



SinoTrough – Innovative Parabolic Trough Technology for a Sustainable Energy System in China

CLIENT II – International Partnerships for Sustainable Innovation

Unlike fossil energy sources, solar thermal power plants can produce efficient, clean and cost-effective electricity. In sunny regions, they supply renewable electricity based on demand through the use of large thermal storage systems. The German-Chinese project SinoTrough is researching collectors and systems to further increase the efficiency and reliability of the technology and reduce manufacturing costs. The project will contribute to sustainable development in China through clean energy delivery coupled with high local value creation and employment.

Contribution to the transformation

Just like in Germany, there is an urgent need in China for solar thermal power plants and their solar collectors. The aim of the SinoTrough project is to develop an innovative parabolic trough collector for solar thermal power plants in the Chinese market. Parabolic trough collectors concentrate the sunlight onto the absorber of a solar thermal system. This should support the transformation of the Chinese energy system and the associated reduction in CO₂. The collectors are to be specially designed for the Chinese market. This means that, on the one hand, they have to be adapted to the particular environmental conditions in the harsh desert climate and, on the other, they must be produced, assembled and operated in China in a socially responsible manner.

Innovative approach

In the project, technological and socio-economic aspects are closely interlinked. In the project, technological and socio-economic aspects are closely interlinked. The technical development in the SinoTrough project will go far beyond current state-of-the-art technology. Innovative solutions for current challenges regarding all core components are being sought in order to improve collector efficiency and adapt the product to the Chinese market. For the reflectors, for example, new concepts in terms of dimensions and design as well as material combinations are being investigated. As a result, the collector will be designed taking into account the climatic, technological, logistical and economic requirements of the Chinese market. Finally, the prototype will be built and measured.

In order to pave the way for a higher proportion of CSP (concentrated solar power, solar thermal power plant)

technologies in the future energy system, the requirements will be analysed in a model region in China to be determined in the course of the project and a workshop will be held with stakeholders to increase public acceptance.

In addition to involving stakeholders, the role of CSP power plants in the Chinese market will be analysed using the Fraunhofer ISE simulation tools devISE, ColsimCSP and Raytrace3D. In this way, the potential of a storable and predictable power generation technology should be identified in order to permanently strengthen acceptance.

Development and implementation of a prototype
At the end of the project, a prototype of the new collector adapted to Chinese conditions will be built, measured and demonstrated in China. Broad future application is to be supported by the model region studies conducted for use on the energy system and by the analysis of the socio-economic acceptance of CSP in China.

The aim of the project is that, after successful development and product launch in China, the SinoTrough can also be offered in other markets, thereby contributing to the transformation of the global energy system. Conceivable transfer markets would above all be the Middle East, North Africa and South America.

SinoTrough was launched by Fraunhofer ISE. The ISE is assuming the role of the coordinator in the joint project, leading the overall project and is also responsible for the socio-economic study, energy system analysis and technology assessment, investigation of innovative manufacturing technology, and surveying

and qualification. It is supported by sbp sonne GmbH, which is responsible for the development of the collectors and for consultation on construction and surveying. The project is also working closely with Chinese partners to build and test the prototype.



The first commercial CSP power plant in China: 50 MW CGN Delingha with 9h of storage and 9120 EuroTrough collectors.

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