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## Exergy analysis of flat plate collector integrated biogas plant

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There has been a worldwide increase in the demand for energy. The major part of this energy demand is being met by the combustion of fossil fuels which has resulted in their price rise. The utilization of fossil fuels has also put across pressing challenges to the society like climate change, pollution and public health hazards and energy poverty making the greening of the energy sector an imperative change. It has long been recognized that the sunlight falling on the earth's surface is more than adequate to supply all the energy that human activity requires. Therefore, in this communication, an analytical expression for slurry temperature ( $T_s$ ) for an active N-flat plate collector's (N-FPC's) integrated biogas plant has been derived for conducting exergy analysis. The calculations were performed by using MATLAB 2010a. In this study, it was found that the maximum annual exergy for flat plate collector and slurry were obtained for the months of June and July. The influences of various design parameters such as the mass of the slurry ( $M_s$ ), the length of the collector pipe ( $L$ ), the number of collectors in series ( $N$ ) and the mass flow rate of the slurry ( $m_s$ ) on slurry temperature has been studied for an optimum slurry temperature ( $\sim 370$  C). Further, the above parameters have also been optimized to design an active system for the heating of the slurry. This flat plate collector integrated biogas plant has been observed to be self sustainable and showed a superior performance as compared to a simple biogas plant.

### Biography

Jasleen Bhatti is a PhD research scholar since 2011 at Centre for energy studies, Indian Institute of Technology Delhi, India. She has completed her BSc (Hons) Chemistry from Delhi University, India and MSc in Analytical Chemistry from Agra University. She has over 4 years of experience in industrial research and operations and has another 4 years of experience solely in the research field of solar energy and its applications, photovoltaic thermal integrated systems and development of biogas technology.

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