

PROJECT

AIR4NRG

Air isothermal compression technology for long term energy storage

Air4NRG's main objective is the development of an innovative, efficient (over 70% round-trip efficiency), long-term, sustainable Compressed Air Energy Storage (CAES) prototype, which can enhance renewable energy availability and offer robustness and safety while increasing cost effectiveness and improving the environmental footprint.

zabala
INNOVATION



Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Commission. Neither the European Union nor the granting authority can be held responsible for them. N 101120660

7

PARTNERS

+2 Affiliated Entities

5

COUNTRIES

€5 M

TOTAL BUDGET

3

YEARS

**AIR4
NRG**

01

Challenge

Air4NRG will help address the growing need for stable and reliable long-term energy storage solutions to stabilise intermittent renewable generation due to increasing reliance on these energy sources. Compressed Air Energy Storage (CAES) has been a valid possible solution for decades. However, its poor energy efficiency, the need for fossil fuels to regenerate electricity, and the use of underground cavities as storage reservoirs have limited its development and use. Variations to CAES have shown low efficiency, losing much energy as heat and mechanical losses.

02

Solution

This project will combine advanced research on the isothermal compression/expansion process with the development of a robust, industrial-grade gas compressor stored in a containerised form factor to develop a new long-term energy storage solution based on former CAES technology. Air4NRG will develop an Isothermal Compressed Air Energy Storage (Isothermal-CAES) system relying, among other things, on isothermal compression and expansion of air by liquid piston to solve the problems of the former CAES.

03

Impacts

Air4NRG will develop an Isothermal-CAES system with 200kW and 2MWh – a robust, industrial-grade gas compressor stored in a containerised form factor. The 70% Round Trip Efficiency, sustainability and integration into an Energy Management System will be proven by the end of the project through end-user integration activities (TRL5). The project will result in a plug-and-play prototype, fitting into a standard 40ft container with >10h of storage. The system developed will be a rare material-free solution with simple industrial infrastructure needs, allowing its full development within the EU and strengthening Europe's position in the energy storage system sector.

IN ONE CLICK

Coordinator

Zabala
Innovation

Programme

Horizon Europe

Period

2023 - 2026

Sector

Energy

Web

Air4NRG.eu