

ANALYSIS OF PERFORMANCE OF A SPECIFIC STEAM GENERATION SYSTEM USING SOLAR ENERGY*

Dr. Eng. M. Adnan Farwati**

Abstract

The aim of this study is to investigate the means and methods that improve the share of solar radiation in energy supply (solar fraction) as well as in protecting the environment. Here, a saturated steam generation system containing mainly a fire tube boiler, heat exchangers and controls, is designed so that can consume all the heat produced by a developed suitable linear parabolic collector as an auxiliary energy resource. A proper computer program is prepared to find out the optimum values of the main specifications of the solar collector so that provide a maximum annual solar energy for the mentioned system. Also the program calculates and shows the performance of the optimum system. The effect of deviation of this specifications on the annual solar fraction are calculated and illustrated in diagrams under different conditions. It is found, with this design and these specifications, that 50.8% of the energy required for steam generation may be gained from the solar radiation annually during day light hours.

Keywords: linear parabolic collector , extended absorber, Steam generation system, heat exchanger, automatic control, solar fraction.

* For the paper in Arabic see pages (23-36).

** Associate Renewable Energy Consultant, Ebla Privet University, Edlib, Syria.