

## COMPARATIVE ASSESSMENT OF THE COSTS AND BENEFITS OF SOLAR THERMAL CONCENTRATING TECHNOLOGIES FOR POWER GENERATION

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This paper will provide a methodology which can be used to comparatively assess the costs and benefits of different technologies for power generation. Both costs and benefits determine mainly the economic situation of a power plant being in competition with different plant technologies (solar or fossil).

The methodology which was used to comparatively assess the capital costs, O&M-costs inclusive plant staff costs and the power generating costs will be presented in detail which was used to comparatively assess the cost and market potential of different solar thermal concentrating technologies for power generation for three actual studies [1, 2, 3].

The objective was to furnish a systematic and detailed comparison of the different technologies with emphasis on cost data and on the economic/market potential if compared with fossil fuel plants (Figure 1).

Main items of the methodology used for the comparison are:

- use technical and performance as well as plant availability data as input data determined for the technical comparison (compare the separate paper of W. Meinecke (DLR))
- determine respectively estimate the capital costs, and the O&M costs inclusive costs of staff and of fuel (if valid) on the basis of consensus guidelines which dictate many parameters/data that should be treated identically
- calculate the power generating costs on the basis of a standardized mathematical financial method (simplifying equation or dynamic model using a computer code)
- compare solar with fossil fuel powered alternative plants on the basis of consensus guidelines
- analyze uncertainties of performance data, capital costs and O&M costs, perform a sensitivity analysis and identify those parameters that have the most significant impact on the annual energy yield predictions as well as on the generating costs
- analyze the market potential (example [3]).

Additional items of assessment of the economic situation may be (not used for above mentioned studies):

- analyze environmental effects
- consider environmental cost adders caused by air pollution, respectively predict benefits by avoiding such adders as is the case for solar plants
- consider financing plans
- consider political effects
- analyze availability and prices of fossil fuel.

### 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
- [3] H. Klaiß (DLR), F. Staiß (ZSW), (Eds.), "Solar Thermal Concentrating Power Plants for the Mediterranean Area" (in German), Vol. 1 and 2, Springer-Publishing, 1992

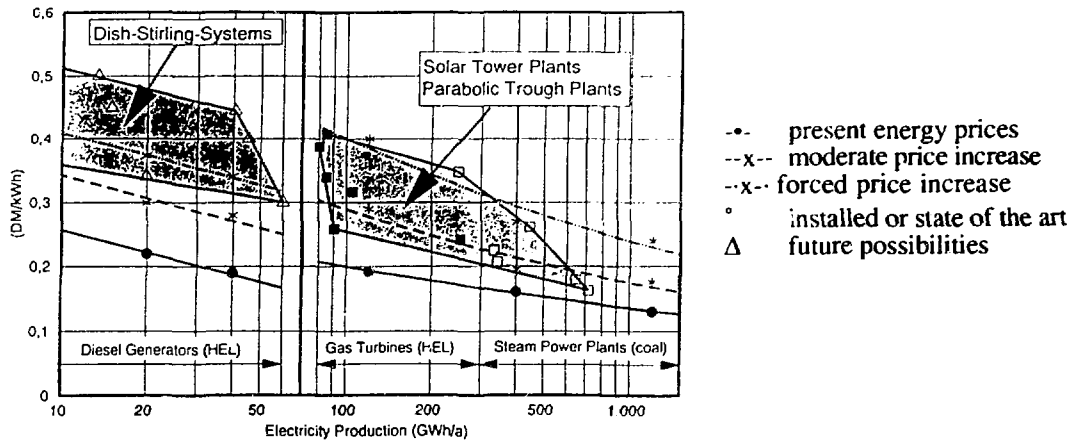


Figure 1: Energy Production Costs of Solar Thermal and Conventional Power Plants in the Range of 10 MWe to 200 MWe (Central Systems) [3]