H2020 project fact-sheet:

Solving Water Issues for CSP plants

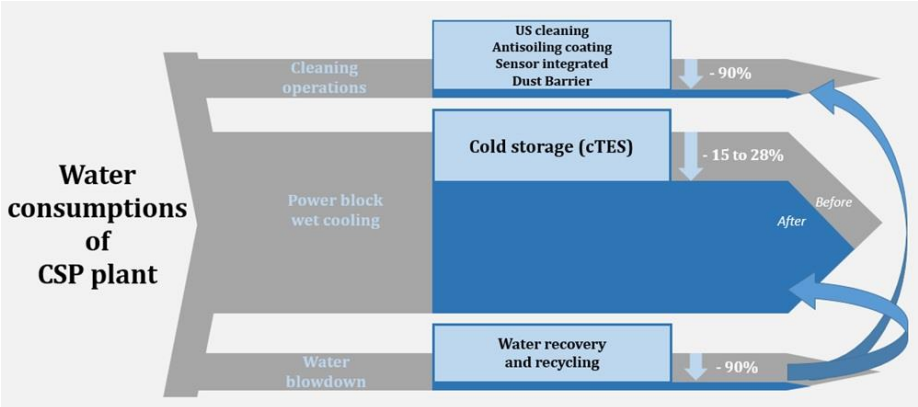
SOLWARIS

Project ambition:

The overall purpose of the SOLWATT project is to upscale, implement and demonstrate cost-effective technologies and strategies that bring about a significant reduction of water of CSP plants while ensuring excellent performance of electrical power production. The SOLWATT approach proposed will tackle all segments of water consumption in a CSP plant by:

- 90 % for reduction of cleaning operations
- 15 to 28 % for cooling of turbine condenser
- 90 % for recovery and recycling of water.

The continuous online determination of optimal plant operation, including water consumption criteria, will contribute towards achieving water consumption reduction and subsequently the LCOE reduction. To facilitate the social acceptance of CSP plants and of the technical solutions proposed by SOLWATT, socio-economic, environmental studies and humanitarian issues and their impact on CSP plants will also be assessed using comprehensive and detailed case studies in representative locations for CSP plant deployment. This overall approach of the project will maximize the opportunities for the emergence of our innovative technologies and near-to-market solutions for CSP plants.



Project facts:

Start date: 01/05/2018
End date: 30/04/2022

Duration in months: 48

Project EU funding: € 10.8 M

H2020 Innovation Action

Grant Agreement: 792103

Call: H2020-LCE-2017

Topic: LCE-11-2017
Near-to-market solutions for reducing the water consumption of CSP Plants

Keywords:
Concentrated solar power, sustainable renewable energy, water saving, cleaning, cooling, water recovery, demonstration

Solving Water Issues for CSP plants - SOLWATT

Project objectives:

- SOLWATT targets a reduction of water consumption of cleaning operations by 90%, i.e. savings nearly 0.25m3/MWhe depending on the soiling rate and the location of the solar field.
- To keep a low temperature at the turbine condenser, i.e. a high efficiency while reducing the water consumption, SOLWATT will demonstrate the efficiency of a cold storage reservoir, regenerated by the lower temperatures that occur at night.
- SOLWATT will demonstrate the efficiency of using a Multiple Effect Evaporation (MEE) system to recycle and re-use 90% of these waste water streams (0.5 m^3/MWhe) using thermal energy otherwise dumped by defocusing parts of the solar field, achieving a water consumption reduced to 0.05 m^3/MWhe.
- The probabilistic treatment of forecasts for the following days is essential for optimisation of CSP plant operations. SOLWATT will demonstrate the efficiency of the optimized global control of the plant thanks to a dedicated application.
- Social, economic and environmental impacts on local communities close to CSP plants are a point of concern.
- All technologies will be installed, demonstrated and validated under real conditions at "La Africana" and "SEDC" CSP plants.

Project workplan

The SOLWATT project workplan consists of several phases. First phase of the project will be focused on development of individual technologies – O&M Optimizer; cleaning means and methods related to solar field components, cooling technologies and water recovery system. Common objective for all technologies is to upscale previously developed solutions and prepare them for the installation in the testing site. All proposed technologies will be deployed and validated under the real conditions at testing sites. In addition to technology development, there are several activities running in parallel with the whole project covering socio-economic and environmental aspects of the CSP including also practice-oriented training activities as well as dissemination and exploitation of the project results.

Expected results:

The SOLWATT project is expected to reduce the total water consumption at CSP facility by 35% for a wet cooled and by 90% for dry cooled CSP plants. Table below shows detailed information on water savings (estimated for La Africana CSP plant) according to individual SOLWATT technologies. These figures are based on preliminary tests and estimations performed by the project partners in order to validate the primary concept. For cleaning technologies, ultrasonic cleaner technology itself can reduce water consumption by 90%. The reduction of the frequency of cleaning operations, and then cost, will be ensured by the implementation of dust barrier, anti-soiling coatings and sensors.

Consortium:

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CEA	FR
DLR	DE
CIEMAT	ES
Cranfield University	UK
Fundacion Tekniker	ES
Rioglass Solar S.A.	ES
INDETEC	ES
FENIKS	ES
BSC	ES
Brightsource Industries	IL
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