<u>MONITORING REPORT – VERSION 4</u>

5th September 2006

CLARION POWER CORPORATION LIMITED Biomass Power Plant in Andhra Pradesh Registration No. with UNFCCC 0075

Project Location Tangutur Village & Mandal Prakasam Dist Andhra Pradesh, India

Clarion Power Corporation Limited

Registered Office

Corporate Office

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Current Status of the Project

Clarion Power Corporation Limited's (CPCL) 12 MW biomass based Power Plant at Tangutur Village & Mandal, Prakasam Dist, Andhra Pradesh, India has been commissioned and is operational since 21st February 2004.

First synchronization of the Project with 132 KV sub station at Ongole (AP TRANSCO grid) was performed on 21.02.2004 after trial operations and after obtaining permission for commercial operations. Plant exported 73.381 million kWh to APTRANSCO grid and consumed 16215 MT of biomass fuel and 6184 MT of coal since beginning of the operations till 23rd September 2005.

The list of vendors who supplied major equipments in the Plant is given below.

<u>S.No</u>	<u>Equipment</u>	<u>Supplier</u>					
1	Boiler	M/s Walchandnagar Industries, Pune.					
2	Turbo-Generator Set	M/s Kaluga EME India Pvt Ltd, Hyderabad.					
		(Turbine was imported from Kaluga Turbine works, Russia and Generator was imported from Electrosila, Russia)					
3	Plant Auxiliaries	Sub-vendors like Sriram Tower Tech Ltd, M/ Kirloskar Pumps, Bharat Bijilee Ltd, M/s ABB Ltd M/s Aquatech Industries, M/s Ingersoll Rand, M/ Annapurna Constructions etc through M/ Walchandnagar Industries, Pune / M/s Kalug EME India, Hyderabad / M/s Encon Services Ltd Chennai.					
4	Fuel Handling System	M/s Hyquip Projects Pvt Ltd through M/s Walchandnagar Industries, Pune					

Plant obtained term loan from financial institutions namely M/s Power Finance Corporation Ltd & M/s Andhra Bank in addition to equity from CPCL itself.

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 & planned) since 21.02.2004. The Plant is using Biomass fuels like Prosophis Juliflora, Rice Husk, and other biomass fuels and supplementary fuel like coal (less than the permitted quantity). 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.

The Plant has suffered major outages for a period of 14 weeks approx. during 2004-05 and 8 weeks approx. during 2005-06 period ended September 2005.

Monitoring Period

The Monitoring period is chosen from 21.02.2004 to 23.09.05 (both days included).

Sustainability – Economic and Social well being

The Company has spent around Rs 111.13 million (USD 2.41 million @ IUS\$ = Rs 46/-) 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 100 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 the local panchayat etc.,

Parameters being monitored according to Monitoring Plan

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

- 1 **Power Export and import**: Power exported to the grid and imported from the grid is monitored from energy meters installed at APTRANSCO sub station on 23rd day of every 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 CPCL.
- 2 **Biomass Fuel:** The Biomass fuel 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.
- 3 **Calorific value of the Biomass fuel:** The calorific value of the Biomass fuel being used is being measured in the inhouse laboratory on daily basis as per the arrivals and average value will be considered on monthly basis.
- 4 **Coal/Diesel:** Coal on receipt in the Plant is 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. Diesel consumption will be monitored on regular basis.
- 5 **Carbon content in Coal**: Carbon content in the coal received is being 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.
- 6 **Calorific value of coal**: CV of coal is being measured in the inhouse laboratory on daily basis as per the arrivals.

Power Generation Export & Import, Fuel Consumption and Fuel Analysis

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

Fuel Consumption and Analysis:

Month	Year	Biomass Consumption, MT	Coal Consumption, MT	% Carbon in Coal	Average GCV of Fuels, Kcal/kg	
					Biomass	Coal
February	2004	60	0	0	4110	0
March	2004	3161	0	0	4000	0
Total for the FY		3221	0			
April	2004	5078	48	39.1	3826	5553
May	2004	922	42	39.1	3743	5553
June	2004	6392	634	41.44	3721	5791
July	2004	3193	194	41.44	3761	5778
Aug	2004	9582	599	42.27	3811	5981
Sept	2004	7461	105	42.94	3810	6030
Oct	2004	10009	482	41.01	3697	5714
Nov	2004	4284	238	41.01	3771	5714
Dec	2004	2452	101	34.16	3522	5321
Jan	2005	7769	1800	34.16	3918	5320
February	2005	7266	1469	34.16	3949	5322
March	2005	7881	445	34.16	3761	5322
Total for the FY		72289	6157			
April	2005	8407	0	0	3833	0
May	2005	6542	27	34.16	3840	5322
June	2005	10240	0	0	3969	0
July	2005	4763	0	0	3915	0
Aug	2005	4290	0	0	3908	0
Sept	2005	6463	0	0	3913	0
Total for	the FY	40705	27			
GRAND 1	TOTAL	116215	6184			

Power Generation, Export, Import & Emission Reductions

The emission reductions per year during 2003-04, 2004-05 and 2005-06 (till September 2005) are as given below:

Emission reductions are calculated based on the power exported to the grid, power imported from the grid during shut down and start up, coal and diesel consumed in the plant in addition to 20% deductions on GHG emission reductions due to usage of non permitted fuels in the plant from 21.02.04 to 03.10.05 as per validation report (first 226 days of plant operations).

Month	Year	Electricity Generated, Million kWh	Electricity Exported, Million kWh	Electricity Imported, Million kWh	Total Biomass used, MT	Coal Used, MT	Diesel consumption , lit	Nett Emission Reductions
February	2004	0.039	0.034	0.0869	60	0	4.0	-30.93
March	2004	3.497	3.076	0.0843	3161	0	44.5	1752.08
Total for the FY		3.536	3.111	0.171	3221	0	48.5	1721.15
April	2004	4.009	3.461	0.072	5078	48	8.0	1929.47
May	2004	0.721	0.597	0.0908	922	42	8.0	248.18
June	2004	4.423	3.895	0.0645	6392	634	15.0	1472.44
July	2004	1.991	1.735	0.1059	3193	194	8.0	718.05
Aug	2004	6.432	5.734	0.0538	9582	599	8.0	2583.83
Sept	2004	4.517	4.008	0.1078	7461	105	8.0	2151.63
Oct	2004	6.193	5.544	0.0628	10009	482	18.0	3046.13
Nov	2004	2.438	2.112	0.1192	4284	238	10.0	1100.60
Dec	2004	1.653	1.477	0.0561	2452	101	11.0	913.49
Jan	2005	6.992	6.235	0.0408	7769	1800	53.0	2279.53
February	2005	6.346	5.647	0.0737	7266	1469	12.0	2240.24
March	2005	5.318	4.728	0.0527	7881	445	46.0	2864.82
Total for the FY		51.051	45.172	0.900	72289	6157	205	21548.41
April	2005	5.965	5.257	0.0683	8407	0	9.0	3875.56
May	2005	4.376	3.877	0.0485	6542	27	9.0	2826.35
June	2005	7.255	6.513	0.0423	10240	0	16.0	4833.35
July	2005	3.286	2.936	0.07	4763	0	8.0	2140.66
Aug	2005	2.791	2.502	0.0712	4290	0	8.0	1815.71
Sept	2005	4.484	4.014	0.0581	6463	0	10.0	2954.88
Total for the FY		28.158	25.098	0.358	40705	27	60.0	18446.51
GRAND TOTAL		82.744	73.381	1.430	116215	6184	313.5	41716.06

Note: kWh measured are mentioned in million kWh (10⁶ kWh) for easy readability

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

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

Baseline emissions = Electricity exported to the grid (kWh) x Grid emission factor (tCO2/kWh)

 Project Emissions due to usage of coal are calculated as per the formula given below:

Emissions due to coal = (Coal used in Mt X (Carbon content in % / 100)) x 44/12

 Project Emissions due to electricity import and usage of diesel in the plant for emergency purpose are included as per the verifier suggestions.

Yearly Summary of Emission Reductions:

SI. No	Particular	2003-04	2004-05	2005-06 (till Sept 2005)	
1	CEF, kgCO2/kWh	0.732	0.732	0.747	
2	Emission factor of diesel as per IPCC guide lines (Source : 1996 IPCC Guide lines, Table 1.1), tCo2/TJ	74.1	74.1	74.1	
3	Power export to the grid, Million Units (MU)	3.111	45.172	25.098	
4	Base line emissions, tCo2	2276	33066	18748	
5	Project Emissions, tCo2 (Emissions due to import of electricity, burning of coal & consumption of diesel)	125	9000	301	
6	Deduction as per the validation report (for first 226 days of operation), tCo2	430	2517	0	
7	Nett Emission Reductions, tons of CO_2	1721	21548	18447	
	Grand Total	41716 tCO ₂			

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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 Asst. General Manager (O&M) and approved by General Manager (O&M).

Carbon content in Coal:

Carbon content in the coal received is being 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.

Roles & Responsibilities

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