

Economic feasibility of biomass based downdraft gasifier power generation system

GAJANAN WASU

Received : 10.07.2013; Revised : 05.10.2013; Accepted : 04.11.2013

Author for Correspondence :

GAJANAN WASU

Central Instituted of Agricultural
Engineering, BHOPAL (M.P.)
INDIA

Email : ghwasu@gmail.com

■ **ABSTRACT** : The economics of 10 kW downdraft gasifier based power generation system and thereby the feasibility of the system was computing by net present value (NPV), benefit cost ratio (BCR), payback period, cost of operation and cost of electricity generation. The economics of the system was evaluated for 12 h (Case I with government subsidy) and 16 h (Case II without government subsidy) of operation. The economic analysis was carried out for considering subsidy and without subsidy on initial investment to brings the past and future cost to present, discount cash flow method was determined with a 10 per cent discount rate. The NPV, BCR, payback period, cost of operation and cost of electricity generation comes in case I for operating duration of 12 h were 307950.95, 1.20, 1101 days, 32.33 and 3.38, respectively, whereas for 16 h it were 571696.39, 1.30, 787 days, 36.12 and 3.72, respectively. Similarly for case II the NPV, BCR, payback period, cost of operation and cost of electricity generation was worked out for operating duration of 12 h and were found to be 197950.95, 1.12, 1466 days, 40.97 and 4.27, respectively and for 16 h it worked out to be 785382.08, 1.47, 1293 days, 36.35 and 3.77, respectively. The payback period for biomass based gasifier power generation system were observed to be 2.15 - 3 years and 3.54 - 4 years in case I and II, respectively. The system was found more economically feasible according to cost of operation and cost of electricity generation at 12 h operating with government subsidy.

■ **KEY WORDS** : Downdraft gasifier, Biomass, Discounted cash flow, Benefit cost ratio, Net present value

■ **HOW TO CITE THIS PAPER** : Wasu, Gajanan (2013). Economic feasibility of biomass based downdraft gasifier power generation system. *Internat. J. Agric. Engg.*, 6(2) : 427-430.