

**MODELLING, DESIGN, AND SIMULATION THERMAL SOLAR POWER PLANT  
BY USING PARABOLIC TROUGH COLLECTOR TO GENERATE 100KW STEAM  
LOCATED IN NUSA TENGGARA**

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**Abstract**

Modeling, design, and simulation has been done to the model of solar energy generating system to be implemented in East Nusa Tenggara Province with 100 kW power capacity. In this research, the simulation of the system model is done to give information about output of turbine power which is operated in a single day, the influence of the thickness of the absorber tube on the heat collector element to the collector's length, the influence of the glass cover on the heat collector element to the output of turbine power, and influence of the concentration ratio to the total coefficient of thermal losses.

In addition, techno-economic calculation is done to give an idea about the feasibility of the system from both technical and techno-economic aspects. Calculation of the intensity of direct normal irradiation (DNI) is done by using the equations that developed based on the earth-sun's geometrical relationship.

From the results obtained by calculation and simulation of system characteristics such as: net collector area of 519.78 m<sup>2</sup>, mean of net power output of 91.91 kW, system efficiency is 49%, capacity factor of 13.5%, total electricity production of 108,577.87 kWh / year with a total NPC of U.S. \$ 281,883.07 and the cost of electricity generation (COE) of U.S. \$ 0.139 / kWh.

According to this study, the solar energy generating system are suitable for implemented to support 35.000 MW electricity programs in Indonesia.