



# Spatial Multi-Criteria Play-Based Analysis for HT-ATES Systems Across the Swiss Molasse Plateau

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## Goals

- Develop a spatial multi-criteria method to assess HT-ATES potential.
- Integrate surface energy demand with subsurface geological data.
- Identify favourable areas and geological targets for HT-ATES deployment.

## Problem

- Dependence on fossil fuels and need to integrate renewable/waste heat.
- Seasonal heat supply–demand mismatch.
- Geological and regulatory constraints for HT-ATES siting.
- Lack of a framework to identify suitable locations.

## Introduction

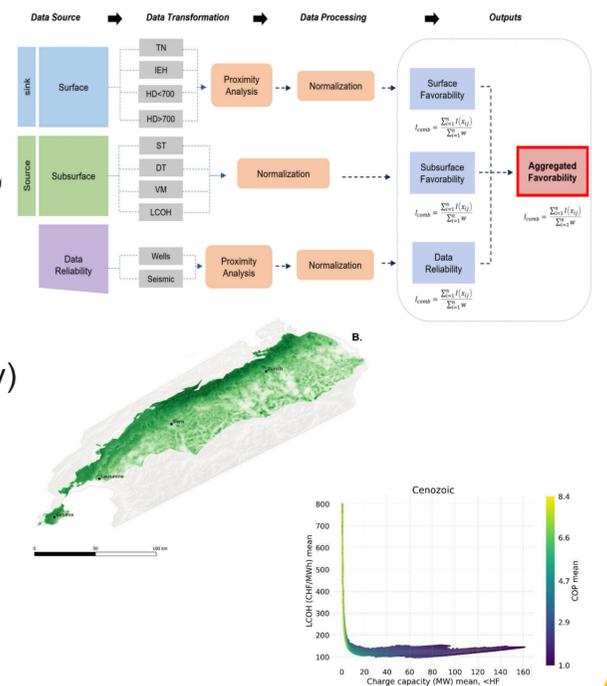
High-Temperature Aquifer Thermal Energy Storage (HT-ATES) is a key technology to support the decarbonisation of heating by enabling seasonal storage of renewable and waste heat.

This study presents a spatial multi-criteria analysis to assess the potential for HT-ATES in the Swiss Molasse Plateau, integrating surface energy demand, infrastructure, and subsurface geological conditions.

Identification of favourable areas and geological reservoirs to support the future deployment of large-scale underground heat storage systems in Switzerland is critical.

## Method

1. **Integrated surface data** (heat demand, industrial excess heat, thermal networks) to assess energy system suitability.
2. **Analysed subsurface conditions** (aquifer depth, thickness, temperature, faults, and storage capacity) using geological and thermal models.
3. **Combined technical, economic (LCOH), and data reliability criteria** to produce HT-ATES favourability maps.



## Results

- The Northern and central Plateau show the highest HT-ATES potential and lowest costs.
- Cenozoic aquifers offer higher capacity;
- Favourability maps identify priority zones for future HT-ATES development.



## Conclusions

- Developed a framework to assess HT-ATES potential. - Identified Geneva, Lausanne, and Zurich as most favourable.
- Integrated technical, economic, and data reliability criteria - Supports HT-ATES deployment for low-carbon heating.

### Core partners



### Associate partners



### Cooperative partners:

