

OBJECTIVE

The main objective of the Competitive Solar Power Towers (CAPTURE) project is to increase plant efficiencies and reduce levelised cost of electricity (LCOE) by developing all relevant components that allow implementing an innovative plant configuration. This plant configuration is based on a multi-tower decoupled advanced solar combined cycle (DSCC) approach that not only increases cycle efficiencies but also avoids frequent transients and inefficient partial loads, thus maximising overall efficiency, reliability as well as dispatchability, all of which are important factors directly related to cost competitiveness on the power market.

The solar receiver prototypes tests started in November 2016. The chosen test facility is the "Plataforma Solar de Almería", a well-known solar test area in southern Spain, where all required infrastructure for the validation of the concept, such as an experimental tower and heliostat field are already available.

CAPTURE's work plan implementation is divided into 10 work packages (WPs), outlined as follows:

- **WP 1 (CENER)** - Definition of the overall specifications of the CAPTURE concept, the decoupled solar combined cycle (DSCC) as well as the development of system model and concept optimisation through simulations
- **WP 2 (CENER)** - Development of an innovative high-efficiency volumetric solar receiver concept
- **WP 3 (IK4-TEKNIKER)** - Development of the CAPTURE regenerative heat exchanger system
- **WP 4 (Bluebox Energy)** - Development of a high efficiency Brayton cycle specifically addressing the needs of the CAPTURE combined cycle configuration
- **WP 5 (CENER)** - Development of the down-sized heliostat and related lean manufacturing analysis, the smart calibration system, as well as the innovative dynamic multi-aiming-point strategy
- **WP 6 (CIEMAT-PSA)** - Testing the solar receiver - regenerator - hot air turbine unit in a "real world" environment
- **WP 7 (TSK-FLAGSOL)** - Detailed risk analysis
- **WP 8 (EUREC)** - Coordination of communication and dissemination activities
- **WP 9 (EDF)** - Exploitation of results
- **WP 10 (CENER)** - Overall management of the CAPTURE project

THE TEAM

The CAPTURE consortium is composed of 13 partners coming from six European countries, whose complementary expertise will enable to successfully deliver the expected results:

Coordinator



MORE INFORMATION

Competitive Solar Power Towers
Tel.: +32 2 318 40 47
info@capture-solar-energy.eu

www.capture-solar-energy.eu

Design: www.acg-bxl.be



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 640905

COMPETITIVE SOLAR POWER TOWERS



Coordinator



CENER



CAPTURE focuses on the following activities:

- 1** The development of an innovative, highly efficient open volumetric solar receiver:
 - As of November 2016, first receiver prototypes are being tested at the PSA in the south of Spain
- 2** A network of highly efficient fixed-bed regenerative heat exchangers working in alternating modes - atmospheric heating and pressurized cooling
 - During the first half of 2017, the design of the system will be optimized and during the second half it will be manufactured and assembled
- 3** A high efficiency two-stage, intercooled Brayton gas-turbine cycle.
 - Progress as of February 2017 includes a full thermodynamic model of a two-stage intercooled Brayton cycle. This model uses a hybrid of known performance for the low pressure and power turbine stages together with models developed for the high pressure and intercooler parts.



- 4** Validation-scale prototypes for the key elements as well as a complete solar-receiver, regenerator and turbine unit will be developed and tested.
- 5** Development of small-area downsized heliostats that will enable improved solar flux control at the solar receiver through automatic heliostat field calibration.
 - An accurate cost effective small size heliostat has been developed based on low cost "off the shelf" available motors and low cost cable transmission.
- 6** The complete theoretical assessment and optimisation of the modular multi-tower decoupled solar combined cycle concept (DSCC) for easing capital investments.

More detailed information is available in the Media & Downloads section of the projet website

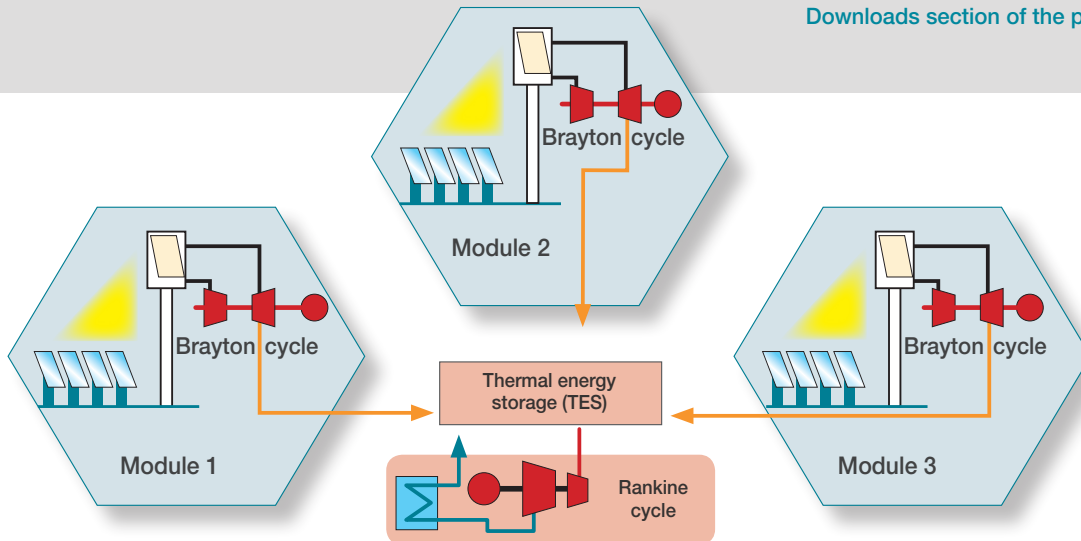


Figure 1
The CAPTURE plant configuration is based on a multi-tower advanced decoupled solar combined cycle approach

