**Performance Analysis of a Solar Cogeneration Power Combined Cycle at Variable Operational and Design Conditions**

**This paper is to investigate the performance of a solar cogeneration power combined cycle( SCPCC), in which a computer program, called “ SCPCC Design" has been developed using MATLAB for the analysis. In addition the System Advisor Model (SAM) software has been used in the analysis. Here, many operational and design parameters are taken in consideration to determine the overall efficiency of the proposed cycle, such as compressor pressure ratio, combustion temperature in the gas turbine unit, inlet steam pressure, exhaust gases temperature and process heat mass fraction. The solar thermal energy obtained from the solar field is obtained according to the specifications of Libyan Capital, Tripoli City, and through all the year. The results obtained from this study have shown a clear influence for these parameters on the overall efficiency, where it increases with combustion temperature, steam pressure and mass fraction, while it decreases with compressor pressure ratio .**

***Index Terms*—performance, solar, cogeneration, power plant, Tripoli.**