

Biogas Plant for Power Generation in High Water Table Condition

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Abstract—A biogas plant of 30 m³ capacity reinforced cement concrete (R.C.C.) fixed dome type was designed and constructed for power generation. This biogas plant saved 25% water as compared to indigenous design biogas plant. The maximum gas production was recorded as 28650 litres per day for the daily loading of 750 kg of cattle dung. The methane content varied between 47.2 to 55.0%. Biogas generator consumed biogas @ 4.90 m³/h. The total cost of the system was Rs. 5.55 lakhs. The total cost of operation was worked out to be Rs. 437/day. The saving in diesel for the generator was found to be 1.5 lit/h. By considering the cost of diesel and income received from the manure obtained from biogas plant, net saving obtained from the system was Rs. 515/day. The total solids of the fresh cow dung and digested slurry were 21.82% and 11.30%, respectively indicating reduction of total solids of fresh cow dung by 48.21%. The volatile solids content of the feed and digested slurry were 72% and 17.75%, respectively. The payback period for the biogas based power generation system was found 3 years.

Keywords: Fixed dome, biogas, generator, net saving, payback.