Climate, environment and circular economy | Energy storage

ENERGY STORAGE

OUR STRENGTHS

Expertise throughout the R&I chain:

- Electrochemistry: testing and characterization resources on all representative scales, from the material through to the system:
  - For flow batteries: compartmentalized electrochemical cells, stack and module integrated into an electricity grid.
  - For Li-ion batteries: cell (button cell, pouch cell), module, vehicle battery pack.
  - In operando analysis tools (e.g. online UV-visible spectroscopy on a redox flow system)
- Control and simulation:
  - Multi-physical Li-ion battery and flow-battery models, accurately representing their behavior, for diverse chemistries and on different scales.
  - Tools for the development and rapid prototyping of software functions for BMS taking into account the specific characteristics of these technologies. Validation according to specific usage scenarios in a Hardware In the Loop environment.
  - Dimensioning tools incorporating technical and economic aspects and adjusted according to usage scenarios (power, energy, production and consumption profiles, services delivered to the network).

- Optimization, data sciences, computer engineering:
  - Energy management web platform bringing together services dedicated to batteries: planning, according to price criteria, behavior monitoring during aging, etc.

A demonstrator at our Lyon site:

A microgrid made up of a photovoltaic panel, a recharging station and a storage system connected to the electricity network was set up. It is used to test the integration of stationary storage across the network, in order to manage the energy resource for enhanced integration of renewable energies. In particular, storage systems for different network services can be qualified thanks to the microgrid.

Discover **IFPEN's microgrid demonstrator** in Lyon with Joseph Martin, IFPEN researcher (in French):

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Energy storage : Our strengths

Link to the web page :