

COMPARATIVE ASSESSMENT OF THE TECHNICAL PERFORMANCE OF SOLAR THERMAL CONCENTRATING TECHNOLOGIES FOR POWER GENERATION

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This paper will provide a methodology which was used to comparatively assess the technical performance of different solar thermal concentrating technologies for power generation for two studies:

- Comparison of solar tower, trough, dish/Stirling and solar chimney plants (DLR [1])
- Second generation central receiver technologies (DLR/SNL [2]).

The objective was to furnish a systematic and detailed comparison of the different system characteristics with emphasis on the following aspects:

- a) Comparison of technical data, indication of technical potentials/limitations and of possible technical improvements:
 - energy flows, annual energy yield, input/output characteristics (Figure 1), efficiencies, operational behavior/diurnal performance
- b) Comparison of economic data, identification of the economic potential:
 - plant costs estimates, O&M costs inclusive staff costs, power generating costs (on the basis of a standardized mathematical financial model).

Item a) will be presented in this paper, whereas item b) will be provided in a separate paper prepared by H. Klaiß, W. Meinecke (DLR) and F. Staiß (ZSW).

Main items of the methodology used for the comparison are:

- classify the plants
- define the models of reference plants
- form a set of consensus guidelines which dictate many parameters/data that should be treated identically
- use common analytical methods/codes for plant design/layout and energetic simulation as well as for reliability analysis
- * assess finally the different technologies (technical/economical aspects; ultimate criteria: low power generating costs).

References

- [1] M. Becker, W. Meinecke (DLR), (Eds.), "Comparison of Solar Thermal Plant Technologies: Solar Tower, Trough, Dish/Stirling and Solar Chimney Plants" (in German), Springer-Publishing, 1992

[2] M. Becker (DLR), P.C. Klimas (SNL), (Eds.), "Second Generation Central Receiver Technologies: A Status Report", C. F. Müller Publishing Karlsruhe, 1993

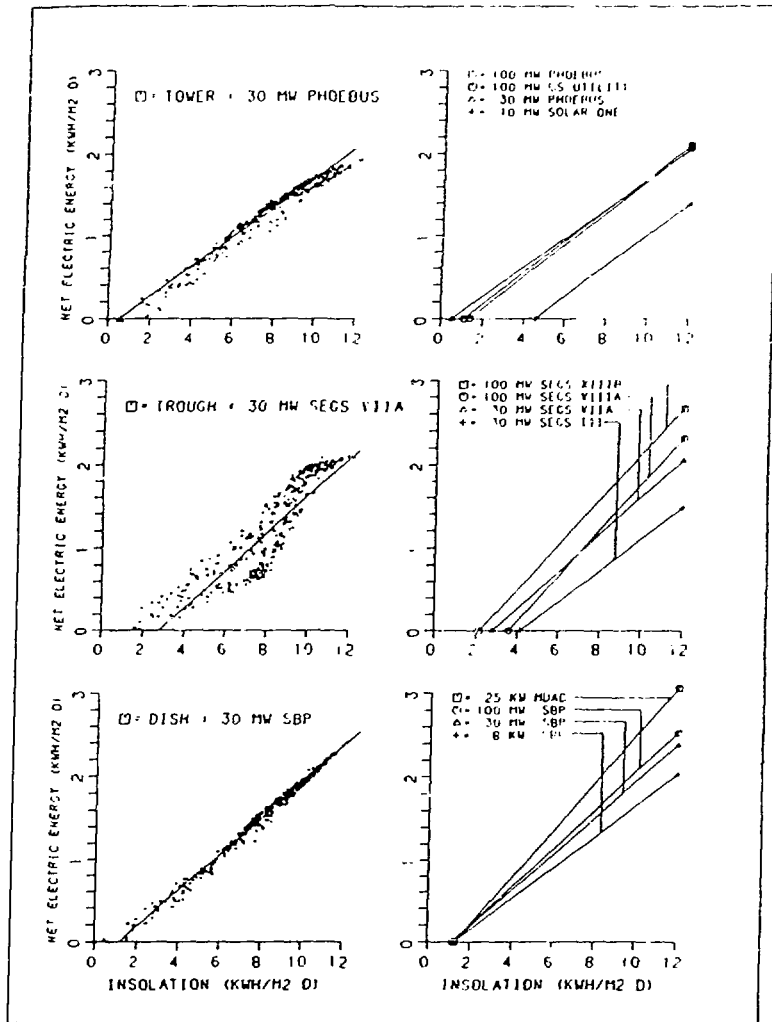


Figure 1: Input/Output Characteristics of Central Receiver, Trough and Dish/Stirling Systems; 30 MWe Plants, Solar Operation, Barstow Insolation 1976 [1]