

Potential of Parabolic Trough Solar Concentrator for Electric Energy Production

Abed Alrzaq Alshqirate*^{1,2}, Adel Alblawi¹, and M. Asfer¹

¹Department of Mechanical Engineering, Engineering College, Shaqra University, KSA

²Al-Balqa Applied University, Jordan

* Corresponding author: abedalrzaq@su.edu.sa, abedalrzaq_alshqirate@bau.edu.sa

Abstract

Parabolic trough technology is a strong system to product electricity from solar energy and to generate steam for different industrial usages. Nowadays, it is considered as the lowest cost and powerful large- scale technology to utilize solar energy. This article recommends generation of electricity by using Parabolic Trough Solar Concentrator (PTSC) in the central area of Kingdom of Saudi Arabia (KSA) at Dawadmi city. Pressurized water is used as heat transfer working fluid. The performance parameters of Euro Trough Collector (ETC) were investigated by Computer simulation technique using MATLAB software. The input data contained the properties of the working fluid (Pressurized water) and the designing parameters of ETC. While the output data will be: the outlet water temperature, the coefficient of heat transfer, the heat loss, and the efficiencies (thermal, solar and global). Simulated results showed the ability of using this type of parabolic trough in KSA to generate electric power due to the high performance parameters achieved. Also the validity of using simulation technique was carried out and showed good conformity.

Keywords

Radiation, Parabolic Trough, Thermal Energy, Solar Concentrator, Computer Simulation, and Electric Energy Production.