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Indigenous Solar Electricity Generation

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Abstract

Energy is the key to development. Many developing countries suffer from lack of energy resulting in deforestation, poverty and population increase, a vicious circle. At the same time these countries usually have ample sun and arid "useless" land. This calls for solar power plants which they can afford with their own resources which are their skillful hands, sun and sand.

The Solar Chimney (as described earlier e. g. in SEI Vol. 4, No. 2, May 1994) fulfills these requirements, because it consists predominantly of a large vertical concrete tube and a flat glass roof.

Concrete/cement and glass are nothing but sand/stone and energy and labour, the energy being supplied by the first solar chimney itself, which thereafter reproduces indigenously.

In the paper the design of a 200 MW-solar chimney with storage for a 24 h continuous electricity generation will be described. By referring to the author's experience with bridge construction in developing countries*) it will be shown that these countries are very well able to build such large plants on their own.

Further, there will be a passing reference to the state-of-the-art in solar electricity generation including the author's own Dish/Stirling-systems for high efficiency decentral small scale solar electricity generation.

In conclusion it will be claimed that in the future developing countries could produce solar electricity not only to cover their own demand, but also for export for the benefit of the industrialised countries as well.

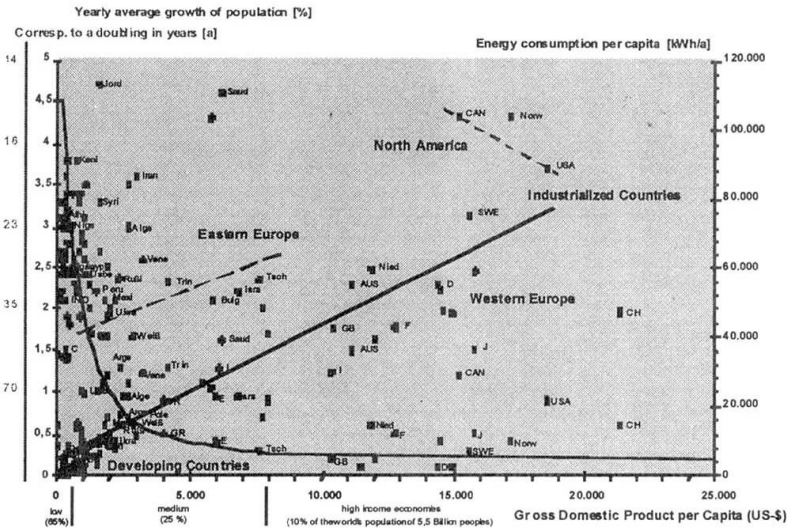


Fig. 1 Energy consumption and population growth in a country as a function of its per capita gross domestic product

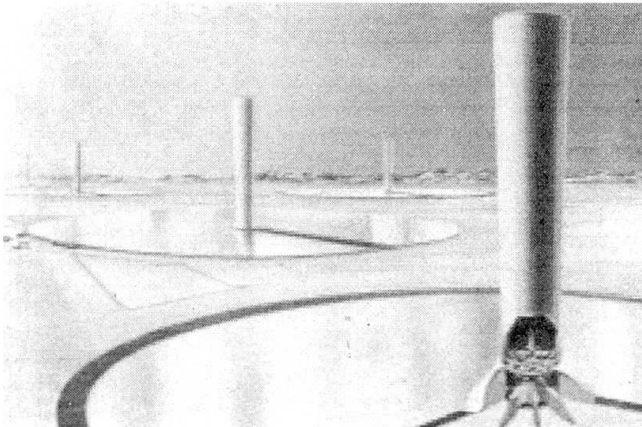


Fig. 2 Drawing of several large (100 – 200 MW solar chimneys in a desert

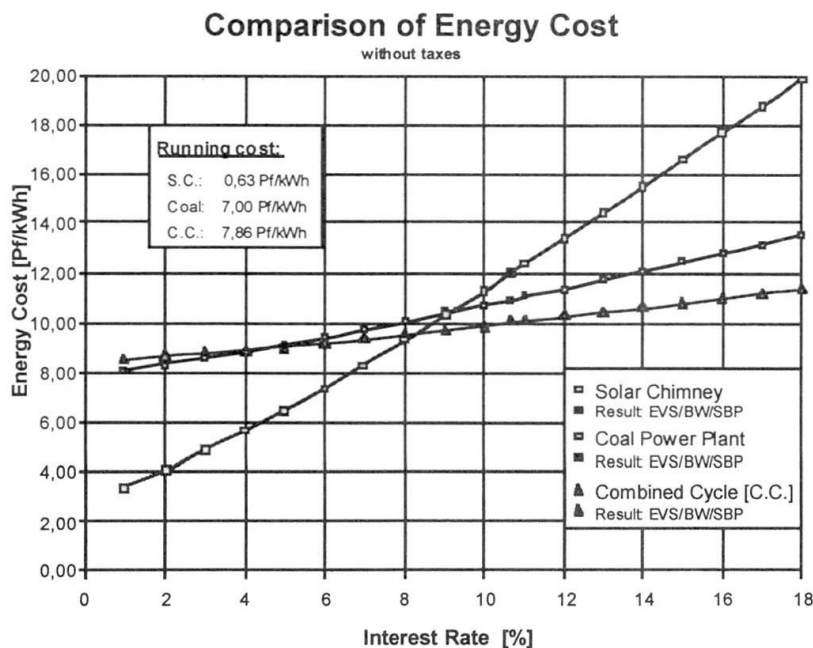


Fig. 3 Electricity costs from solar chimney, coal or combined cycle power plants depending on interest rate