GANPATI SUGAR INDUSTRIES LIMITED

MONITORING REPORT
SEPTEMBER 2006

GANPATI CO-GENERATION PROJECT AT MEDAK, ANDHRA PRADESH

CDM Registration reference no: 0370

Monitoring Period

1/01/2003 to 31/08/2006

PROJECT LOCATION

SANGA REDDY MONDAL
MEDAK DISTRICT
ANDHRA PRADESH, INDIA

PREPARED BY:

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1. INTRODUCTION

This document reports the Emission Reductions (ERs) generated by the Ganpati sugar industries limited Bagasse Cogeneration Project (hereinafter GSIL), CDM Registration Reference Number 0370 from 01/01/2003 to 31/08/2006.

This project activity consists of increasing efficiency in the bagasse (a renewable fuel source, residue from sugarcane processing) cogeneration facility of an Indian sugar mill. With the implementation of this project, the mill has been able to sell electricity to the southern regional grid, avoiding that fossil-fuelled thermal plants dispatch the same amount of energy to that grid. By that, the initiative avoids CO2 emissions, also contributing to the regional and national sustainable development.

Bagasse cogeneration is important for the energy strategy of the country. Cogeneration is an alternative to postpone the installation and/or dispatch of electricity produced by fossil-fuelled generation utilities. The sale of the CER generated by the project will boost the attractiveness of bagasse cogeneration projects, helping to increase the production of this energy and decrease dependency on fossil fuel.

By dispatching renewable electricity to the grid, electricity that would otherwise be produced using fossil fuel is displaced. This electricity displacement will occur at the system's margin, i.e. this CDM project will displace electricity that is produced by marginal sources (mainly fossil fueled thermal plants), which have higher electricity dispatching costs and are solicited only over the hours that base load sources (low-cost or must-run sources) cannot supply the grid (due to higher marginal dispatching costs or fuel storage – in case of hydro sources – constraints).

Bagasse is a fibrous biomass by-product from sugarcane processing, which accounts for about 30 percent on weight of fresh cane and approximately one third of the cane's energy content. In a typical Indian sugarcane mill, burning bagasse for generation of process heat and power production is a practice already established. The energy produced from these facilities is almost entirely consumed for their own captive use or exported in rare cases. Low-pressure boilers, very little concern with optimal use and control of steam, crushers mechanically activated by steam, energy intensive distillation methods, are a few examples of inefficient methods applied to the sugar industry as normal routine.

Using steam-Rankine cycle as the basic technology of its cogeneration system, for achieving an increasing amount of surplus electricity to be generated, GSIL began its efforts from 2001 and synchronized with the grid of APSEB by first day of January 2003.

2. APPLIED BASELINE METHODOLOGY

Type I – Renewable Energy Projects
I D - Renewable electricity generation for a grid – Version: 7

3. APPLIED MONITORING PLAN

The monitoring provides a range of data measurement, estimation and collection options/techniques in each case indicating preferred options consistent with good practices to allow project managers and operational staff, auditors, and verifiers to apply the most practical and cost-effective measurement approaches to the project. The aim is to enable GSIL project activity to have a clear, credible and accurate set of monitoring, evaluation and verification procedures. The purpose of these procedures would be to direct and support continuous monitoring of project performance/key project indicators to determine project outcomes, greenhouse gas (GHG) emission reductions.

The project revenue is based on the units exported as measured by power meters at plant and check meters at the high-tension substation of the APTRANSCO. The monitoring and verification system mainly comprise of these meters as far as power export is concerned. The export of electricity is through invoices to APTRANSCO. The measurement of the quantity of bagasse used will produce evidence that the energy is being generated with zero net CO2 emissions.

The GSIL project activity has employed the latest state of art monitoring and control equipment that measure, record, report, monitor and control various key parameters. Parameters monitored are the quantity and quality of bagasse fuel used, total power generated, power exported to the grid. All monitoring and control functions are done as per the internally accepted standards and norms of GSIL.

The instrumentation system of the GSIL project activity are mostly comprised of microprocessor – based instruments of reputed make with desired level of accuracy. All instruments are calibrated so that the accuracy of measurement can be ensured all the time. Plant protection and safety interlocks are implemented through PLC based DAS System.

GHG SOURCES

1. Project Emissions from the fossil fuel usage

Not applicable because the entire power is being generated through mill generated bagasse. However in case coal is being utilized later, the CERs generated would be reduced from the emission reductions annually.

2. Baseline Emissions from the grid electricity generation

As the number of units exported to the grid determines the emission reductions from the project, it becomes important for the project to monitor the net export to the grid on real time basis. Therefore the net electricity (after meeting the auxiliary and captive needs) exported to the grid multiplied by the baseline emission factor gives the baseline emission reductions.

MONITORING APPROACH

The general monitoring principles are based on:

1. Frequency
2. Reliability
3. Registration and reporting

As the number of units exported to the grid determines the emission reductions from the project, it becomes important for the project to monitor the net export to the grid on real time basis.

Frequency of monitoring

The project developer has installed all metering and check metering facilities within the plant premises as well as in the grid substation where exported power is connected to the grid. The measurement are being recorded and monitored on a continuous basis by both APTRANSCO and the project developer.

Reliability

The amount of emission reduction units is proportional to the net energy generation from the project. Thus the final KWh meter reading is the final value from project side. All measurement devices are of microprocessor based with best accuracy procured from reputed manufacturers. Since the reliability of the monitoring system is governed by the accuracy of the measurement system and the quality of the equipment to produce the result all power measuring instruments are calibrated once a year for ensuring reliability of the system. Therefore the system ensures the final generation is highly reliable.

Registration and reporting

Daily and monthly reports are prepared stating the generation. In addition to the records maintained by the GSIL, APTRANSCO also monitors the power exported to the grid and certify the same. The other major factor, which needs to ensured and monitored, is the use of bagasse fuel for power generation.

OPERATIONAL PARAMETERS OF THE GSIL PROJECT ACTIVITY

Total power generated

The total power generated along with the power consumed for auxiliaries, sugar plant and the power exported to the grid is measured in the plant premises to the best accuracy and it is recorded, monitored on a continuous basis.

Power exported to the grid

The project developer has installed all metering and check metering facilities within the plant premises as well as in the grid substation where exported power is connected to the grid. The measurement are being recorded and monitored on a continuous basis by both APTRANSCO and the project developer.

Power generation at plant premises	MWh	
Power consumption for captive	MWh	

purposes		
Aux. Consumption at plant premises	MWh	
Net Energy export	MWh	
Energy reading at APSEB Sub-station	MWh	

Efficiency of the cogeneration project activity, major equipments like boiler & STG

The inlet and outlet steam parameters of the boiler are being measured and monitored along with the parameters of fuel and feed water. Quantity of the steam to the turbine is being monitored through microprocessor flow meters.

Based on the measured input and output parameters system efficiency of boiler and STG is calculated and monitored continuously.

All the above parameters/factors will demonstrate the performance of the project at any point of time.

VERIFICATION

The performance of the bagasse based power project leads to CO_2 emission reductions. In other words, the longer the cogeneration power plant runs and exports power to the grid more would be the emission reductions. The project control system comprises a state of the art sophisticated control and monitoring systems, which measures and collects the information about various process parameters, records, monitors and controls on a continuous basis. Fully functional management information systems developed so that accessing and verification of actual data are possible at any point of time. The major activities to be verified are as under

- Verification of various measurement and monitoring methods
- Verification of instrument calibration methods
- Verification of data generated.
- Verification of measurement accuracy

Similar to above activities, following major project parameters which affects the emission claims need to be verified, based on the available operating data is as under

- Cane crushing by sugar unit
- Quantity of the bagasse fuel
- Efficiency of project activity
- Total generation of power and captive & auxiliary power requirements
- Power exported to the grid

4. MONITORED DATA

Parameters being monitored according to Monitoring Plan

i. **Power Export and import**: Power exported to the grid and imported from the grid is monitored from energy meters installed at plant and APTRANSCO sub station on 24th day of every month. A joint meter reading for the energy exported to the Grid is recorded by representatives of APTRANSCO and Company and the readings are jointly signed by both the parties as a proof of export of Power to the grid from power plant and import of Power from grid by the power plant. These meter readings are the basis for the invoices raised by GSIL.

ii. **Total power generated and auxiliary consumption:** The total power generated and the auxiliary consumption by the power plant is recorded daily. The meters are calibrated every year and the records of the same are maintained.

iii. **Grid Emission Factor (OM, BM and CM of the grid)**: These values are fixed values throughout the crediting period. Hence the OM grid emission factor, BM grid emission factor and Grid emission factor need not be monitored.

iv. **Coal:** Coal is not being used, if used the purchased coal on receipt in the plant will be weighed in the Electronic Weigh Bridge installed in the Plant and unloaded in the fuel storage yard. Coal is fed to the Boiler as and when required and consumption will be recorded whenever it is used. The quantity of coal used will also be monitored.

Environmental monitoring

The project has achieved consent to operate from the pollution control board and all the environmental parameters are up to the standards with the norms mentioned by the pollution control board.

Calibration and testing of meters

Testing details of energy meters

The Energy Meters have been calibrated periodically once in a year adopting Calibration Method No.OP/CAL/034 using 3 Phase Energy Meter with Phantom Load by Electronics Test & Development Centre, Government of India, Department of Information Technology, Ministry of Communication & Information Technology, Kamala nagar, Hyderabad. The details of Energy Meters installed with their location and Serial Numbers are given below.

Sl. No.	Location of Meter	Make/ Model	Serial Number	Date of Testing	Percentage Error	Tested by
1.	APTRANSCO Sub Station at Kandi Main Meter	L&T ER300 P	01959480	06.10.05	Within specified limit	ETDC
2.	APTRANSCO Sub Station at Kandi Check Meter	L&T EQ300 P	03148278	06.10.05	Within specified limit	ETDC
3.	15 MW Generator Terminal	L&T ER300 P	04249082	06.10.05	Within specified limit	ETDC

5. MONITORED ENERGY DATA AND EMISSION REDUCTION

The project derives and calculates the baseline emission co-efficient on ex-ante basis and the actual electricity produced is metered based on expost as mentioned in the PDD.

The two major parameters which determine the emission reduction are:

1. Net electricity exported to the grid – Ex-post (based on the actual generation) - The total power generated, total power exported and the auxiliary consumption by the power plant are recorded.

2. Carbon Emission factor – This data is a fixed value throughout the crediting period and need not to be monitored.

Monthly-wise data on net export and net emission reductions achieved is given below for the monitoring period:

Month	Net energy exported in KWh	Net energy exported in GWh	Project emission on account of fossil fuel burning	CEF value tCo2e/GWh	Net Emission reduction achieved
CALENDER YEAR 2003					
Jan 2003	5233000	5.233	0	937.41	4905.46653
Feb 2003	6665000	6.665	0	937.41	6247.83765
Mar 2003	6829000	6.829	0	937.41	6401.57289
Apr 2003	7793000	7.793	0	937.41	7305.23613
May 2003	6094000	6.094	0	937.41	5712.57654
Jun 2003	5527000	5.527	0	937.41	5181.06507
July 2003	0	0	0	937.41	0
Aug 2003	0	0	0	937.41	0
Sep 2003	0	0	0	937.41	0
Oct 2003	0	0	0	937.41	0
Nov 2003	512000	0.512	0	937.41	479.95392
Dec 2003	6149000	6.149	0	937.41	5764.13409
TOTAL	**44802000**	**44.802**			**41997.84**
CALENDER YEAR 2004					
Jan 2004	7219000	7.219	0	937.41	6767.16279
Feb 2004	7705000	7.705	0	937.41	7222.74405
Mar 2004	7494000	7.494	0	937.41	7024.95054
Apr 2004	3706000	3.706	0	937.41	3474.04146
May 2004	2204000	2.204	0	937.41	2066.05164
Jun 2004	0	0	0	937.41	0
July 2004	0	0	0	937.41	0
Aug 2004	0	0	0	937.41	0
Sep 2004	0	0	0	937.41	0
Oct 2004	0	0	0	937.41	0

Nov 2004	1571000	1.571	0	937.41	1472.67111
Dec 2004	1969000	1.969	0	937.41	1845.76029
TOTAL	**31868000**	**31.868**	**0**	**11248.92**	**29873.38188**
CALENDER YEAR 2005					
Jan 2005	4165000	4.165	0	937.41	3904.31265
Feb 2005	3817000	3.817	0	937.41	3578.09397
Mar 2005	2465000	2.465	0	937.41	2310.71565
Apr 2005	2330000	2.33	0	937.41	2184.1653
May 2005	771000	0.771	0	937.41	722.74311
Jun 2005	0	0	0	937.41	0
July 2005	0	0	0	937.41	0
Aug 2005	0	0	0	937.41	0
Sep 2005	0	0	0	937.41	0
Oct 2005	0	0	0	937.41	0
Nov 2005	0	0	0	937.41	0
Dec 2005	4034000	4.034	0	937.41	3781.51194
TOTAL	**17582000**	**17.582**	**0**	**11248.92**	**16481.54262**
CALENDER YEAR 2006					
Jan 2006	6092000	6.092	0	937.41	5710.70172
Feb 2006	5113000	5.113	0	937.41	4792.97733
Mar 2006	3881000	3.881	0	937.41	3638.08821
Apr 2006	4191000	4.191	0	937.41	3928.68531
May 2006	4263000	4.263	0	937.41	3996.17883
Jun 2006	5680000	5.68	0	937.41	5324.4888
July 2006	0	0	0	937.41	0
Aug 2006	0	0	0	937.41	0
TOTAL	**29220000**	29.22	**0**	7499.28	27391.1202

The total CER generation: 115743.88 t Co2e

6. MEASURES TO ENSURE THE RESULTS / UNCERTAINTY ANALYSIS

Export meters:

As per the Power Purchase Agreement (PPA), the energy exported to the AP Grid is recorded from two independent meters viz., Main Meter and Check Meter and reading of main meter is used for billing. In the event of main meter not in operation / fails, the reading of the check meter shall be used for Billing.

The calibration of monitoring equipment is being maintained as per the requirement of APTRANSCO and the same is being done regularly. Power Generation, Export & Auxiliary Consumption, fuel consumption are being recorded daily and the same is being verified by Manager (Power Plant) and approved by Executive Director.

Carbon content in Coal:

The plant has so far not used any traces of Coal in future if it is used then the following would be developed.

Carbon content in the coal received will be considered as per the analysis reports of reputed laboratory which are furnished by the coal supplier or calculated by standard formula from the analysis values furnished in the received analysis reports.

7. ROLES & RESPONSIBILITIES

A CDM team has been formed in GSIL for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management of GSIL. Qualified and trained people monitor the parameters and emission reduction calculations. In the complete implementation and monitoring Plan, GSIL is the sole agency responsible for implementation and monitoring. The internal GHG plan is executed as mentioned in the PDD.