

A comprehensive review on the exergy analysis of combined cycle power plants

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ABSTRACT

The arriving optimum improvement of a thermodynamic system of energy conversion such as a combined cycle power plant (CCPP) is complicated due to the existence of different factors. Energy and exergy analysis is utilized as effective methods to determine both the quantity and quality of the energy sources. This paper reviews the latest thermodynamics analysis on each system components of a CCPP independently and determine the exergy destruction of the plant. A few layouts of the CCPP plant from different locations considered as case studies. In fact, the most energy losses occurred in the condenser compared with the plant components. It found that in the combustion chamber (CC) the highest exergy destruction occurred. The ambient temperature causes an evident decrement in the power production by the gas turbine (GT). The result has proved that besides energy, exergy analysis is an efficient way to the assessment of the performance of the CCPP by recommending a more advantageous configuration of the CCPP plant, which would lead to reductions in fuel required and emissions of air pollutants.
