

## **New Solar Thermal Power Plants can cover Egypt's Demand for Energy and Water**

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### Abstract:

The huge potential of solar energy remains unused for large scale power stations because of the relatively high costs involved in present technologies. Photovoltaic, an excellent facility for small applications, is not applicable for several hundreds of Megawatt power stations. Concentrating solar power (CSP) yields lower electricity costs. The only large scale commercial application is that of parabolic troughs which proved electricity generation costs much lower than that of photovoltaic, however, still well above other renewable energy sources like wind energy.

The following describes a new technology using Fresnel flat mirror collectors - rather than parabolic mirrors – thus giving a real cost reduction perspective due to manufacturing of main components in Egypt.

The flat mirrors are driven to follow the sun from east to west, thus concentrating the sunrays continuously from a flat horizontal area to a fixed tube on top containing water under pressure. The temperature is thus raised to produce steam in the tube, which is used to drive a conventional steam turbine.

The power station works like a conventional steam power station, whereas the fuel fired boiler is substituted by a solar boiler. The fuel fired boiler, can be used for night operation (Hybrid power station) or as a backup for cloudy days.

Land under the mirror roof can be used for planting thus reducing irrigation water requirement in hot and sunny areas like Toshka.

Beside electricity production at reasonable costs, seawater desalination - a vital and very urgent issue for Egypt – can be combined in the same power station by using the waste heat of the condenser (Combined Heat and Power). Thus raising thermal efficiency of the power station and reducing costs of desalted water production.