

Project Fact Sheet

Project Title **Development of a multifunctional and combined large-scale seasonal pit storage for heat and cold**

Keywords Thermal energy storage, multifunctional pit storage, seasonal storage, optimizing energy storage systems

Project Details

Project Start	2018	Duration	3 years
Grant Scheme	Funding for applied research and development for universities of applied sciences (Programm zur Förderung der angewandten Forschung und Entwicklung an Hochschulen für angewandte Wissenschaften – Fachhochschulen)		Project ID
Funding Authority	Bayerisches Staatsministerium für Bildung Kultus, Wissenschaft und Kunst (Bavarian State)		
Project Budget	324€		
Contact Person	Prof. Dr. Peter Bayer (Project Leader) Dr. Ingo Dressel		
Project Partners	IN-Campus GmbHsch University (SU)		

Description

In our project „long-term storage”, we investigate and assess the re-use of artificial, large-scale basin systems, in order to utilize them for the storage of heat, and to form the storage scenarios that may be used in practice. This project is in cooperation with a local industrial company that plans to utilize an old area of a refinery to build a modern campus for research and development projects. The new area will contain office buildings, data centers and infrastructure and therefore has a higher overall cooling demand than heating demand. Accordingly, a complex and strategically useful energy supply can only be realized if a flexible heating- and cooling-scenario is applied. For such a scenario, an energy storage system is necessary. Here, the re-use of artificial basins has the particular advantage of cost-savings, as the basin does not need to be removed.

The overall goal of our project is to develop a multifunctional heating and cooling storage system that does not only consider seasonal variations, but particularly buffers short-term heating/cooling demands and, ideally, is combined with a variety of heating sources.

For that, we:

- refer to the experiences with existing large-scale energy storage systems and discuss the

utilization of the artificial basins and assess this scenario with respect to heating and cooling,

- develop a strategy for heating and cooling that considers the specific conditions of the location using numerical modelling,
- work on constructional modifications for the artificial basins to have a highly efficient storage system in practice.

These steps cannot be achieved solely if common technologies are used. Therefore, additional innovative strategies need to be incorporated. For this reason, an additional insulation (thermal and hydraulic) that increases the efficiency of a storage system, is discussed. Moreover, the combination and linkage between different types of basins (i.e., with varying size and geometry) is analyzed in order to have multifunctional storage systems that consider short-term heating and cooling demands.