



NEW STORAGE LATENT AND SENSIBLE
CONCEPT FOR HIGH EFFICIENT CSP PLANTS



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

H2020 Grant Agreement N°:
720985

H2020 Grant Agreement N°.: 720985

Project acronym: NEWSOL

Project full title: NEW StOrage Latent and sensible concept for high efficient CSP plants

Deliverable D5.5 - Thermocline and module TES designs and drawings

ABSTRACT

Concentrated Solar Power (CSP) is a promising technology for electricity production. However, as most of the renewable energy sources, some problems arise from the discrepancy between the availability of the resource and the demand, yielding a low dispatchability of a solar power plant, Thermal Energy Storage (TES) is an additional technology that allow us to store thermal energy when available until it is needed (within some small periods of hours).

The NewSOL investigation and demonstration project focuses on the development of durable materials solutions for high efficient thermal solar energy harvesting in new and existing Concentrated Solar Power (CSP) plants. Two energy storage system architectures have been proposed to combine the advanced materials solutions into an optimum configuration design improving the thermal performance. First, a new thermocline concrete tank Hybrid TES system has been proposed to provide storage capacity to new CSP plants at lower cost than commercially available 2- tanks using molten salts at 400°C. The new Hybrid TES system will be designed to store enough thermal energy to drive the steam generator for 8h in the demonstrating phase in Évora (Portugal). Second, a high-efficient and durable concrete module TES system with a storage capacity of 1600 kWh_{th} will be demonstrated for retrofitting of existing CSP plants. The module of concrete is thought to provide a flexible and low-cost option for enhancing STE capacity of existing thermal power plants without TES capabilities or with storage capacities lower than the standard of 8-9 hours.

The aim of this document is to describe and specify the characteristics of the thermocline tank and the module.

The designs of the tanks and the module have been developed according to all the inputs of the different Work Packages and the codes and standards.

Slight changes to these designs could be addressed following construction technical assistance issues or following cost matters.