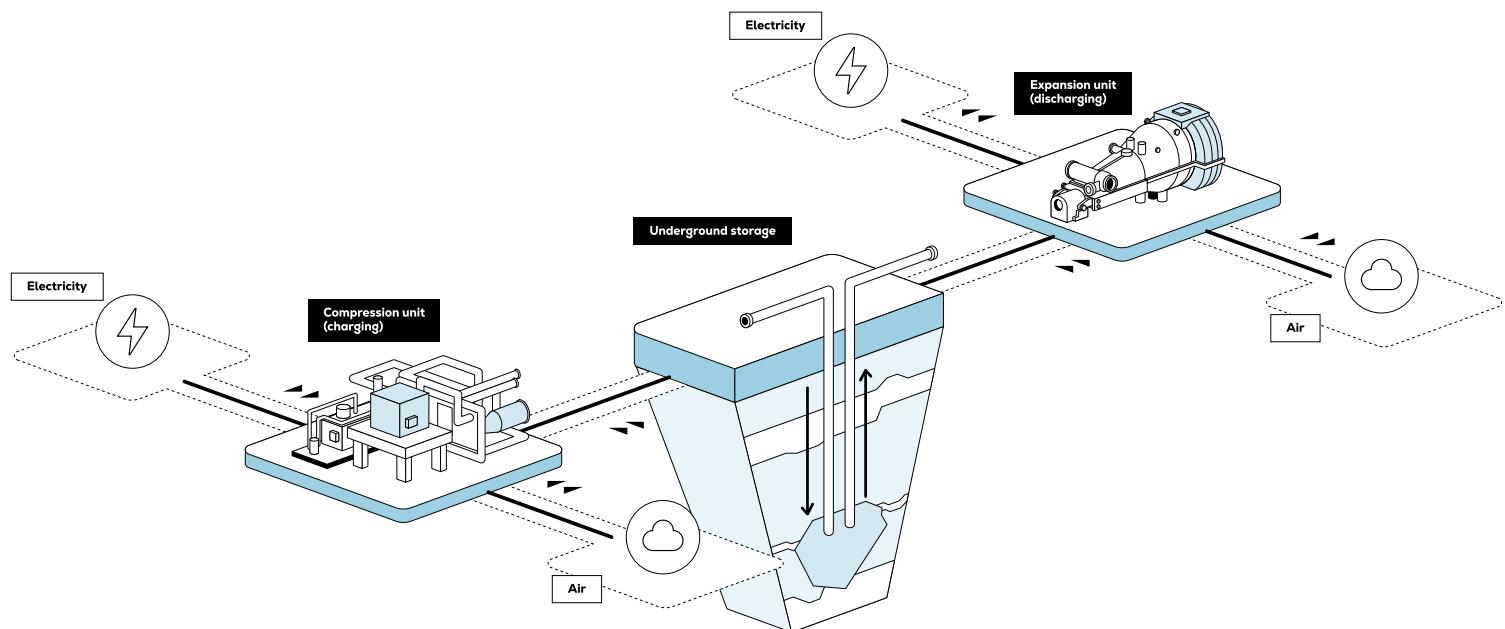
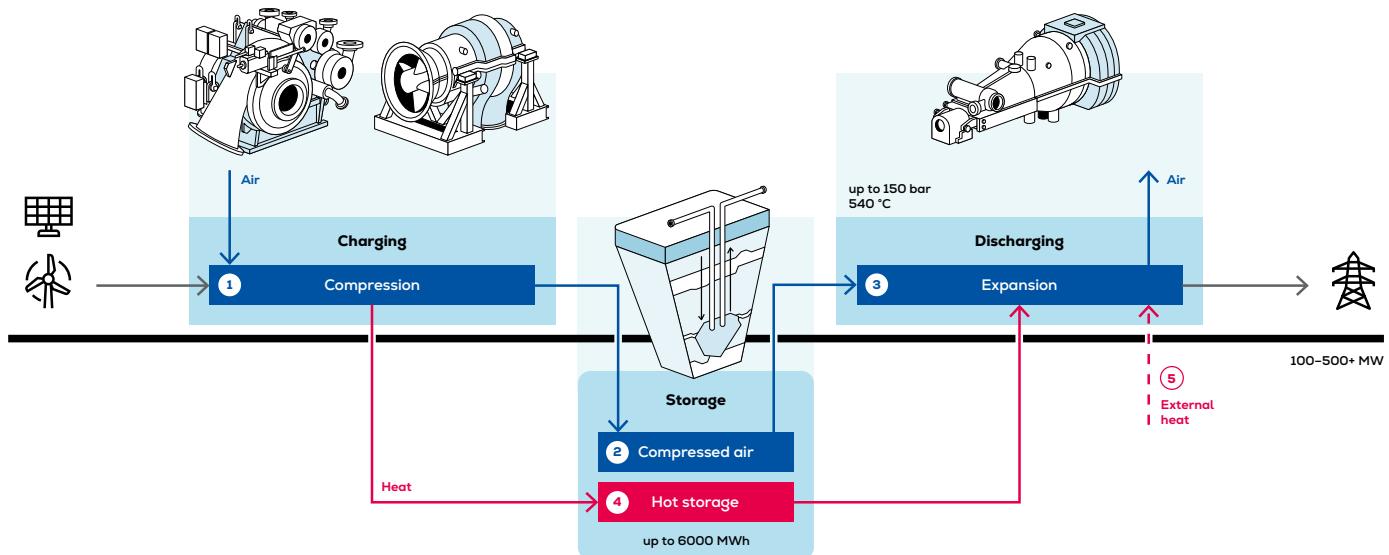


# CAES



## Benefits at a glance

- High system efficiency enabled by Everllence turbomachinery
- Proven technology with decades of operational experience
- Low capital investment and competitive levelized cost of storage
- High power output and large storage capacities
- Suitable for multiple energy services such as grid balancing, spinning reserve, and black start capability
- Scalable solution for long-duration, bulk energy storage



## General

CAES is a proven and cost-effective long-duration energy storage technology. It stores compressed air in underground caverns or geological formations and releases it to generate electricity when needed – providing reliable, grid-scale flexibility for renewable integration.

## Technology

During charging, electrical power drives an Everllence compressor to compress ambient air, which is stored in underground caverns or other geological reservoirs. When electricity is required, the air is released and expanded through an Everllence expander to drive a generator. By integrating a thermal energy storage system, the heat generated during compression can be reused, significantly increasing the system's round-trip efficiency.

CAES systems typically achieve efficiencies of 50–70 %, enabling storage durations from several hours to multiple days, depending on cavern size and configuration.

## A legacy of innovation

Everllence pioneered modern CAES technology. In 1978, Everllence supplied the compressors for the world's first CAES plant in Huntorf, Germany (300 MW/1GWh), which is still in operation today and a global benchmark for long-duration energy storage. This proven foundation supports Everllence's ongoing innovation in sustainable and future-ready energy storage systems.

## Future-ready and sustainable

CAES uses ambient air as the storage medium – free from emissions, rare materials, or chemical degradation. The technology can be combined with renewable heat sources, hydrogen production, or waste heat recovery, further improving overall system efficiency and sustainability. Everllence turbomachinery solutions are modular and scalable, enabling reliable, large-scale energy storage for a decarbonized energy future.

## Why Everllence

Everllence provides the turbomachinery core for reliable and efficient energy storage. With a track record of innovation, engineering excellence, and operational success, we deliver compressors and expanders that set industry standards for efficiency, durability, and scalability – empowering customers worldwide to accelerate the energy transition.

## Everllence turbomachinery for CAES

### Compressors

Everllence designs and manufactures high-performance compressors optimized for CAES applications. Our portfolio includes radial, integrally geared, and combined axial/radial compressors for large-scale units, with suction flow rates up to 1.5 million m<sup>3</sup>/h and discharge pressures up to 250 bar (3625 psi). These compressors ensure stable operation and high efficiency even under dynamic load conditions.

### Expanders

With more than a century of turbomachinery experience, Everllence provides expanders and steam turbines for power generation and mechanical drive applications up to 180 MW. They are designed for inlet temperatures up to 540 °C (1004 °F) and pressures up to 150 bar (2175 psi). Our flexible axial and radial gear expander configurations ensure optimal performance for air and process gas applications, combining robustness with superior efficiency.

## Contact

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