

MONITORING REPORT

Version 1, 11/07/2007

CHAMBAL POWER LIMITED (CPL)

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 March, 2006 to 30th June, 2007

PROJECT LOCATION

Chambal Power Limited
Rangpur, Kota District, Rajasthan, India.

July 2007

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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.

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.

The first monitoring report covers the activity from 01/03/2006 till 31/06/2007. As per registered PDD the start date of the project activity was 01/03/2004 and of the crediting period is 01/03/2006.

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

5. Project Description

5.1 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).

CPL 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.

5.2 Project Participants

The project participants are ‘Chambal Power Limited.’

5.3 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. The location map is as follows:

Figure 1: Location Map of Project Activity

5.4 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.

There will be one 35 TPH, 67 kg/cm², 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 will be of fluidized bed combustion (FBC) type and will have 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.

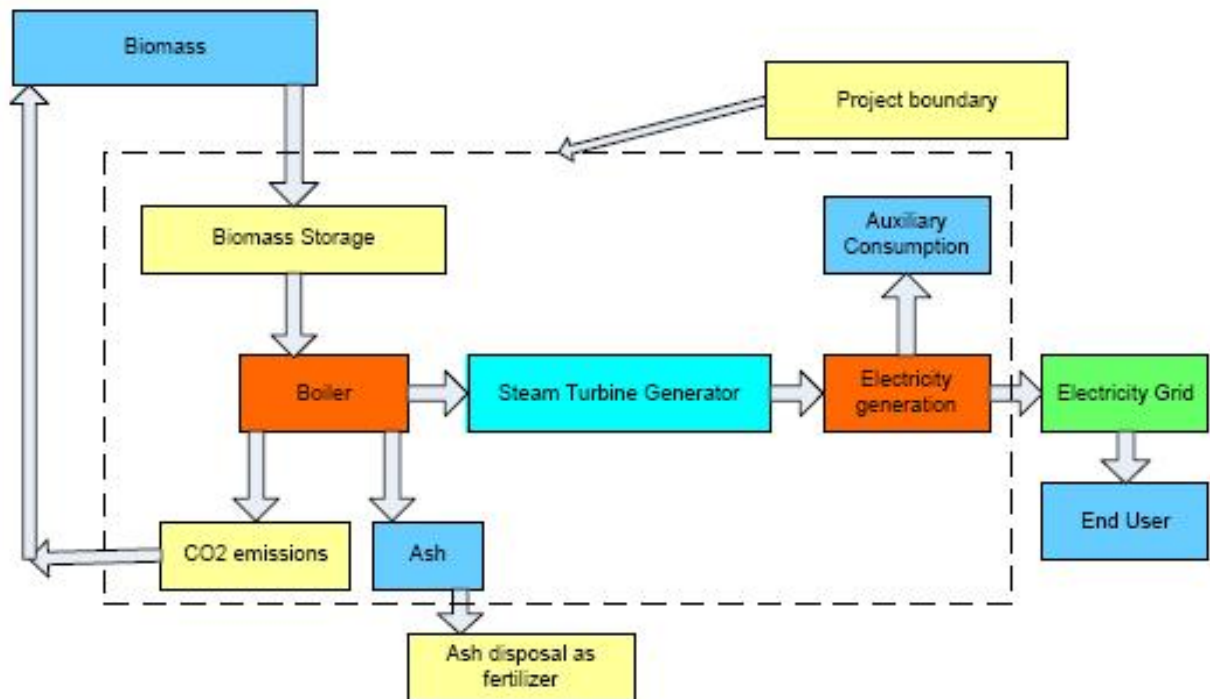
Steam turbine of fully condensing mode with suitable alternator generator will be installed for generating electricity. The turbine will be single cylinder, single exhaust fully condensing type, designed for high operating efficiencies and maximum reliability.

Along with the new 35-TPH boiler and the 7.5-MW turbo-generator (TG), the other auxiliary units of the plant would 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.

5.5 Project Boundary

A pictorial representation of the project boundary is given below:

Figure 2: Pictorial Representation of Project Boundary



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

The Project has been completed as planned and described in the Project Design Document (PDD).

The plant is in operation continuously (with outages –forced and planned) since April 2006. The last year being the first year of operation of the plant, several teething troubles in form of technical difficulties were faced by the plant which led to several outages. The frequency of such problems has now reduced substantially and the plant is expected to run smoothly in the future.

The purpose of the project is to generate electricity by utilizing agricultural wastes and other biomass residues. 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)

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 (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/paper)	For how long is archived data to be kept?	Comment
D.3.a.1.	Power	Total electricity generated	kWh	M	Shift wise	100%	Electronic	3 years after issue of CER	Measured in plant premises and monitored and recorded continuously through DCS. Manufacturers of equipments should be of repute.
D.3.a.2.	Power	Auxiliary consumption	kWh	M	Shift wise	100%	Electronic	3 years after issue of CER	-
D.3.a.3.	Power	Power export	kWh	M	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	Data	Data	Data	Measured	Recording	Proportion	How will	For how long	Comment
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number	type	variable	unit	(m), calculated (c) or estimated (e)	g frequenc y	n of data to be monitore d	the data be archived? (electronic/ paper)	is archived data to be kept?	
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	Fortnightl y	-	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

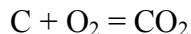
9.1 Project Emission Calculations

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:

CO₂ Emission (kg) = Stoichiometric CO₂ release from carbon content in coal (based on total carbon content

To have an estimate of the project CO₂ emission quantity due to combustion of coal along with the biomass, total carbon content of the coal should be known. Combustion reaction for CO₂ emission is as under.



Assuming complete combustion of coal, following formula can be used for conservative estimation of CO₂ 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 CO₂/ TJ)

9.4 Emission Reduction Calculation

The emission reductions will be calculated as per the equation:

$$ER = BE - NE_p$$

ER - CO₂ Emission reduction per annum by project activity (tCO₂/year)

BE - Baseline Emissions per annum (tCO₂/year)

NE_p - Net emissions by project activity (tCO₂/year)

Appendix 1 : Monitored Data (March 2006 – June 2007)

The annual values of the parameters monitored is given below.

S.No	Parameter	Unit	Value
1	Total Electricity Generated	kWh	27,303,100
2	Auxiliary consumption	kWh	3,095,300
3	Net Power export	kWh	21,577,000
4	Biomass quantity	MT	27,163
5	Biomass Calorific value	kCal/kg	As per Annexure
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

Emission Reduction Calculations	Value	Units
CO ₂ Emission Factor	0.94288	kg CO _{2e} / kWh
Net Electricity Exported	21577000	kWh
Total Baseline Emission	20344522	kg CO _{2e}
Total Baseline Emission	20345	tCO _{2e}
Project Emissions	0	tCO _{2e}
Leakage	33	tCO _{2e}
Emission Reductions	20312	tCO _{2e}

2) Project Emissions

	Unit	Qty
Coal Consumption	MT	0
Carbon %	%	0
Project Emissions	tCO ₂	0

3) Leakage

	Units	Trucks	Tractors
Biomass transported	MT/year	18450	8713
Capacity of each vehicle	MT	12	4
Total Vehicle Trips	per year	1487	2199
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	13	20

4) Emission Reductions

	Value	Units
Total Baseline Emission	20345	tCO _{2e}
Project Emissions	0	tCO _{2e}
Leakage	33	tCO _{2e}
Emission Reductions	20312	tCO _{2e}

Annexure 3: Contact Information

Organization:	Chambal Power Limited
Street/P.O.Box:	Village Rangpur
Building / Location:	
City:	District – Kota
State/Region:	Rajasthan
Postfix/ZIP:	324002
Country:	India
Telephone:	0744-2438398
FAX:	0744-2434283
E-Mail:	cplkota@sancharnet.in
URL:	
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Wagle
Middle Name:	R
First Name:	S
Department:	

Annexure 4: Calorific Value of biomass

Date	Calorific Value (kCal/kg)
06/03/06	3202
07/03/07	3409
08/03/06	3192
10/04/06	3709
26/04/06	3547
17/05/06	3562
30/05/06	3560
16/06/06	3617
30/06/06	3600
19/07/06	3447
28/07/06	3314
18/08/06	3011
30/08/06	3146
11/09/06	3054
30/09/06	2961
10/10/06	2536
25/10/06	2634
20/11/06	2419
27/11/06	2664
16/12/06	3246
31/12/06	3335
01/01/07	3093
20/01/07	3243
10/02/07	3360
25/02/07	3448
13/03/07	3656
28/03/07	3646