



Alternative fuels

> Case History

Arashi Hi-Tech Bio-Power Pvt. Ltd., Coimbatore

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Where:

Arashi Hi - Tech Bio - Power Pvt. Ltd., Coimbatore, India

What:

A 1 MW power plant operating on 100% producer gas-based gensets

Purpose:

To adopt eco-friendly technology to generate power from a renewable energy source and ensure low cost power generation from a readily available biomass

Primary choice factors:

- Utilization of renewable energy source over fossil fuels
- To adopt an eco-friendly technology for power generation
- Achieve low cost of power
- Ensure reliability of gas engine and genset technology by going with a dependable supplier

India's first 1MW 100% producer gas based grid connected power generation at Arashi Hi-Tech Bio-Power Pvt. Ltd.

COIMBATORE, INDIA - Arashi Hi-Tech Bio-Power (P) Ltd., located in Sultanpet, a village in Tamilnadu is an Independent Power Producer (IPP), working with the single largest capacity fixed bed gasifier based power package linked to the Grid. Due to its coastal location, the village has an abundant supply of coconut shells, which are used essentially as feedstock. The power plant at Arashi Hi-Tech Bio-Power (P) Ltd. houses latest technology in terms of their biomass processing, gasification and PC based automation and control systems, full fledged water / effluents treatment plants, power package and evacuation systems. The plant uses a gasifier and gasification system based on IISc technology and Cummins producer-gas gensets, which have till date completed cumulative 40,000 plus hours of operation.

Originally in year 2002, the power plant was designed to house two 750 Kg/Hr gasifiers, which supplied gas to engines/ gensets operating on dual fuel mode. In the first phase one slow speed 750 Kg/Hr gasifier marine diesel engine operating on dual fuel mode was commissioned. However, as operations on dual fuel were not optimized and were quite troublesome; resulting frequent breakdowns, higher fuel consumption as also the increasing cost of diesel made the operation of this power plant an un-economical proposition.



GTA-1710-G Cummins engine operating on 100% producer gas



Preparation and sizing of woody biomass

Arashi Hi-Tech Bio-Power (P) Ltd. was on the look out for a dependable supplier with proven and reliable gas engine technology as they wanted to run gas gensets for longer hours within the maintenance intervals for generating low cost economical power.

Initially the plant was designed considering the ample availability of coconut shells as feed stock. However during the course of time, it was realized that this feedstock might not be available on continuous basis and therefore, the plant was modified with IISc's assistance to be able to use other readily available woody biomass like Prosopis Juliflora, etc. In addition, five gas gensets powered by Cummins engine model GTA-1710-G operating with two 750 Kg/Hr gasifiers allowed enough flexibility to the customer for continuous operations of the power plant as well as to enable him to plan maintenance activities without the slightest interruption to the entire system.

To meet the above stated requirements, Cummins Power Generation proposed to supply 1 MW capacity power plant comprising of gas gensets, paralleling switch gears and a remote cooling system. The waste exhaust heat from one of the gas engines is used in the Vapor Absorption Machine (VAM) for chilling the producer gas. Installation of this 1 MW power plant opened further opportunities for the customer prompting him to install the remaining one 750 Kg/Hr gassifier (total installed capacity of two 750 Kg/Hr gasifiers) and commission the 1 MW power plant, thereby availing all fiscal and financial benefits offered by the Ministry of Non-conventional Energy Sources (MNES).

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Since 1.2 Kg/Hr biomass is required to generate 1 KWh, cost of power generation comes to approx. Rs. 3 per KWh vis-à-vis Rs. 5.20 per/KWh, which is the cost of Grid power, thereby offering Rs. 2.20 / KWh as savings. To generate 1MW power on a continuous basis, 30 tons of biomass is required per day.

This biomass after undergoing the required processes produces approximately 1.5 to 2 tons of charcoal per day, which is sold in the market by the customer at an attractive price. Since, activated charcoal generated from coconut shells as fuel has special demand considering its applications, this benefit further offsets the operating costs for the customer.

Considering the eco-friendly technology for generating power from non-conventional renewable energy sources, such power plants are also recognized as low pollutant plants and are therefore, considered for "Carbon Credit" benefits. Whilst, the installed plant is meeting variable demands of captive power the excess power produced is being fed to the Grid and sold to a third party. In addition, plant load factor of around 80% is also being achieved.

The producer gas-based power generation initiative offers innumerable opportunities in terms of, new sources of economical power for rural industries, and distributed power generation opportunities for IPPs and rural electrification.

Cummins Power Generation is a world leader in the design and manufacture of power generation solutions for a wide variety of standby and prime power applications. For further information on on-site distributed generation of power, contact your local Cummins dealer.

