AI-flex

Autonomous AI for cellular energy systems increasing flexibilities provided by sector coupling and distributed storage

> *I am glad that, together with our project partners, we will be taking a step towards an future energy system within the framework of this research project*

The cellular approach addresses decentralized, self-governed energy cells on all hierarchical grid levels. Every cell can encompass electric, gas and district heating grids achieving high efficiency and flexibility due to sector coupling and energy storage solutions such as batteries and Power-to-X systems. Compared to conventional grid operation, each cell optimizes its renewable power generation, energy consumption and storing on a much finer granularity level and a much higher level of complexity of the optimisation due to a high number of participants. In order to address this challenge, an autonomous AI-based cell optimizer will be developed for the efficient energy management of a multitude of energy storage devices from the perspective of an energy cell. The AI-based control is integrated and demonstrated under real-world conditions by means of a digital twin of the energy system serving as a coherent information and interaction layer for all market participants.

Project Duration

01.06.2022 - 31.05.2025

Project Budget

Total Budget: € 1,098,806.-
Funding: € 814,073.-

Project Coordinator

Hochschule Bielefeld (Germany)

Project Partners

- RPTU Kaiserslautern (Germany)
- Stadtwerke Bielefeld GmbH (Germany)
- VOLTARIS GmbH (Germany)
- TU Wien (Austria)
- AIT (Austria)

Project Website

https://www.linkedin.com/showcase/ai-flex-fh-ites-agnes

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ERA-Net Smart Energy Systems

ERA-Net Smart Energy Systems Joint Call 2020 (MICall20)

This project has been awarded funding within the ERA-Net SES Joint Call 2020 for transnational research, development and demonstration projects. 22 Mio EUR of funding have been granted to 21 projects active in 17 regions and countries.

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 2020. 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

Our main objectives in the research project include:

- Analysis and definition of AI methods for controlling different sector coupling technologies in the energy system in a cellular approach.
- Development of a digital twin to represent cellular networks at all levels of sector coupling.
- Analysis of innovative business models in the context of sector coupling technologies.

Main Results

Our main results in the research project is the development of a cell manager for autonomous control of grid cells across different types of sector coupling and final evaluation in the field.