



CENER

CENTRO NACIONAL DE
ENERGÍAS RENOVABLES
NATIONAL RENEWABLE
ENERGY CENTRE

IK4  TEKNIKER

Research Alliance

EASY

AN INNOVATIVE DESIGN FOR COST EFFECTIVE HELIOSTATS/SOLAR FIELDS

The EASY concept

Among all the available Concentrated Solar Power (CSP) technologies, Power Tower has been predicted to be the most cost-effective for producing solar-generated electricity on a large scale. Current investment costs are still high (just the solar field can involve up to 50% of the plant capital cost), but their cost reduction potential for the following years is wide.

CENER and IK4-TEKNIKER have joined together to develop the EASY project, where the analysis and design of an innovative and cost effective small size heliostat is being carried out.

This cost effective solution offers clear advantages: use of standard components, no need of canting, easy installation, minimal on-site labor, low wind loads, automatic heliostat calibration system and cheaper testing equipment needed.



ACTIVITIES PERFORMED



Driving mechanism

The use of a simpler tracking mechanism strongly reduces the cost of the heliostat. A test bench has been designed and created, which allows to test many different driving mechanisms (i.e. belts, chains, wire...). Limits, benefits and drawbacks of several mechanisms have been already analyzed.



Calibration system

Frequent calibration of the heliostats make it possible to relax the requirements on the mechanical construction of the heliostat, allowing cheaper solutions. An innovative calibration system based on computer vision has been designed. A first prototype has been prepared in parallel to the development of specific software. Performance tests for the fine adjustment to ensure proper orientation of heliostats are currently underway.



Wind load tests

Wind load effects are a key factor to establish the optimum heliostat mechanical design. A testing prototype has been designed for the monitoring of bending moments and torques caused by the wind in real conditions. This prototype has been anchored to the ground with a ground screw system foundation at a location with rich wind resources, carefully chosen for this activity.

CONCLUSIONS

CENER and IK4-TEKNIKER have joined efforts to deeply explore the trend of small size heliostats, heading towards a significant heliostat cost reduction.

The performed activities will lead to a heliostat design and calibration system that will achieve the goal of 100\$/m².

Future work will include a deep analysis of different studies performed at demonstration scales, which will be done by the end of the current year. Further field tests are planned and should be executed during the next months.



Contact:

info@cener.com | www.cener.com
renovables@tekniker.es | www.tekniker.es