

Exergy and Energy Analysis in the Steam Power Plant System PLTU PT. POMI Unit 7 Paiton Probolinggo.

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ABSTRACT

The exergy analysis of the PT POMI Paiton Unit 7 steam power plant system is based on the first and second laws of thermodynamics. The exergy flow rate and efficiency of the PLTU are calculated for each generator component including boiler, HPT, IPT, LPT, condenser, CP, LPH, deaerator, FWP, and HPH. Exergy analysis provides information regarding exergy rate, exergy efficiency, and irreversibility. The steam exergy that enters the system is 3796270.346 kW and that can be converted into electrical energy is 1652058.748 kW so that the overall exergy efficiency of the plant is 44%. The Sankey diagram shows the exergy loss of each PLTU component. Maximum irreversibility occurs in the boiler component, namely 1195680.33 kW, followed by the turbine component, namely 778051.5 kW, followed by the HPH, deaerator, condenser, LPH and pump components. The optimization carried out is an effort to reduce irreversibility and increase exergetic efficiency in the boiler. Based on the optimization results by varying the boiler outlet pressure, it was found that the efficiency value increased and the irreversibility value decreased at a pressure of 190 bar within the range of component values.

Keywords : *Energy, Exergy, Irreversibility, Efficiency, Optimization.*