

## **Analysis of Exergy on the Steam Power Plant System (Case Study at PT POMI Unit 3 Paiton PLTU)**

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### ***ABSTRACT***

*Analysis of exergy in the electric power generation system (case study at the PT Pomi Unit 3 Paiton PLTU) was carried out based on an energy and exergy analysis. Energy and exergy levels are calculated in each state and main components include Boilers, High Pressure Turbine / HPT, Intermediate Pressure Turbine / IPT, and Low Pressure Turbine / LPT), Condensers, Condensate Pumps (CP), Low Pressure Heaters (LPH), Daerator, Boiler Feed Pump (BFP), and High Pressure Heater (HPH). Energy analysis provides information on the magnitude of the energy rate of each component. While, the exergy analysis provides information about the exergetic efficiency and irreversibility of each component. Moreover, the system performance can be improved in overall or only on its components. The results of the exergy analysis showed that the exergy entrance rate of 5517010.21 kW was used to produce electricity amounting to 3097083.84 kW with a system exergy efficiency of 26.32%. The greatest irreversibility occurred in the boiler that is equal to 1019746.40 kW. The optimization that the researchers did was in the effort to reduce irreversibility and increase the exergetic efficiency of the boiler. The exergy optimization is carried out by varying the boiler output pressure. The optimization results show that the higher the boiler output pressure causes the exergetic efficiency to increase and irreversibility decreases. The optimal boiler output pressure is obtained at a pressure of 24.53 MPa in the range of component values.*

**Keywords:** *Energy, Exergy, Irreversibility, and Optimization*