

TOWARDS A SUSTAINABLE ENERGY FUTURE

The electricity sector is in a transition phase towards a new energy model characterised by a greater complexity in its management and the need to ensure the security of supply.

IN THIS CONTEXT, storage is configured as a mechanism that allows renewable energy integration and improves the flexibility and efficiency of the system, in turn helping to maintain the necessary balance between supply and demand.

With the Almacena Project (energy storage project), Red Eléctrica strengthens its commitment to move towards a more sustainable energy model.

Energy storage allows the efficiency of the electricity system to be improved as it enables greater integration of renewable energy, increases system flexibility and favours the flattening of the demand curve



Lithium-ion battery installed in the Carmona transmission substation (Seville).



CO-FINANCED BY THE EUROPEAN REGIONAL DEVELOPMENT FUND (ERDF)

This R&D+i project of Red Eléctrica de España is co-financed by the European Regional Development Fund (ERDF), which aims to strengthen economic and social cohesion in the European Union by correcting imbalances between different countries and regions.

A way to build Europe



We care for your energy

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RED ELÉCTRICA DE ESPAÑA



Electrochemical storage solution to improve the efficiency of the electricity system

WHAT IS THE ALMACENA PROJECT?

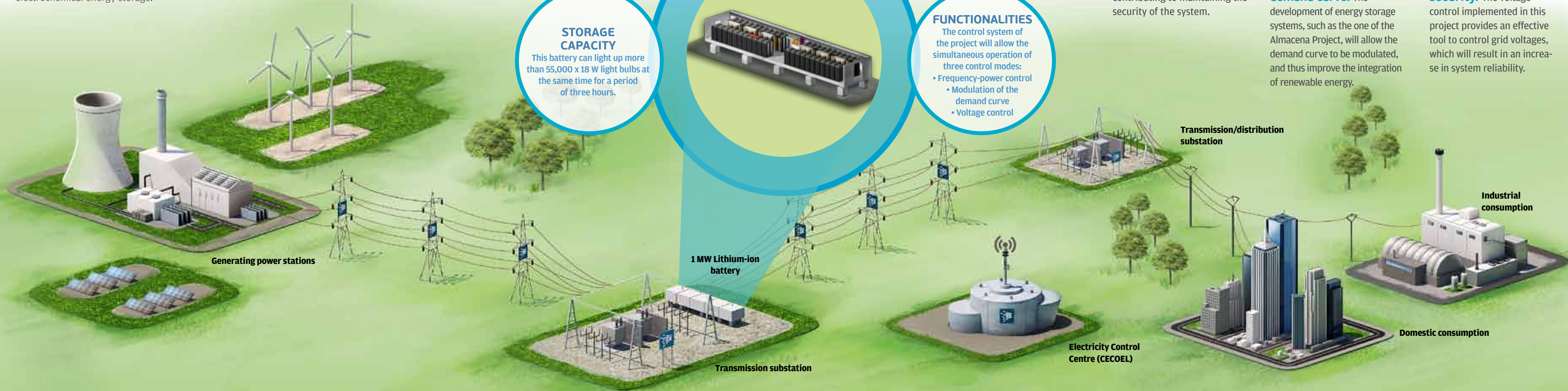
Almacena is a technological R&D+i project that enables the analysis and assessment of the challenges and capabilities associated with a energy storage battery connected to the transmission grid.

THE PROJECT REPRESENTS AN ELECTROCHEMICAL ENERGY STORAGE SOLUTION connected to the transmission grid. It consists of the installation of a lithium-ion battery with a power output of 1 MW and a capacity of 3 MWh at the Carmona 220/400 kV substation (Seville).

During the project, work has been carried out to achieve the following objectives:

- Clarify and define the solution regarding electrochemical energy storage.

- Identify the challenges associated with the **engineering and construction** of the storage system.
- Test the **technical capacities** related to the flexibility that this system provides to the operation of the electricity system.
- Gain experience in the **operation** of these systems and identify relevant aspects associated to their maintenance.



STORAGE CAPACITY
This battery can light up more than 55,000 x 18 W light bulbs at the same time for a period of three hours.

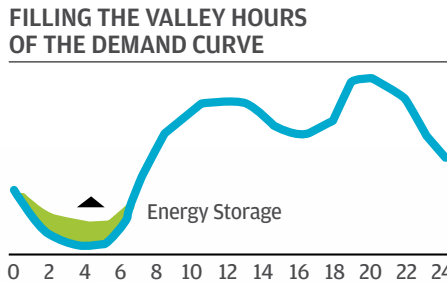
MODULAR STORAGE SYSTEM
Lithium-ion prismatic cells, grouped into modules, which in turn are grouped into racks.

FUNCTIONALITIES
The control system of the project will allow the simultaneous operation of three control modes:
• Frequency-power control
• Modulation of the demand curve
• Voltage control

HOW DOES THIS TECHNOLOGY CONTRIBUTE TO THE SUSTAINABILITY OF THE SYSTEM?

The storage of electricity will allow the integration of renewable energies and improve the flexibility and efficiency of the electricity system, whilst maintaining security of supply.

- 1. Flexibility.** The frequency-power functionality implemented in the Almacena Project makes it possible to compensate the lack of manageability of renewable energy sources, enabling a swift response (providing or absorbing energy) when faced with abrupt and unforeseen variations of said technologies and thus contributing to maintaining the security of the system.



- 2. Modulation of the demand curve.** The development of energy storage systems, such as the one of the Almacena Project, will allow the demand curve to be modulated, and thus improve the integration of renewable energy.

- 3. Quality and security.** The voltage control implemented in this project provides an effective tool to control grid voltages, which will result in an increase in system reliability.