

# **FOURTH MONITORING REPORT**

Monitoring Period  
25.09.2008 to 24.09.2009  
(Both Days Included)

## **Project 0362: Sri Balaji 6 MW Non-Conventional Renewable Sources Biomass Power Project**

Version: Balaji/001  
Date : 25th January 2010

**Project Site:**  
Chennur village,  
Chennur Mandal, Kadapa district,  
Andhra Pradesh, India

**Sri Balaji Biomass Power Pvt. Ltd.**  
**1071, Road No 44, Jubilee Hills,**  
**Hyderabad – 500033,**  
**Andhra Pradesh, India.**  
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## **A. Project Reference:**

**Title:** Sri Balaji 6 MW Non – Conventional Renewable Sources Biomass Power project

**UNFCCC Reference No:** 0362

**Registration Date:** 21 May 2006

**Methodology:** AMS ID Version 7

**Crediting Period:** 15<sup>th</sup> April 2004 to 14<sup>th</sup> April 2011 (Fixed)

## **B. Monitoring Period**

The Monitoring period is chosen from 25.09.2008 to 24.09.2009 (both days included).

## **C. Location of the Project:**

Project 0362: Sri Balaji 6 MW Non – Conventional Renewable Sources Biomass Power Project Plant located at Chennur Village, Chennur Mandal, Kadapa Dist., Andhra Pradesh, India, has been commissioned and is operational since 14.04.2004. The Plant is using renewable Biomass fuels like Rice Husk, Ground Nut Shell, Prosopis Julie flora etc.

## **D. Brief Description and Current Status of the Project:**

The project was registered with CDM Executive Board on 21 May 2006.

During the first Monitoring Period (15 April 2004 to 24 November 2006) plant exported 96.55 million units to the grid and was issued 81295 CERs.

During the second Monitoring Period (25 November 2006 to 24 September 2007) plant exported 30.13 million units to the grid and was issued 24830 CERs.

During the third Monitoring Period (25 September 2007 to 24 September 2008) plant exported 37.55 million units to the grid and was issued 30951 CERs.

The specifications of major equipment and their suppliers are detailed below.

S. No	Equipment	Supplier
1	Boiler	Walchand Nagar Industries Ltd, Pune.
2	Turbo Generator	Triveni Engineering & Industries Ltd.

The Plant is using renewable Biomass fuels like Rice Husk, Ground Nut Shell, Prosopis Julie flora etc. In addition, plant also uses small quantity of diesel very occasionally for power generation using DG set to meet emergency power requirement during complete black out and factory also for internal vehicles for fuel transfer.

The Plant is in operation continuously (with outages – forced & planned) during the monitoring period. The Plant had suffered major outages as detailed below during the period:

Month	Running hours	Planned outages	Forced outages	Reason for major Outrage
		Hrs/Min.	Hrs/Min.	
Oct (25/09 to 24/10)	454.69	258.35	0.76	Conveyor Maintenance
Nov (25/10 to 24/11)	348.93	289.19	4.16	Travelling Grate Maintenance
Dec (25/11 to 24/12)	379.22	341.22	0.58	Condense Maintenance
Jan (25/12 to 24/01)	354.77	384.39	4.46	Cooling Tower Maintenance
Feb (25/01 to 24/02)	421.51	159.38	158.25	Boiler Problem
Mar (25/02 to 24/03)	629.53	19.65	6.12	General Maintenance
Apr(25/03 to 24/04)	543.39	177.58	21.43	Half yearly Maintenance
May(25/04 to 24/05)	549.45	139.91	31.05	Conveyor Maintenance
Jun(25/05 to 24/06)	582.65	136.00	23.65	Cooling Tower Problem
Jul(25/06 to 24/07)	504.00	187.38	3.58	Air Compressors Maintenance
Aug(25/07 to 24/08)	389.04	334.35	20.51	Yearly Maintenance

Sep(25/08 to24/09)	609.30	122.76	11.14	Travelling Grate Maintenance
<b>Total For The Monitoring Period</b>	<b>5766.48</b>	<b>2550.16</b>	<b>285.69</b>	

## **E. Sustainability – Economic and Social well being:**

The Company has spent around Rs. 15.25 million (USD 0.32 million @ IUS\$ = Rs 46.25/-) during the monitoring period towards fuel usage in the Plant. Procurement of biomass fuel from local farmers and biomass suppliers has generated additional income and improved economic condition of the community.

This has also resulted in local employment generation. Plant has generated employment opportunities directly / indirectly to more than 500 people.

As a part of social responsibility, Plant has been contributing to social infrastructure by way of employing local people for the Plant operations and also paying significant amount as tax for Sales Tax, water charges to Irrigation Department, and for the local Panchayat.

## **F. Baseline Emission Factor**

The baseline emissions and the emission reductions from project activity are estimated based on the quantum of electricity to be exported by the project activity and the Baseline Emission Factor (BEF) of the chosen Southern Regional grid (India). The baseline emission factor (combined margin) has been calculated as per the guidance provided in ACM0002 (Version 06). The Baseline Emission Factor 0.830 Kg CO<sub>2</sub>/ KWh has been validated and is available in the [registered CDM PDD](#).

## **G. Baseline Emission Factor**

Baseline and project emissions are calculated as per the formulas mentioned in Section B of the PDD.

- Baseline emissions are calculated as per the formula given below:

Baseline emissions = Net Electricity exported to the grid (KWh) x Grid emission factor (tCO<sub>2</sub>/KWh)

Grid emission factor of 0.830 kgCO<sub>2</sub>/kWh is considered based on the data provided in the registered PDD and procedures mentioned in ACM0002 (Version 6).

- Emission Reductions:

The project activity reduces carbon dioxide through displacement of grid electricity generation with fossil fuel based power plants by renewable- electricity generated through biomass. The emission reduction E<sub>Ry</sub> due to project activity during a given year y is calculated as the difference between baseline emissions (B<sub>Ey</sub>), project emissions (P<sub>Ey</sub>) and emissions due to leakage (L<sub>y</sub>), as per the formulae given below:

$$E_{Ry} = B_{Ey} - P_{Ey} - L_y$$

Where,

B<sub>Ey</sub> = Baseline emissions

P<sub>Ey</sub> = Project emissions;

L<sub>y</sub> = Emissions due to Leakage.

P<sub>Ey</sub>(Import) = Net Electricity imported to the grid (KWh) x Grid emission factor (tCO<sub>2</sub>/KWh)

P<sub>Ey</sub>(coal) = (Coal used in MT X (Carbon content in % / 100)) x 44/12

P<sub>Ey</sub>(diesel) = [(Diesel consumed in liters x calorific value (TJ/kg) x density of fuel (kg/l))] x IPCC emission factor (tCO<sub>2</sub>/TJ) x oxidation factor

Where,

CV = Calorific value = 10270 Kcal/Kg (*Ex-Ante*)

EF = Emission Factor = 74.1 tCO<sub>2</sub>/TJ (*Ex-Ante*) IPCC 2006

In the case of this project activity L<sub>y</sub> = 0 ([Please refer to the registered PDD](#))

Based on this it has been observed that there is a difference in Net emission reduction applicable to present monitoring period when compared to registered PDD as indicated below.

Emissions	Baseline Emissions (tCO <sub>2</sub> )	Project Emissions (tCO <sub>2</sub> )	Net Emission Reduction (tCO <sub>2</sub> )
As per registered PDD	28405	0	28405
As per the records	26535	192	26342

## H. Parameters being monitored:

For the Project, the following parameters are being monitored on continuous basis:

- 1 **Power Generation (KWh):** Power generation from the plant is measured continuously using the generation meter installed in the control room of the plant. The total generated power will also be used to measure the auxiliary consumption of the plant after deducting power exported to the grid.
- 2 **Power Export & Import (KWh):** Power exported to the grid and imported from the grid is monitored from energy meters installed at APTransco substation on end of every billing month. A joint meter reading for the energy exported to the Grid will be recorded by representatives of APTransco and Company and the readings will be 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 SRI BALAJI BIOMASS POWER PRIVATE LIMITED.
- 3 **Biomass Fuel (MT):** The Biomass fuel (of all kinds) on receipt in the Plant is weighed in the Electronic Weigh Bridge installed at the entry of the Plant and unloaded in the fuel storage yard. The biomass fuel after necessary preparation is fed to the Boiler as per the requirement and consumption will be recorded on daily basis.
- 4 **Calorific value of the Biomass fuel (Kcal/Kg):** The calorific value of the Biomass fuel (of all kinds) used is being measured in the laboratory on a monthly basis, by sampling method as per the arrivals of the biomass and average value is considered. Though this parameter is not directly used in the emission reduction calculations the project proponent monitors the same for maintaining a check on the quality of biomass being fired in the boiler.
- 5 **Coal (MT):** Coal never has been used in plant during the complete monitoring period.
- 6 **Diesel (Liters):** Diesel consumption will be monitored on regular basis using level gauge/measurement on store issues.

Month-wise data on Power Generation, export, import, fuel consumption and diesel consumption is given below for the monitoring period:

Billing Month	Year	Electricity Generated, KWH	Electricity Exported KWH	Electricity Imported KWH	Biomass Used, MT	Coal Used, MT	Diesel consumption, lit
Oct (25/09 to 24/10)	2008	2887100	2563700	11400	4790	0	1884
Nov (24/10 to 24/11)	2008	2354100	2108800	19500	3684	0	1146
Dec (24/11 to 24/12)	2008	2333300	2068400	19400	3835	0	1428
Jan (24/12 to 24/01)	2009	2219300	1975100	2200	3325	0	872
Feb (24/01 to 24/02)	2009	2780100	2484400	21000	4403	0	1786
Mar (24/02 to 24/03)	2009	4060300	3628100	8200	6500	0	937
Apr(24/03 to 24/04)	2009	3079600	2697700	15300	5254	0	1672
May(24/04 to 24/05)	2009	2847800	2455300	15000	5095	0	1812
Jun(24/05 to 24/06)	2009	3579200	3162400	8900	6038	0	2198
Jul(24/06 to 24/07)	2009	3401000	2999100	15200	5228	0	1530
Aug(24/07 to 24/08)	2009	2418100	2149000	26100	3632	0	967
Sep(24/08 to 24/09)	2009	4115600	3677500	9800	5635	0	1844
<b>Total For The Monitoring Period</b>		<b>36075500</b>	<b>31969500</b>	<b>172000</b>	<b>57419</b>	<b>0</b>	<b>18076</b>

Emission reductions are calculated based on the power exported to the grid; power imported from the grid during shut down and starts up, coal and diesel consumed in the plant for the monitoring period.

Billing Month	Year	Electricity Exported, KWH	Electricity Imported KWH	Biomass Used, MT	Coal Used, MT	Diesel consumption, lit	Net Emission Reductions (tCO2e)
Oct (25/09 to 24/10)	2008	2563700	11400	4790	0	1884	2113
Nov (24/10 to 24/11)	2008	2108800	19500	3684	0	1146	1731
Dec (24/11 to 24/12)	2008	2068400	19400	3835	0	1428	1697
Jan (24/12 to 24/01)	2009	1975100	2200	3325	0	872	1635
Feb (24/01 to 24/02)	2009	2484400	21000	4403	0	1786	2040
Mar (24/02 to 24/03)	2009	3628100	8200	6500	0	937	3002
Apr(24/03 to 24/04)	2009	2697700	15300	5254	0	1672	2222
May(24/04 to 24/05)	2009	2455300	15000	5095	0	1812	2020

Jun(24/05 to 24/06)	2009	3162400	8900	6038	0	2198	2611
Jul(24/06 to 24/07)	2009	2999100	15200	5228	0	1530	2472
Aug(24/07 to 24/08)	2009	2149000	26100	3632	0	967	1759
Sep(24/08 to 24/09)	2009	3677500	9800	5635	0	1844	3039
<b>Total For The Monitoring Period</b>		<b>31969500</b>	<b>172000</b>	<b>57419</b>	<b>0</b>	<b>18076</b>	<b>26342</b>

Based on the time of meter reading, the generation before reading has been added as a part of generation of the preceding month and the generation after reading added in the next month.

## I. Quality Control (QC) and Quality Assurance (QA)

### QA/QC procedures

ID	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
Electricity Generated	Low	The data is measured using the generation meter installed in the control room of the plant, which is calibrated each year
Auxiliary Consumption	Low	The auxiliary consumption is arrived here by deducting export of electricity from the total generation.
Electricity Export	Low	The data is measured through meter at APTRANSCO substation, calibrated every year. Sales receipts for electricity supplied to grid by the project are used for the purpose of double check
Electricity import from grid	Low	The data is monitored from energy meters installed at APTRANSCO substation at end of every billing month, All meters calibrated every year
Biomass used	Low	The quantity is recorded at the entry level by weighing through a weigh bridge. The amount fed to the boiler is recorded on a daily basis. The weighbridge is calibrated at regular intervals
Avg. calorific value of Biomass used	Low	CV of coal is being analyzed at government approved outside laboratory at regular intervals.
Coal used	Low	The amount used is weighed through weighbridge and is recorded. The weighbridge is calibrated at regular intervals. During this period



		there is no coal usage.
Carbon content in coal	Low	This is analyzed at government approved laboratory at regular intervals.
Calorific value of coal	Low	Not applicable as we use the second procedure and use the carbon content in coal to get the emission from coal
Diesel used	Low	Diesel consumption is monitored on regularly using level gauge/measurement.
Net calorific value of Diesel	Low	IPCC Values ( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html">http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html</a> )
Density of Diesel	Low	<a href="http://www.iocl.com/Products/DieselSpecifications.pdf">http://www.iocl.com/Products/DieselSpecifications.pdf</a> )
Oxidation factor of Diesel	Low	( <a href="http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf">http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf</a> )

## Calibration

As per the Power Purchase Agreement (PPA), the energy exported to the APTRANSCO 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.

As per the requirements of APTRANSCO calibration has to be carried out at least once in five years however the plant will undertake the calibration of meters once in a year to make sure the accurateness of readings.

The calibration test has been done:

Meter Type	Calibration Tested on	Valid Up to
Export	23.08.2008	23.08.2009
	23.08.2009	22.08.2010
Generation	10.02.2008	09.02.2009
	31.01.2009	30.01.2010
Auxiliary	10.02.2008	09.02.2009
	31.01.2009	30.01.2010
Weighbridge	7.12.2007	6.12.2008
	6.12.2008	5.12.2009

Power Generation, Export & Auxiliary Consumption, fuel consumption are being recorded daily and the same is being verified by Manager (O&M) and approved by General Manager (Operation).

## **J. Roles & Responsibilities**

A CDM team has been formed in Sri Balaji Biomass Power private limited for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management. Qualified and trained people monitor the parameters and emission reduction calculations. In the complete implementation and monitoring Plan, Sri Balaji Biomass Power Private Limited is the sole agency responsible for implementation and monitoring.

### **CDM team member names:**

1. Mr. Raju M	Overall project Implementation
2. J. Hanumantha Rao	Technical Audit, daily monitoring parameters
3. Mr. Murali krishna M 4. Ms. Anwasha	MIS Reporting CDM and Documentation

# Annexure I

## Emission Reduction Calculation

Month	Year	Electricity Generated, kWh	Electricity Exported, kWh	Electricity Imported, kWh	Auxiliary Consumption		Biomass Used, MT					Coal Used, MT	Grand Total, MT	% Carbon in Coal	Emission Factor, kgCO <sub>2</sub> /kWh	Diesel		Baseline emissions, tCO <sub>2</sub> e	Project Emissions, tCO <sub>2</sub> e				Nett Emission Reductions, tCO <sub>2</sub> e
					kWh	%	Rice Husk	GN Shell	Jufliflor a	*Others	Total Biomass								Emission s due to import	Emission s due to Coal	Emission s due to Diesel	Total Project emissions	
		As per SBPPL log sheets	As per certified meter readings	As per certified meter readings			As per SBPPL Books							As per Test certificates	As per PDD	Consumption, lit	Emission factor (IPCC), tCO <sub>2</sub> /TJ						
Oct (25/09 to 24/10)	2008	2887100	2563700	11400	323400	11.2	1550	1035	40	2165	4790	0	4790	0	0.83	1884	74.1	2128	9.46	0	5.15	15	2113
Nov (24/10 to 24/11)	2008	2354100	2108800	19500	245300	10.4	1320	995	120	1249	3684	0	3684	0	0.83	1146	74.1	1750	16.19	0	3.13	19	1731
Dec (24/11 to 24/12)	2008	2333300	2068400	19400	264900	11.4	1500	955	260	1120	3835	0	3835	0	0.83	1428	74.1	1717	16.10	0	3.91	20	1697
Jan (24/12 to 24/01)	2009	2219300	1975100	2200	244200	11.0	1305	805	445	770	3325	0	3325	0	0.83	872	74.1	1639	1.83	0	2.38	4	1635
Feb (24/01 to 24/02)	2009	2780100	2484400	21000	295700	10.6	1955	105	300	2043	4403	0	4403	0	0.83	1786	74.1	2062	17.43	0	4.88	22	2040
Mar (24/02 to 24/03)	2009	4060300	3628100	8200	432200	10.6	1645	295	640	3920	6500	0	6500	0	0.83	937	74.1	3011	6.81	0	2.56	9	3002
Apr(24/03 to 24/04)	2009	3079600	2697700	15300	381900	12.4	500	540	1715	2499	5254	0	5254	0	0.83	1672	74.1	2239	12.70	0	4.57	17	2222
May(24/04 to 24/05)	2009	2847800	2455300	15000	392500	13.8	950	465	2070	1610	5095	0	5095	0	0.83	1812	74.1	2038	12.45	0	4.96	17	2020
Jun(24/05 to 24/06)	2009	3579200	3162400	8900	416800	11.6	2415	595	1200	1828	6038	0	6038	0	0.83	2198	74.1	2625	7.39	0	6.01	13	2611
Jul(24/06 to 24/07)	2009	3377000	2999100	15200	401900	11.8	2100	1015	900	1213	5228	0	5228	0	0.83	1530	74.1	2489	12.62	0	4.18	17	2472
Aug(24/07 to 24/08)	2009	2418100	2149000	26100	269100	11.1	1857	675	780	320	3632	0	3632	0	0.83	967	74.1	1784	21.66	0	2.64	24	1759
Sep(24/08 to 24/09)	2009	4115600	3677500	9800	438100	10.6	4070	520	540	505	5635	0	5635	0	0.83	1844	74.1	3052	8.13	0	5.04	13	3039
Total		36051500	31969500	172000	4106000	11.4	21167	8000	9010	19242	57419	0	57419	0		18076		26535	142.76	0	49.44	192	26342

\*Others include Bengal gram, Bagasse, Saw dust, Juwari Husk