

Abdelhady, S., Borello, D., Rispoli, F., & Tortora, E. (2013). **Solar Thermal Electric Power Plant in the Egyptian Western Desert**. In International Conference on Applied Energy - ICAE2013. Pretoria, South Africa

## **ABSTRACT**

This paper discusses the assessment of a concentrated solar thermal electric power plant fed with diathermic oil. The plant is located in the Egyptian western desert. The site under consideration is in Kharga Oasis, at 200 km from the Nile valley. It has a population of approximately 100,000 inhabitants. This configuration is considered as a promising solution to provide an isolated area with energy sustainability and electric energy for the local loads and contemporarily fight desertification. Parabolic trough plant has been modelled in TRNSYS simulation environment integrated with the Solar Thermal Electric Components model library. Both solar and power cycle performances have been modelled based on the solar energy data of the plant site. The mirrors area and the solar collectors have been designed to optimize the incident solar energy. The operational temperature of the Heat Transfer Fluid (HTF) was imposed equal to 400 °C determining the maximum power of the solar thermal power plant. The results show that by parabolic trough solar power plant a 6 MW electric power and a 21.5 MW heat power can be provided with an overall efficiency of about 85%.The analysis demonstrated that the solar operation time of the CSP plant in the selected site can be expanded to run during the all day without recurring to fossil fuel backup.