Project Fact Sheet

Technische Hochschule Ingolstadt
Institute of new Energy Systems

Project Title	**STORE - Grid stability through AI-driven energy system integration: Supermarkets as flexible prosumers**
Keywords	AI-driven integration of energy systems, energy management development, research collaboration, flexible prosumers, e-mobility, supermarkets

Project Details

Project Start	2024	**Duration**	3 Years
Grant Scheme	Clean Energy Transition Partnership (CETP)	**Project ID**	03EI6133A
Funding Authority	BMWK - Bundesministerium für Wirtschaft und Klimaschutz		
Project Budget	1.655.919,29 €		
Project Leader	Prof. Matthias Huber		
Contact Person	Stefan Schneider		

Cooperation partners
Steinbacher-Consult Ingenieurgesellschaft mbH & Co. KG in Germany,
FOSS (Research Centre for Sustainable Energy) of the University of Cyprus (UCY),
LaRINa (Research Laboratory of Smart Grids and Nanotechnology) of the National School of Science and Advanced Technologies of Borj Cedria (ENSTAB), University of Carthage
Associated partners
Handelsverband Deutschland e.V., MediaMarktSaturn Retail Group GmbH, Wurm GmbH & Co. KG Elektronische Systeme

Description

The challenges of climate change and its resulting consequences are motivating many countries to achieve the goal of climate neutrality. The countries of the European Union (EU) have committed to achieving this milestone by 2050. The implementation of this vision requires the use of innovative technologies, the integration of various renewable energies into the existing energy infrastructure, and the electrification of certain sectors. Reducing energy consumption and demand-driven distribution are also key aspects. The STORE project focuses on supermarkets, which consume 56% more electricity than the rest of the retail sector. In addition, the project focuses on the steadily increasing demand for energy and charging infrastructure due to e-mobility in recent years.

The overall goal of STORE is to develop an AI-based Smart Flexibility Energy Manager (SFEM). This innovative system will enable to integrate large-scale electric vehicle charging infrastructure into supermarket operations and to use electricity generated by the stores themselves from photovoltaic systems. The aim is to improve both grid stability and energy

efficiency. In this context, supermarkets are seen as potential 'filling stations of the future'. The energy management solution developed in the project will be systematically developed, technically and economically tested, and optimised specifically for this scenario. The project, which is being carried out in Cyprus, Germany, and Tunisia, is working with the different local conditions to develop a robust and transferable solution.
To achieve this goal, the project has set itself seven specific objectives:

1) Stabilisation of the power supply grid through AI-supported energy management
2) Optimised distribution and storage of the electricity generated by the supermarket using photovoltaics
3) Development of a holistic storage concept
4) Creation of an innovative business model customised to the target group
5) Development of an innovative data collection method for a high-quality data pool
6) Implementation of the international approach through the applicability of the SFEM in different environmental conditions
7) Capacity building of the parties involved through the exchange of international expertise from industry and science

The functions of the SFEM are designed to incorporate or support the achievement of these objectives. The data for the development of the SFEM will be collected during ongoing market operations and thus reflect reality. As part of this, a detailed market analysis will be carried out for the three countries to identify potential new sources of revenue in electromobility and electricity grids. This analysis will feed into the development of multi-layered business models. To ensure effectiveness, the real data will be combined with data from virtual simulations. SFEM's energy management system will use advanced scientific methods to optimise load scheduling, energy storage, and flexibility services. A professional transfer concept will ensure communication at local, national, and international levels.

Within the overall project, Technische Hochschule Ingolstadt (THI) is responsible for coordinating the project network and thus plays a central role in planning, organization, and communication within the consortium.