2nd MONITORING REPORT
Version 1, 10/01/2008

SURYACHAMBAL POWER LIMITED (SPL)

Chambal Power Limited's (CPL) proposed 7.5 MW biomass based power project at Rangpur, Kota District, Rajasthan, India

Reference No. UNFCCC 0347

Monitoring Period: 1st July, 2007 to 31st December, 2007

PROJECT LOCATION
Suryachambal Power Limited
Rangpur, Kota District, Rajasthan, India.

January 2008

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1. Title of the Project

Title: CPL's proposed 7.5 MW biomass based power project at Rangpur, Kota District, Rajasthan, India.

Project Proponent: The project proponent is '*Suryachambal Power Limited*' (SPL) and was formerly known as '*Chambal Power Limited*' (CPL). All relevant administrative procedures for change of name have been completed and appropriate clearances have been received from concerned Government authorities.

Date of Registration: 8th May 2006

2. Introduction

The purpose of the monitoring report is to calculate the Greenhouse Gas (GHG) emission reductions achieved by the project activity for periodic verification.

This second periodic monitoring report covers the emission reductions from the project activity between 01/07/2007 till 31/12/2007. As per registered PDD the start date of the project activity was 01/03/2004 and of the crediting period is 01/03/2006. All dates are in *dd/mm/yyyy* format.

3. Reference

3.1. Sectoral Scope

Category 1: Energy industries (renewable - / non-renewable sources)

3.2. Approved Baseline Methodology

The name of the approved baseline methodology applied to the project activity is: *"Grid connected renewable electricity generation", AMS 1D. (Version 7) dated 28th November 2005.*

3.3. Approved Monitoring Methodology

The name of the approved monitoring methodology applied to the project activity is: *"Grid connected renewable electricity generation", AMS 1D. (Version 7) dated 28th November 2005.*

3.4. Project Design Document

Title: CPL's proposed 7.5 MW biomass based power project at Rangpur, Kota District, Rajasthan, India.

Version: 02

Date: 8th December 2005

4. Definitions in the Report

CPL: Chambal Power Limited

PDD: Project Design Document

ER: Emission Reduction

RRVPNL: Rajasthan Rajya Vidyut Prasaran Nigam Limited

RSEB: Rajasthan State Electricity Board

NREB: Northern Regional Electricity Board

SPL: Suryachambal Power Limited

5. Project Description

Project Activity

The main purpose of the project is to generate and export eco-friendly power to the Rajasthan Rajya Vidyut Prasaran Nigam Limited (RRVPNL), which is a transmission company of the Rajasthan State Electricity Board (RSEB) and a part of the Northern Regional Electricity Board (NREB).

SPL has implemented a modern 7.5 MW Power Project based on mustard husk and stalks, corn cobs, baggase and other available agricultural wastes as fuel. The project is likely to export surplus power to RRVPNL after meeting the in-house auxiliary demand.

Project Location

The project is proposed to be located at Rangpur village area of Kota District, Rajasthan State, India, which is about 8 km from Kota railway station towards

north direction and about 1 km south of village Rangpur. The latitude & longitude of the site are 25°16'36'' North & 75°56'22'' East.

Technology Employed

The power plant is based on Rankine Cycle. The steam generator is designed to operate on any biomass like mustard and soya husk and stalks, corncobs and bagasse to ensure consistent plant efficiency even in times of biomass deficiency, if any.

Presently there is one 35 TPH, 67 kg/cm^2, 450 +/- 5°C high pressure boiler and a single bleed cum condensing steam turbine generator (STG) of 7.5 MW capacity. The 35 TPH of steam from boiler will be fed into condensing turbine. The boiler is of fluidized bed combustion (FBC) type and has the advantages of high thermal and combustion efficiency reducing quantity of husk needed, to a minimum, automatic operation for consistent high efficiencies and reduced need for manpower.

Steam turbine of fully condensing mode with suitable alternator generator has been installed for generating electricity. The turbine is a single cylinder, single exhaust fully condensing type, designed for high operating efficiencies and maximum reliability.

Along with the new 35-TPH boiler and the 7.5-MW turbo-generator (TG), the other auxiliary units of the plant include: fuel handling system with storage and processing arrangements; ash handling system; air pollution control devices; cooling water system and cooling tower; de-mineralized (DM) water plant; compressed air system; fire protection system; air conditioning and ventilation; complete electrical system for power plant and grid interconnection including power evacuation, instrumentation and control systems etc.

6.0 Statement to what extent the Project has been implemented as planned

The purpose of the project is to generate electricity by utilizing agricultural wastes and other biomass residues. The Project has been completed as planned and described in the Project Design Document (PDD).

After implementation of the project activity, project proponent has not made any changes in the project boundary. Following is the list of major components of the project activity and their respective suppliers:

S.No.	Equipment	Supplier/Make
1.	Boiler	M/s. Sitson India Ltd.
2.	T.G. Set	M/s. Triveni Engineering & Industries Ltd.
3.	Fuel Handling System	M/s. India Conveyor Systems (Indicon Group Company)

6.1 Current Status of the project

The plant is in operation continuously (with outages –forced and planned) since April 2006. Having overcome the initial teething troubles, the plant is now operating at almost full capacity.

7.0 Monitoring Methodology and Plan

Table 1: List of Parameters to be monitored for Project Emission

a) Parameters affecting emission reduction of project activity

ID number	Data type	Data variable	Data unit	Measured, calculated / estimated	Recording Frequency	Proportion of data to be monitored	How data will be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
D.3.a.1.	Power	Total electricity generated	kWh	Measured	Shift wise	100%	Electronic	3 years after issue of CER	Measured in plant premises and monitored and recorded continuously through DCS.
D.3.a.2.	Power	Auxiliary consumption	kWh	Measured	Shift wise	100%	Electronic	3 years after issue of CER	-
D.3.a.3.	Power	Power export	kWh	Measured	Shift wise	100%	Electronic	3 years after issue of CER	As per PPA with RSEB

b) Parameters affecting the leakage emissions from project activity

ID number	Data type	Data variable	Data unit	Measured, calculated / estimated	Recording Frequency	Proportion of data to be monitored	How will data be archived? (electronic/ paper)	For how long is archived data to be kept?	Comment
D.3.b.1	Fuel	Biomass Quantity	MT	Measured	Daily	100%	Paper	3 years after issue of CER	
D.3.b.2	Fuel	Biomass calorific value	Kcal/Kg	Measured	Fortnightly	-	Paper	3 years after issue of CER	Through sample testing
D.3.b.3	Fuel	Coal quantity	MT	Measured	Daily	100%	Paper	3 years after issue of CER	
D.3.b.4	Fuel	Coal calorific value	Kcal/Kg	Measured	Once	Grab sample	Paper	3 years after issue of CER	Through sample testing
D.3.b.5	Distance	Distance of procurement	Km	Calculated	Daily	100%	Paper	3 years after issue of CER	
D.3.b.6	Mileage	Mileage of vehicle	Km/litre	Estimated	Monthly	-	Paper	3 years after issue of CER	
D.3.b.7	Density	Density of fuel	Kg/litre	Measured	Once	-	Paper	3 years after issue of CER	Through sample testing
D.3.b.8	Volume	Capacity of vehicle	MT	Measured	Once	-	Paper	3 years after issue of CER	

8.0 Quality Assurance (QA)/Quality Control (QC) Plan

Quality control and quality assurance mechanisms for the monitored data have been followed as mentioned in the registered PDD.

9.0 GHG Calculations

9.1 Project Emission Calculations

If in the project activity only biomass fuel is used then the emissions from the project activity will be 'nil'.

If any supplementary fossil fuel (*e.g.* coal) is used with biomass then the emissions will be calculated based on this formula:

CO_2 Emission (kg) = Stoicheiometric CO_2 release from carbon content in coal (based on total carbon content

To have an estimate of the project CO_2 emission quantity due to combustion of coal along with the biomass, total carbon content of the coal should be known. Combustion reaction for CO_2 emission is as under.

$C + O_2 = CO_2$

Assuming complete combustion of coal, following formula can be used for conservative estimation of CO_2 emissions.

$CE_C = (44/12) * C*Q$

where,

CE_c - Stoichiometric carbon-dioxide emission due to coal burning at project, MT

C - Carbon percentage in coal, %

Q - Quantity of coal burned, MT

9.2 Baseline Emission Calculations

Baseline emissions will be calculated by multiplying the total power exported to the grid with net baseline emission factor, as given in the PDD.

$$BE = TP_{exp} \times NEF_B$$

Where,

BE – Baseline Emissions per annum (tones/year)

TP_{exp} – Total clean power export to grid per annum

NEF_B – Net baseline emission factor

9.3 Leakage

The leakage activity identified, which contributes for GHG emissions outside the project boundary is transportation of biomass from biomass collection centers to biomass power project site.

Leakage will be calculated as per below:

$$Leakage = \frac{Q_{bio} \times D_p \times N_y \times D_n \times C_v \times C_f \times E_f}{C_t \times M}$$

Q_{bio} = Quantity of biomass transported (MT/day)

C_t = Capacity of truck/ vehicle carrying biomass (MT)

D_p = Distance of procurement including return journey of vehicle (km)

M = Mileage of vehicle (km/litre)

N_y = No of days in a year

D_n = Density of fuel (Kg/Litre)

C_v = Calorific value of fuel (Kcal/ kg)

C_f = Conversion factor from Kcal to Trillion Joules (TJ)

E_f = Emission factor of fuel (ton CO_2/ TJ)

9.4 Emission Reduction Calculation

The emission reductions will be calculated as per the equation:

$$ER = BE - NE_P$$

ER - CO_2 Emission reduction per annum by project activity (tCO_2/year)

BE - Baseline Emissions per annum (tCO_2/year)

NEp - Net emissions by project activity (tCO_2/year)

Appendix 1: Monitored Data (01 July 2007 – 31 December 2007)

The annual values of the parameters monitored is given below.

S.No	Parameter	Unit	Value
1	Total Electricity Generated	kWh	23,955,900
2	Auxiliary consumption	kWh	2,129,400
3	Net Power export	kWh	21,068,800
4	Biomass quantity	MT	32,054
5	Biomass Calorific value	kCal/kg	As per Appendix 4
6	Coal quantity	MT	0
7	Coal calorific value	kCal/kg	NA
8	Average Distance of procurement	Km	11
9	Mileage of Vehicle	Km/litre	Truck - 3.5 Tractor – 3.5
10	Density of fuel	Kg/litre	0.889
11	Average Capacity of vehicle	MT	Truck – 12 Tractor – 4

Appendix 2: Emission Reduction Calculations

1) Baseline Emissions

Description	Value	Units
CO_2 Emission Factor	0.94288	kg CO_{2e} / kWh
Net Electricity Exported	21068800	kWh
Total Baseline Emission	19865350	kg CO_{2e}
Total Baseline Emission	19865	tCO_{2e}

2) Project Emissions

Description	Unit	Qty
Coal Consumption	MT	0
Carbon %	%	0
Project Emissions	**tCO_2**	0

3) Leakage

Description	Units	Trucks	Tractors
Biomass transported	MT/year	30397	1657
Capacity of each vehicle	MT	13	5
Total Vehicle Trips	Per year	2252	310
Average Distance of procurement	Km	11	11
Mileage	Km/litre	3.5	3.5
Density of diesel	kg/l	0.89	0.89
Calorific value of diesel	Kcal/Kg	10272	10272
Conversion Factor	TJ/kCal	4.186E-09	4.186E-09
CO_2 emission factor for diesel	tCO_2/ TJ	74.1	74.1
Leakage Emissions	**tCO_2**	**20**	**3**

4) Emission Reductions

	Value	Units
Total Baseline Emission	19865	tCO_{2e}
Project Emissions	0	tCO_{2e}
Leakage	23	tCO_{2e}
Emission Reductions	**19843**	tCO_{2e}

Appendix 3: Contact Information

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Appendix 4: Calorific Value of biomass

Date	Calorific Value (kCal/kg)
18.08.07	3276.87
28.08.07	2706.5
02.09.07	2472.61
15.09.07	2478.65
29.09.07	3128.85
03.10.07	2561.16
15.10.07	2601.19
30.10.07	2621.9
02.11.07	2598.91
16.11.07	2683.72
29.11.07	3129.56
07.12.07	3387.02
19.12.07	2674.98
30.12.07	3103.88