.plamanescu@upb.ro.

ERA-Net Smart Energy Systems

ERA-Net Smart Energy Systems Joint Call 2023 (MICall23)

This project has been awarded funding within the ERA-Net SES Joint Call 2023 for transnational research, development and demonstration projects.

This project has been funded by partners of the ERA-Net Smart Energy Systems (www.eranet-smartenergysystems.eu) and Mission Innovation (mission-innovation.net) through the Joint Call 2023. As such, this project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 883973.

Joint Programming for Flourishing Innovation – from Local and Regional Trials towards a Transnational Knowledge Community

www.eranet-smartenergysystems.eu

Main Objectives

INFUSE **overarching goal** is achieving an optimal energy transfer in emerging, inertialess grids, with high share of RES-based energy sources by enhancing grid intelligence as a way to successfully transform the operation of emerging power systems by including local information processing (edge-computing) in the context of distributed generation and high-penetration of RES.

The goals will be achieved by collaborative work on four project' objectives:

Objective 1: *Develop multi-vector, heterogeneous sources data integration framework* Create a robust data integration and exchange framework within a software cross-platform using a standard format capable of handling multi-vector measurement information, including power profiles with a high-reporting rate (1 frame/s) and environmental conditions data from sensors.

Objective 2: *Implement correlation and data analytics computing* Develop an intelligent data analytics engine that can process and correlate information from various sources (energy transfer parameters, environmental and contextual conditions).

Objective 3: *Implement a hybrid state estimator for distribution network operators* Develop a data integration module capable of seamlessly integrating PMU data with very high-reporting rates (50 frames /s) in the same open-source platform using the common format.

Objective 4: *Integration of real-time digital simulation tools and live demonstration in campus grid* Establish an integration mechanism of heterogeneous data with real-time (heterogenous) digital simulation tools for modelling and simulation of energy transfer in emerging power grids.

Main Results

- A cloud-based ICT platform, a consistent data exchange format and a standardized interface to integrate heterogeneous data sources as well as existing data platforms from field trials.
- Integration of the multi-vector data platform with real-time digital simulation environment
- Development of an intelligent data analytics engine that can process and correlate information from various sources at the process level enabling anomaly detection, predictive maintenance and energy control in reduced inertia grids.
- Implementation of an infrastructure for microgrid balancing in LV campus grid with high-reporting rate measurements
- Development of a software tool using PMU data for optimization of the MV distribution grid and its subsequent verification in the real operation of the compensated MV distribution grid.