PROJECT DETAILS

PROJECT REFERENCE:
721045
START/END:
Jan 2017 - Dec 2020
TOTAL COST:
EUR 6 307 851,25
EU CONTRIBUTION:
EUR 4 999 777,88
PROGRAMME ACRONYM:
NEXTOWER
CALL IDENTIFIER:
H2020-NMBP-2016-two-stage
TOPIC:
NMBP-17-2016 - Advanced materials solutions and architectures for high efficiency solar energy harvesting
FUNDING SCHEME:
IA - Innovation action
PROJECT WEBSITE:
http://www.h2020-nextower.eu

CONTACTS

Project Coordinator

Antonio Rinaldi

AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE
antonio.rinaldi@enea.it

Project Manager

Isella Vicini

BEWARRANT S.L.
isella.vicini@warrantgroup.it

NEXTOWER

PARTNERS

ENEA · KTH · Politecnico di Torino · Ciemat PSA · ICCRAM · University of Oxford · Sapienza · Sandvik · beWARRANT · Certimac · LiqTech International · R2M Solution · CALEF · Siltronix · Greenway CSP Solar Tower · EngiCer · UNE Normalización Española

FOR MORE INFORMATION:

http://www.h2020-nextower.eu

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NEXTOWER

NEXTOWER

ADVANCED MATERIALS SOLUTIONS FOR NEXT GENERATION HIGH EFFICIENCY CONCENTRATED SOLAR POWER (CSP) TOWER SYSTEMS

THE PROJECT

Atmospheric solar towers represent one of the best short-term options for large scale power generation in Concentrated Solar Power, provided that limitations in materials for solar receivers and heat transfer solutions are developed and tested.

NEXTOWER aims at demonstrating high-performance durable materials for the next generation of concentrated solar power (CSP) air-based tower systems, making them commercially competitive in the energy market beyond 2020.

NEXTOWER takes a comprehensive conceptual and manufacturing approach that starts by optimizing for durability the ceramic materials to achieve 20-25 years of maintenance-free service receiver components, while increasing their operating temperature for thermodynamic efficiency. The actual exploitation of the hotter air (up to 800°C) is then crucially tied to the development of a high-temperature thermal storage, here inspired by nuclear fission GEN-IV technology and based on liquid lead by means of new corrosion resistant steels.

INNOVATION

Fore-front Ceramic Design, Modelling, Characterization & Manufacturing:

The solar receiver of the atmospheric CSP will be designed out of tough monolithic ceramic with high thermal conductivity.

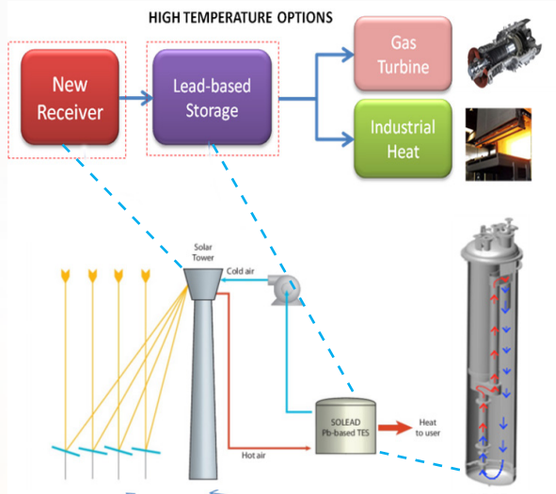
Thermal Storage:

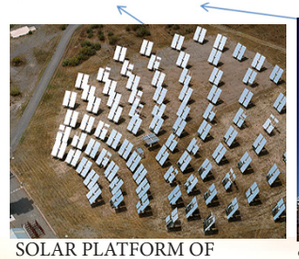
Innovative expertise and equipment derived from nuclear research for the purpose of developing liquid metal (lead-based) technology for high temperature storage.

Excellence and commitment to CSP testing in laboratory and full scale rigs:

NEXTOWER makes available full scale large demonstrators and some of the best known research facilities in solar technologies.

CONCEPT





SOLAR PLATFORM OF ALMERIA (SPAIN)

SOLAR TOWER

OBJECTIVES

- **Durable solar receivers**

Develop new mechanically tough and highly thermally conductive SiC ceramic receivers, working under extreme thermal cycling without failure at a maximum materials temperature of at least 800°C and delivering over 20 years of continued operations.

- **High temperature steels for thermal storage by liquid lead**

Develop coextruded-tubes and liner technologies from proprietary FeCrAl corrosion-resistant alumina forming steels to build high-capacity, high-efficiency lead-based heat storage that can work with high temperature receivers to supply gas turbines or industrial processes, thus expanding the boundaries of CSP technology.

- **Field testing that will run for 12 months**

One year of demonstration with lead at average 700°C for the full proof of all the materials and for input data for levelized cost of energy (LCOE) and Life Cycle Assessment (LCA) computations.

- **New SOLEAD demo of CSP with lead loop**

Set up a full scale CSP demonstrator (SOLEAD) for unprecedented field testing of materials for CSP lead-towers, encompassing a large solar receiver interfaced to a single-chamber lead storage pool, in turns connected to a secondary “heat sink”.

- **Proving long term operations**

Non-destructive testing and multi-scale modelling are intertwined synergically to optimize resources and provide predictive approach, while contributing to the EMMC (European Materials Modelling Council) initiative.

- **Exploitation and Standardization**

NEXTOWER will establish and maintain an exploitation culture throughout the project, treating IPR in a way that maximizes impact, and addressing the integration of NEXTOWER with the standardization system.