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CHARACTERIZATION AND EVALUATION OF SOLAR-BIOMASS HYBRID MODEL BASED ON THERMODYNAMIC ANALYSIS TO RUN A THERMAL POWER PLANT

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ABSTRACT

A solar-biomass hybrid power system shall ensure continuous supply of electricity as both energy sources will complement each other. While a solar thermal shall be operated in a day time, biomass plant can be hybridized during night. An energy analysis of regenerative hybrid biomass-solar power plant has been investigated. As per availability of solar-biomass resources, an energy analysis of 5 MW regenerative solar-biomass hybrid power plant with series mode has been analyzed by using heat gain $(\%)$ *from solar & biomass. Month-wise daily average beam radiation has been considered to utilize contribution of solar heat* $(\text{i.e. } 20\%, 40\%, 60\%, 80\%)$ *in the total heat of the proposed hybrid plant. The heat transfer fluid gets heated through parabolic trough collector (PTC) field as per availability of solar resource and remaining heat will take from biomass boiler to maintain the steam at super-heated temperature of* $500\ ^{\circ}C$ *. The recorded regenerative overall energy efficiency of the hybrid power plant is* $35.9\ \%$ *.*

KEYWORDS: *Biomass Resources, Solar DNI, Modelling of Hybrid Solar-Biomass Power Plant, Energy Analysis*