J Bioremediat Biodegrad 2017, 8:5(Suppl)
DOI: 10.4172/2155-6199-C1-009

Exergoeconomic study of gas turbine combined power cycle with biofuel

Saeid Soltani
University of Tabriz, Iran

Biomass energy has the potential to replace fossil fuels despite its lower heat value. Fog cooling and steam injection, as well as adding steam turbine cycles to gas turbine cycles, can enhance the performance of power generation systems. Here, the results are reported of energy, exergy and exergoeconomic analyses of two proposed biomass (wood) integrated steam injection cycles and combined power cycles. Their performances are assessed for similar sets of conditions. The thermodynamic analyses demonstrate that at lower values of compressor pressure ratio the combined cycle has a higher efficiency but at higher values of pressure ratio the steam injection plant is advantageous. For the same conditions, the steam injection plant exhibits a higher net power output. The exergoeconomic analyses show that electricity and component costs for the combined cycle are higher than for the steam injection plant. The exergy destruction rate and its cost are higher at lower compressor pressure ratios for the steam injection cycle, and at higher pressure ratios for the combined cycle. The exergy loss rate and its cost are higher for the combined cycle at all pressure ratios. Also the steam injection cycle is more cost effective due to its lower relative cost difference.

soltani929@gmail.com