

HyPES System – always on!

Enairys' Hydro-Pneumatic Energy Storage (HyPES) system is made up of 3 main parts:

- 1 A modular storage unit:** bundles of high pressure steel cylinders or fiber (carbon or glass) wound cylinders for the storage of compressed air. The total volume of the storage unit defines the energy capacity of the system (kWh).
- 2 A water conditioning unit,** which aims at cleaning and maintaining the system's water at ambient temperature. It comprises a water tank, a water filter and an ambient heat exchanger.
- 3 A modular power conversion and management unit,** which uses the system's water to efficiently convert the electric power generated by different types of sources into high pressure air. And, when needed, it efficiently converts back the compressed air into electricity to supply the load or feed the grid. The size of this unit defines the power rating (kW) of the system.

The modular design and the separation of the power part (kW) from the energy part (kWh) provide a great flexibility in the sizing and the operation of the system.



Main specifications:

Maximum operating pressure:
200 bar currently, Target: 400 bar

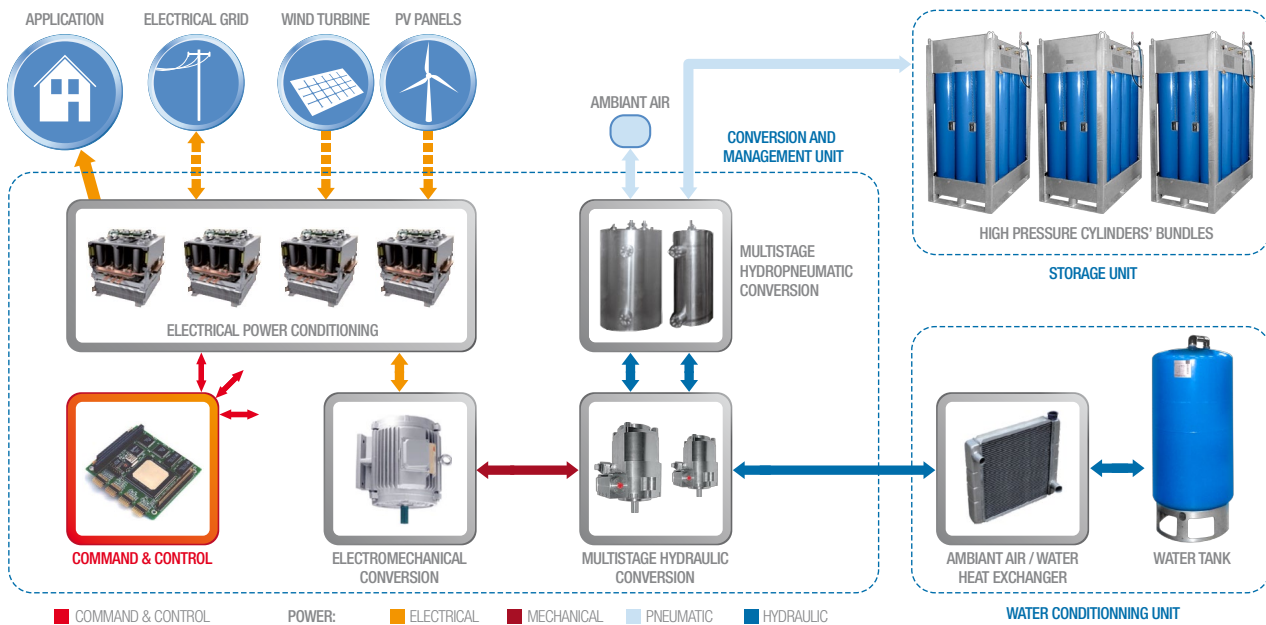
Volumetric energy density:
30 kWh/m³ at 200 bar,
65 kWh/m³ at 400 bar

Power range:
5 to 100kW/unit (Paralleling possible)

Physical dimensions:
Depend on the power rating and the energy capacity

Operating principle

HyPES energy storage concept is based on the natural compressibility of air. Thus, energy is stored in the form of pressure potential of compressed air. The originality of Enairys approach with this concept relies on 2 major innovations in the fields of hydro-pneumatics and power electronics:



An electrical power conditioning module with dedicated topologies and control strategies

This module allows the combination of different types of electrical sources and loads while ensuring an effective management of the power flow between them, a reliable, flexible and autonomous operation of the global system.

A new concept of water-hydraulic gas compression / expansion

This concept uses water as a "liquid piston" to compress the air while cooling it simultaneously and to expand it while heating it simultaneously. The resulting "quasi-isothermal" compression/expansion process leads to an excellent conversion efficiency.