



# CAES

## COMPRESSED AIR ENERGY STORAGE

**Massive Compressed Air Energy Storage (CAES) in salt leached caverns is an attractive and mature technology that can be a solution to electrical power grid issues such as the integration of intermittent energies and peak consumption period demand.**

### WHAT ARE THE STAKES?

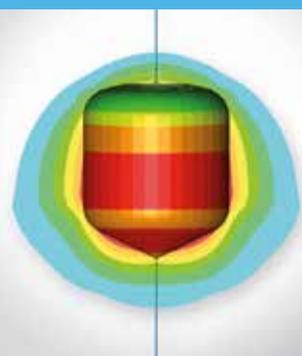
**Electricity storage has become a major issue, especially as a result of intermittent renewable energy production (solar, wind).**

Geostock has been a participant in the **"SACRE"** research project **"Compressed air storage for the electricity grid"** supported by the "French national research agency" in partnership with EDF and research laboratories (LMS, PROMES, L2EP) to study **the technical and economic feasibility of adiabatic compressed air storage for the electrical power grid.**

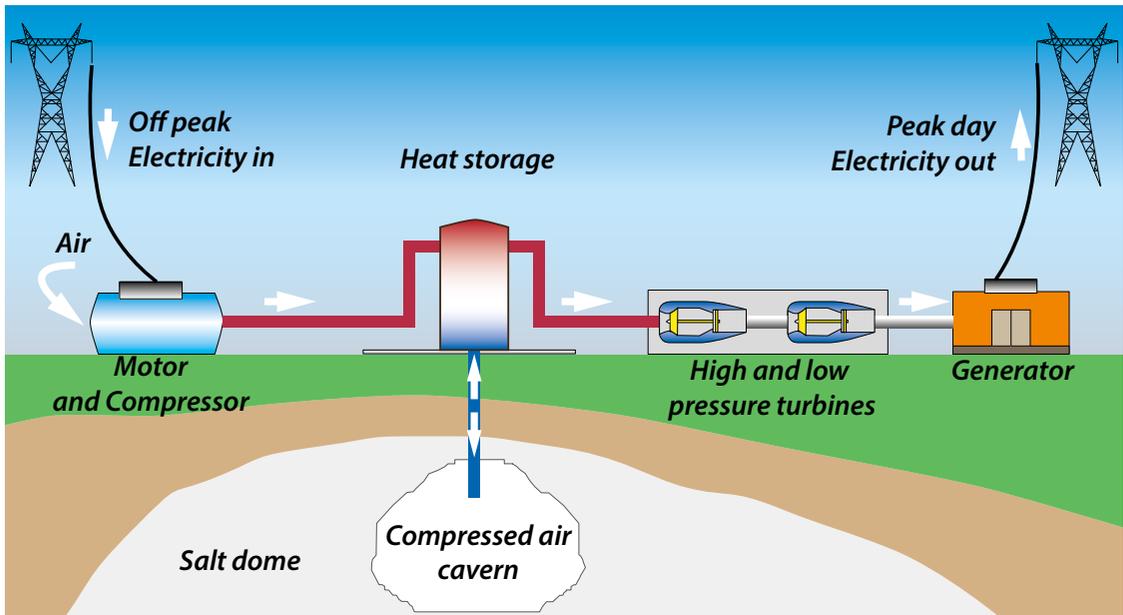
**In the first generation**, the air coming out of the compressor is cooled before being injected into the cavern, and the cold air coming out of the cavern is warmed in a combustion chamber before entering the turbine. **The energy efficiency of this system is lower than 50%.**

The advantage **of the adiabatic concept** (see diagram) compared to first generation CAES is the recovery of heat generated by the compression of the air using a heat storage system to avoid CO<sub>2</sub> emission and to achieve **an energy efficiency of around 70%.**

### KEY BENEFITS



- Green energy storage: zero CO<sub>2</sub> emission
- Energy efficiency of around 70%
- Storage capacity up to 1 GWh and 300 MW
- Solution to integration of intermittent energies and power grid issues



## ADIABATIC CAES INSTALLATIONS

### THE SACRE PROJECT HAS MADE IT POSSIBLE:

- To identify suitable materials for heat storage and calculate the size of such storage at surface,
- To identify potential geological sites and to calculate the size of the underground storage cavern for the required power,
- To develop a specific digital tool to simulate the storage cavern's thermal and mechanical behaviour,
- To identify all the possible services that such a storage can render to the electrical grid,
- To optimise the compressor and turbine system architecture.

## OUR SERVICES

- Site selection, investigation works and underground storage design for salt cavern and rock mined caverns,
- Drilling engineering services and construction supervision of the underground storage cavern,
- Specific CAES well completion (corrosion issues),
- Definition and optimisation of fast operational cycles,
- Entire compressed air cavern Project Management, from design to commissioning.