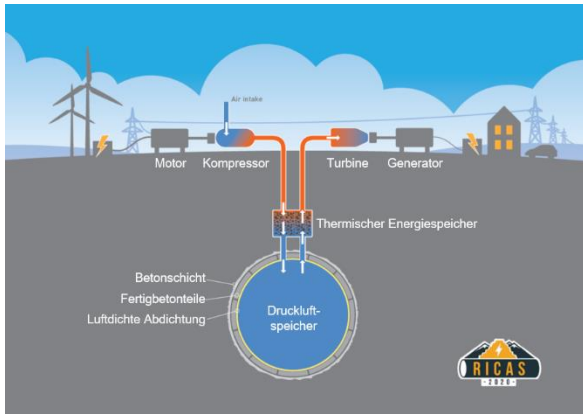
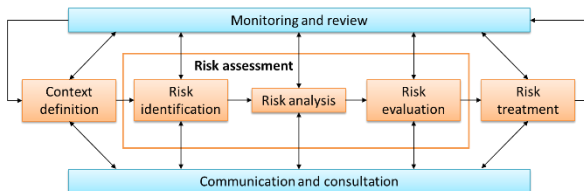


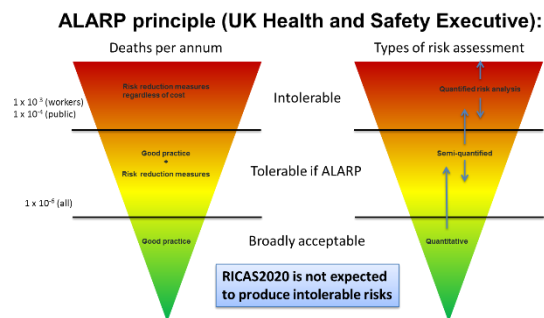
System definition and system limitations



Design concept



Risk analysis method (ISO 31000)



ALARP principle

### Description

The RICAS-2020 European research project is a design study focused on the below-ground storage of green energy using adiabatic compressed-air storage technology (AA-CAES) for the European Underground Research Infrastructure. The project aims to storing renewable energy in a manner that not reliant on the prevailing geological conditions of a specific area. To this end, it should be possible to store energy wherever a high demand for it arises.

The design concept to be developed is based on a small-scale testing facility that has an estimated rated output of 5 MW.

The following topic areas were examined:

- Thermal and pressure-specific interactions between surrounding rock/soil, tunnel lining and compressed air
- Innovative, environmentally-friendly excavation methods
- Leaktight sealing of caverns throughout the entire lifecycle
- Low-vibration and low-noise excavation techniques
- Material requirements with pressure fluctuations of up to 50 bar and temperatures of up to 800 °C
- Risk and safety analysis for safeguarding operational safety

### Services

HBI Haerter Consulting Engineers rendered the following services:

- Literature research in view of relevant guidelines, standards and state-of-the-art technology for adiabatic compressed-air storage techniques
- Consideration given to the risk of a sudden release of compressed air
- Development of safety requirements and methods to ensure the safe operation of a compressed-air storage power station
- Preparations leading up to possible future approval procedure for a test facility in Eisenerz, Austria
- Development of a safety strategy for commissioning a test facility

The risk assessments were conducted based on ISO 31000 guideline requirements and the ALARP (as low as reasonably practicable) principle.