

SUMMARY OF PROJECT DESIGN DOCUMENT (PDD)

Name of Project: "Biogas-based Cogeneration Project at Shakarganj Mills Ltd., Jhang, Pakistan" Version: 01

Objectives:

- The project activity involves the installation of 8 new biogas gensets (1MW each), which will use the biogas generated from extra spent-wash which would normally go to the drain. The extra spent-wash is generated due to increased ethanol production.
- The project activity also involves the installation of a H₂S removal plant for purification of biogas, which will enable the new biogas engines to efficiently utilize the gas for power generation. Therefore, the overall efficiency of the power production will improve and contributes towards sustainable development.
- To help in achieving the objectives of combating climate change under UNFCCC by reducing significant amount of greenhouse gas (carbon dioxide) emissions and contributes to the regional and national sustainable development.

Date of Submission: May, 23rd 2008

Submitted by: Carbon Services Limited.

Project Sponsors: Shakarganj Mills Ltd.

Project Development Consultants: Factor Consulting + Management AG

Detail of Total Project Cost:

Description	Amount (Rs. In 000)
Civil Construction	
Land	10,000
Building	8,000
Gen-Set Foundations	2000
H ₂ S Removal Tanks Foundations	2,500
Road, Drain, Cable Trenches	1000
Building for chillers, after coolers and compressors	2500
Machinery	
Bio gas Gen-Set (08Nos) 1.0MW each	186,747
Landing cost of Gen-Set	22,856
5% Duty, 3% Freight/Insurance/Clearing/Bank charges	

Erection/ Installation of four Gen-Set Including, Supply/Installation of -Jacket water cooling Circuits -After Cooler system, -Lube Oil Circuits and tanks -Gas Supply Fittings -Air ventilation System -Flushing and Recharging, -Lifting and Transportation, -Silencer hanging and Thermal lagging -Grounding and Earthling -Motor Control center -Control cables, Power cables - Module control -Island and power panels	28000
De-Humidification Plant -Biogas Chiller, after coolers (02) and Blowers (08) along with their installation and piping circuits.	45,000
-Power House lighting -Fire protection System -Supply of computer & accessories for remote control and communication -Air conditioning of control Room -HT Panels and Transformers	25,000
H2S removal scrubbing system and its piping circuits including landing cost along with Filter media and H2S removal tanks for treatment of 100,000m3 Biogas (Local +Imported)	10,8000
Waste heat recovery boilers 03Nos	19200
Contingencies and Start up Expenses	2000
Total in PK (Rs. In 000)	462,803000
Total amount in US \$ (million)	6.8

Estimated Emission Reduction:

<u>Source</u>	<u>Tons of CO₂eq/ yr</u>
Shakarganj Mills Ltd.	24,344
Total annual reduction:	24,344

Operational Lifetime: 20years.

Starting/Commissioning date: 01/02/2008

Crediting/Validity Period:

- Kyoto first commitment period: 2008-12
- Estimated validity period (Including Post Kyoto period): 2008-28

Economic Viability of the Project:

Internal Rate of Return (IRR):
Without CDM benefits: -0.48%
With CDM benefits: 8.63%

Benefits from the Project:

Activity	Revenue (US\$) million/annum
Sale of Carbon Credits (@ US\$ 12/tonnes of CO _{2eq}):	0.28
Total estimated annual revenue:	0.28

Other Qualitative Benefits:

- The project activity makes the fullest utilization of the Shakarganj Mills Ltd (SML's) distillery capacities. It thus supports employment at the project site by setting up jobs in ethanol production.
- The project builds up a knowledge base about the operation of the biogas based power generation and builds up a skill set for such kind of operation.
- The project improves the skill set for local inhabitants through training and capacity building in order to grow their technical skills.
- The project demonstrates the use of a clean energy technology which utilizes Biogas for power generation.
- Grid electricity production in Pakistan is strongly based on fossil fuel combustion. By utilizing by-products of sugar for electricity production and using natural resources as fuel the waste disposal problems are significantly reduced.
- Distillery spent-wash is the ultimate waste product in the sugar production process. This is biologically treated to produce biogas to be used for heat and power generation, and water which is safe enough to be used for irrigation.