FlexCHESS

Flexibility services based on Connected and interoperable Hybrid Energy Storage System

2024, October

FlexCHESS advances its open platform to turn Europe's distributed storage into a single flexible asset

A Horizon Europe consortium is building open, interoperable tools that let batteries, heat pumps and electric vehicles work together to support the grid and cut costs for consumers.

The FlexCHESS project (Grant Agreement No 101096946), funded under the European Union's Horizon Europe programme, has advanced the development of its Virtual Energy Storage System (VESS) approach — a way of coordinating many small, distributed energy resources so that, together, they behave like a single large-capacity storage system.

As renewable generation grows across Europe, the electricity grid faces greater variability and uncertainty. FlexCHESS responds to this challenge by aggregating distributed resources — home and EV batteries, heat pumps, flexible loads and small-scale generation — into Connected Hybrid Energy Storage Systems (CHESS) that can store surplus energy and release it when the system needs it. The project's open platform, the FlexPlatform, combines a real-time digital twin, advanced forecasting and a decision-support system to help operators and energy communities make the most of these resources.

A central aim of FlexCHESS is to lower the barriers to participation. Through its low-cost CHESS-plug, the project enables existing appliances to be retrofitted and connected, while distributed-ledger technology and smart contracts provide transparency, traceability and a fair reward mechanism for those who contribute flexibility. The consortium is working towards Technology Readiness Level 7, with the ambition of bringing its solutions closer to market readiness thereafter.

FlexCHESS responds directly to the European Union's energy and climate priorities. Under the European Green Deal and the recast Electricity Market Directive (EU) 2019/944, consumers and energy communities are encouraged to take an active role in the energy system — generating, storing, sharing and trading electricity, and providing flexibility through demand response and storage. Coordinated by Aix-Marseille University, FlexCHESS brings together partners from across Europe and contributes to this agenda by lowering the technical and economic barriers that have kept smaller players out of flexibility markets. >

Funded by the European Union

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"Europe's energy transition needs flexibility, and a great deal of it already exists — in the batteries, heat pumps and electric vehicles people use every day. FlexCHESS is building the open tools that let these distributed resources work together as a single, dependable asset, supporting the grid while creating new value for consumers and energy communities".
Seifeddine Ben Elghali, Project Coordinator, Aix-Marseille University

The FlexCHESS approach is being prepared for validation across five pilot sites in Spain, Italy, Slovenia, the United Kingdom and Türkiye, each representing a different real-life context — from industrial areas and multi-functional buildings to electric-vehicle communities and island grids.

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FlexCHESS project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101096946. This publication reflects only the author's view, and the EC is not responsible for any use that may be made of the information it contains.