CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-SSC-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

Annexes

Revision history of this document

Version Number	Date	Description and reason of revision
01	21 January 2003	Initial adoption
02	8 July 2005	• The Board agreed to revise the CDM SSC PDD to reflect guidance and clarifications provided by the Board since version 01 of this document. • As a consequence, the guidelines for completing CDM SSC PDD have been revised accordingly to version 2. The latest version can be found at <http://cdm.unfccc.int/Reference/Documents>.
03	22 December 2006	• The Board agreed to revise the CDM project design document for small-scale activities (CDM-SSC-PDD), taking into account CDM-PDD and CDM-NM.

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

>>10 MW biomass based power generation project by Rake Power Limited at Ramtek, Nagpur. Version – 4, dated 07/02/2011

A.2. Description of the small-scale project activity:

>>Keeping in view of the deficit situation for power and encouragement given by Government of India for setting up of renewable energy projects, Rake Power Limited (hereafter RPL) had proposed to start a 10 MW biomass based power project at Patgowari (V), Ramtek (T), Nagpur District, Maharashtra State, India. The project has received all clearances and financial closure. Project has started its commercial operation on 25th July 2008.

Purpose of the Project Activity:

The project activity, 10 MW capacity plant has started its commercial operation on 25th July2008 and is exporting electricity to the western grid which is a part of NEWNE grid in India. The maximum gross power generation with 330 operating days per annum at 80% PLF is 63.36 million units. The net power availability for export at 80% PLF is estimated as 57.02 million units per annum after in-house auxiliary power consumption of 10% of total units generated.

The project activity has been essentially conceived to generate GHG emission free electricity by making use of available biomass at the project site to meet the regional electricity demand. The project being a renewable energy project leads to sustainable development through efficient utilisation of available natural resources and generation of additional employment for the local stakeholders.

Contribution of Project Activity to Sustainable Development:

Indian economy is highly dependent on "Coal" as fuel to generate electrical energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met.

This results in excessive demands for electricity and places immense stress on the environment. Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of Renewable Energy (RE) sources.

Government of India has stipulated following indicators for sustainable development in the interim approval guidelines[1] for CDM projects.

1. Social well-being
2. Economic well-being
3. Environmental well-being
4. Technological well-being

1. Social well being:

[1] Ministry of Environment and Forest, web site: http://envfor.nic.in:80/divisions/ccd/cdm_iac.html

- The plant site is an isolated rural area where unemployment, poverty and other economic backwardness are prevailing. The project would lead to the development of the region.
- During civil works, a lot of construction work will took place, which will generate employment for local people around the plant site.
- Other than these, there are various kinds of mechanical work, which generated /will generate employment opportunity on regular and permanent basis.
- Since, the biomass resources are collected and transported to the plant site from the fields, opportunities are generated for the rural people to collect and transport biomass. This results in the enhanced employment of the people.

2. Economic well being:

- The project activity generates employment in the local area.
- It provides stable and quality power to the industry.
- The project creates a business opportunity for local stakeholders such as bankers, consultants, suppliers, manufacturers, contractors etc.
- The main fuel resources for power generation are various types of surplus biomass which are collected from the farmers and brought to the project site. This generates additional revenue for the farmers on account of supply of the biomass to the project. Otherwise these types of biomass which are proposed to be used in the project were under-utilized / burnt and had little or no commercial value.
- In other words, the plant is imparting commercial value to agricultural residues enabling the farmers to get better price out of their produce augmenting their income.
- The above benefits due to project activity ensure that the project would contribute to the social and economic well being in the region.
- Hence, the project contributes to the economic sustainability around the plant site, which is promotion of decentralization of economic power.

3. Environmental well being:

- A power plant based on renewable energy sources (biomass) as fuel, does not affect the ecology, provided a few precautions are taken in the design of the plant. Project also reduces pollution in general. All the necessary measures have been taken in the plant's design for minimizing the impact on the ecology of the environment.
- The project ensures the resource sustainability, which has been used. The fuel is a surplus residue of agricultural products and hence the project is friendly for biodiversity.

4. Technological well being:

- The technology selected for the project is a more energy efficient technology.
- This ensures an optimum usage of fuel thereby leading to resource sustainability.

In view of the above, the project participant considers that the project activity profoundly contributes to the sustainable development in the region of the project activity.

CDM – Executive Board

A.3. Project participants:

>>

Name of the party involved ((Host) indicates a host party)	Private and /or public entity(ies) project participants	Kindly indicate if the party involved wishes to be considered as project participant (Yes/No)
India (Host)	**Private entity:** Rake Power Limited	No

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

>>

A.4.1.1. Host Party(ies):

>> India

A.4.1.2. Region/State/Province etc.:

>> **State:** Maharashtra

A.4.1.3. City/Town/Community etc:

>>**District:** Nagpur
Taluka: Ramtek
Village: Patgowari

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

>> Project site: Survey No. 429, 432 & 433
Village: Patgowari
Taluka: Ramtek
District: Nagpur
Geographical coordinates: Longitude 79°15’06’’ E, Latitude 21°23’51’’ N

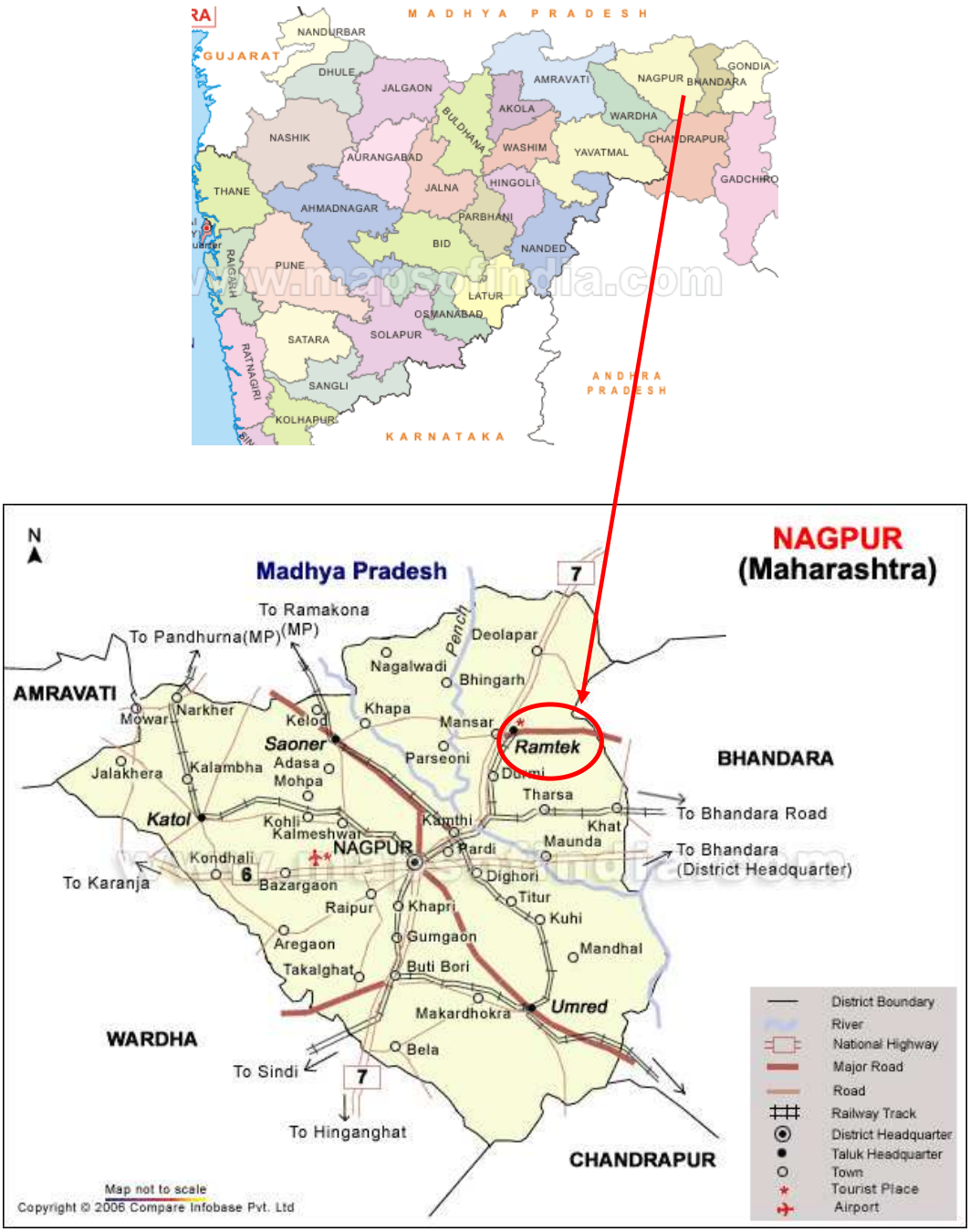


Fig. 1 – Location Map

A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

>> **Type : I – Renewable energy project**
Category : I. D. Grid connected renewable electricity generation (I.D. Version 15, 30 Oct 2009)

Technical details of the project activity

The project is designed to generate electricity for grid system using multi-fuels where the biomass residues viz., cotton stalks, rice/wheat husk, paddy straw & stalks can be used as main biomass fuel, gram stalks, maize/ jowar stalks, ground nut shells, woody biomass (juliflora twigs) can be used as secondary/supplementary fuel and also coal can be used up to 10%. The basic technology which is indigenous is Rankine cycle route where direct combustion of biomass materials takes place through the multi-fuel fired boiler to generate high pressure and high temperature steam, which drives an impulse turbine generator set.

Technical Specifications:

Boiler	
Make	Thermax Ltd., India
Type	AFBC
Capacity	45 TPH, 66 kgf/cm^2(g), 485 +/- 5^{o}C
Turbine	
Make	Hangzhou steam turbine co., ltd, China
Type	NK 32/45/20, Impulse extraction cum condensing
Nominal rating of turbine	10000 kW
Turbine speed and nominal rating	8951.6 rpm
First critical speed of turbine	3800 rpm
Second critical speed of turbine	13000 rpm
Nominal inlet steam pressure	63 kgf/cm^2 (g)
Nominal inlet steam temperature	480 ^{o}C
Inlet steam flow	Normal: 40800 kg/hr, Maximum:48700 kg/hr
Generator	
Make	Nanyang explosion protected group co., ltd, China
Type	QFW-10-4
Rating in MVA	12.5 MVA
Rating MW	10.0 MW
Power Factor	0.8
Rated Speed	1500 rpm

The plant is designed with all other balance of plant systems like the fuel handling system, ash handling system, raw water system, cooling water system, de-mineralized water system, compressed air system, HV and EHV systems etc. for its successful operation. The scheme is configured to optimize the power generation, with one stage of feed water heating. The extraction of steam and its usage in the deaerator for the feed water heating improves the efficiency of the plant.

CDM – Executive Board

The generating voltage at the generator terminals is 11 KV, which will be stepped up to 33 KV state electricity grid level. The power produced is evacuated to the grid of 132/33 kV sub-station at Mansar situated at about 6 km from the proposed project location**.** The project activity uses state of the art technology having modern safety features and pollution control systems to ensure environmentally safe and sound operation.

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

>> The annual average emission reduction works out to be 40244 tonnes of equivalent CO_2 and the total emission reductions for the entire crediting period of 10 years is as follows

Years	**Annual estimation of emission reductions in tonnes of CO_2**
1st year	40244
2nd year	40244
3rd year	40244
4th year	40244
5th year	40244
6th year	40244
7th year	40244
8th year	40244
9th year	40244
10th year	40244
Total estimated reductions	**402442**
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tCO2 e)	40244

A.4.4. Public funding of the small-scale project activity:

>> The project has neither received any public funding from the Annex I parties norany Official Development Assistance (ODA). The project is a unilateral project.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

Appendix C, paragraph 2 of the Simplified Modalities and Procedures for Small-Scale CDM project activities states:

- A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:
  - With the same project participants;
  - In the same project category and technology/measure; and
  - Registered within the previous 2 years; and
  - Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point.

- If a proposed small-scale project activity is deemed to be a de-bundled component in accordance with paragraph 2 above, but total size of such an activity combined with the previous registered small-scale CDM project activity does not exceed the limits for small-

scale CDM project activities as set in paragraph 6 (c) of the decision 17/CP.7, the project activity can qualify to use simplified modalities and procedures for small-scale CDM project activities.

On the basis of the above, the biomass based power project cannot be considered as de-bundled component of a large project activity as:

RPL had not requested for registration a small-scale project activity within the previous two years.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

>> Title : **Type – I**, Renewable Energy Project
Reference : **AMS – I.D. Grid connected renewable electricity generation, Version 15, EB 50**

B.2 Justification of the choice of the project category:

>> The project activity is to generate electricity from renewable fuel i.e., biomass and export electricity to western grid of India which is dominated by fossil fuel fired generating units. No cogeneration is involved in the project activity. The project activity capacity is 10 MW and is well below the qualifying limit (15MW) of project activities under small scale methodology **AMS – I.D.** Hence the methodology, **AMS – I.D. Grid connected renewable electricity generation** is applicable to the project activity.

The maximum electricity generating capacity is limited by the design of the plant and machinery and by the license issued by the state authorities. Hence there is no possibility of the project activity exceeding the limits of small scale CDM project activity during the crediting period.

Below is the table for the justification of methodology

Applicable conditions Justification	**Justification**
1. This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and/or displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.	The project activity is renewable biomass power plant which generates electricity and supply to an electricity distribution system (NEWNE grid) that is or would have been supplied by at least one fossil fuel fired generating unit.
2. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in	The project activity is not a hydro power plant.

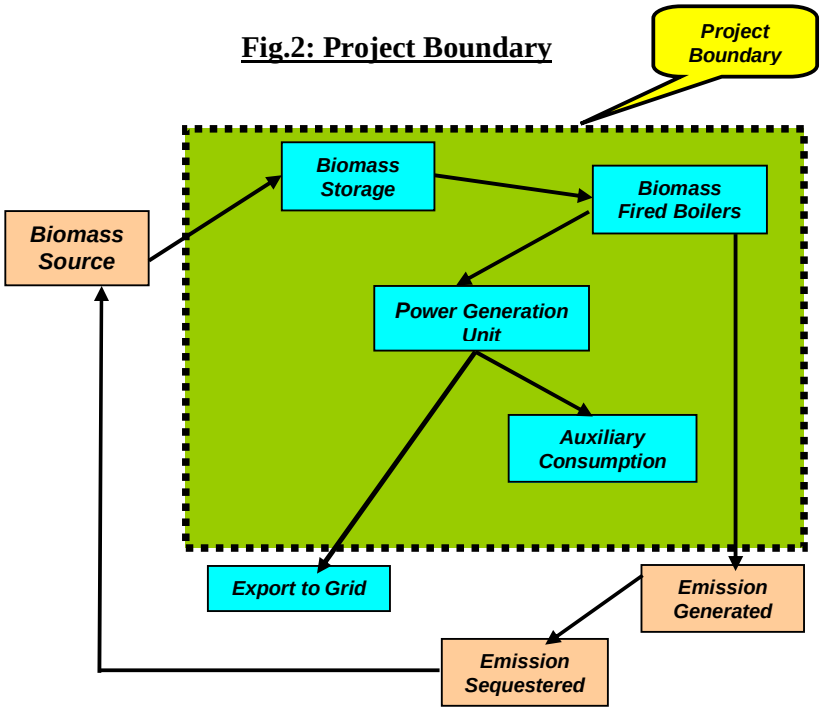
the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m2.	
3. If the unit added has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel[1], the capacity of the entire unit shall not exceed the limit of 15 MW.	Fossil fuel coal can be co-fired in the project activity and the generation capacity of the project plant is 10MW which is less than 15MW.
4. Combined heat and power (co-generation) systems are not eligible under this category.	The project activity is renewable biomass based power plant where the heat generated is used for only generation of electricity which is exported to the grid system and there is no other process or activity existing at the project site and hence it is not a Combined heat and power system.
5. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	The project activity is green field project and hence there is no existing renewable power generation facility at the project site before project activity.

As the project activity meets all the above written applicability criteria therefore the Methodology AMS.I.D version 15 is applicable.

B.3. Description of the project boundary:

>> Project boundary specified in the Appendix B of simplified modalities and procedures is that encompasses the physical, geographical site of the renewable generation source. This includes the project installation, pooling and sub-stations. The proposed project activity evacuates the power to the Western grid which is a part of NEWNE Grid. Therefore all the power plants contributing electricity to the NEWNE Grid are taken in the connected (project) electricity system for the purpose of baseline estimation.

Fig.2: Project Boundary



B.4. Description of baseline and its development:

>> The baseline of the project activity is determined in accordance with the methodology AMS – I.D of Appendix B to the Simplified modalities and procedures for small scale CDM project activities. As per the version 15 of methodology AMS – I.D.:

"For all other systems, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner as:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered.

OR

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used. Calculations must be based on data from an official source (where available) and made publicly available."

The project opted to choose for the option (a) i.e. combined margin emission factor. The combined margin factor is considered from the data of emission factors for Indian grid systems which are published by Central Electricity Authority (CEA) of Government of India, for every year in its "CO_2 Baseline Database" according to the guidelines of CDM UNFCCC website.

Overview on emissions sources included in or excluded from the project boundary Source

	Source	**Gas**	**Included**	**Justification / Explanation**
Baseline	Power Generation in baseline	**CO_2**	Yes	Main Emission Source
		CH_4	No	Excluded for simplification. This is conservative.
		NO_2	No	Excluded for simplification. This is conservative.
Project	Onsite fuel & electricity consumption due to the project activity	**CO_2**	Yes	Main Emission Source
		CH_4	No	Excluded for simplification. This is conservative.
		NO_2	No	Excluded for simplification. This is conservative.

Emission gases and their sources are excluded from the project boundary for the purpose of calculating baseline emissions and Project emissions to that attributable to the project activity.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The project reduces anthropogenic emission of greenhouse gases by source below those that would have occurred in absence of the CDM project activity.

As per decision 17/cp.7 Para 43, a CDM project is additional if anthropogenic emission of greenhouse gases by source are below those that would have occurred in the absence of the CDM project activity.

National Policies:

Privatised companies that were previously state run electricity boards, primarily manage electricity generation in India. The Electricity Act, 2003 is now the main driver of reform in the electricity sector. The Electricity Act, 2003 consolidated the laws relating to the generation, transmission, distribution and trading of electricity and generally sought to put in place measures to promote the development and supply of electricity across India.

The Electricity Act, 2003 goes further than most State legislation, introducing new elements like open access and power trading into the sector. Whilst the Electricity Act, 2003 does not explicitly set any targets for renewable energy, it does mention that the National Electricity Policy should develop the power sector with regard to the optimal utilization of resources and "renewable" is mentioned in this section.

- **Additionality**

According to Attachment A to Appendix B of the simplified modalities and procedures for CDM small-scale project activities, evidence to why the project is additional is offered under the following categories of barriers:

a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;
b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions
c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;
d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

Identify barriers that would prevent the implementation of type of the proposed project activity

Investment barrier

IRR analysis has been prepared for a period of 20 years. For the purpose of IRR analysis the following assumptions are significant.

Parameter	Assumption	Source
Project cost	INR.395.15million	DPR
Debt Equity ratio	70:30	Page No. 55 of MERC order dated 08.08.2005[1]
SHR	3650kcal/kWh	Page No. 52 of MERC order dated 08.08.2005[1]

Average plant availability	330 days in a year	DPR
Plant Load Factor(PLF)	70% for 1st Year 80% from 2nd year onwards	Page No. 50 of MERC order dated 08.08.2005[1]
Auxiliary consumption	10%	MERC order dated 08.08.2005[1]
Number of working Days	330 days	Page No. 15 of MERC order dated 08.08.2005[1]
Fuel GCV in kcal/kg	3250 for main biomass fuel 2900 for supplementary biomass fuel 3384 for coal	Page No. 54 of MERC order dated 08.08.2005[1]
Biomass Fuel Price	Main biomass fuel – INR1200/- Supplementary biomass fuel – INR1050/-	Page No. 40 of MERC order dated 08.08.2005[1] and fuel supply agreements with suppliers.
Fossil fuel price	Coal – INR 1500/-	Page No. 40 of MERC order dated 08.08.2005[1]
Fuel Price Escalation	5%	Page No. 55 of MERC order dated 08.08.2005[1]
O& M Expenses	4%	Page No. 58 of MERC order dated 08.08.2005[1]
O & M Expenses escalation	5%	Page No. 58 of MERC order dated 08.08.2005[1]
Interest rate for working capital	13%	Page No. 59 of MERC order dated 08.08.2005[1]
Tariff	For 1st year INR3.18/kWh	Page No. 08 of MERC order dated 08.08.2005[1]
Salvage value	10%	Standard accountancy practise

[1] http://mercindia.org.in/pdf/biomass%20Order-8.8.05.zip

[2] http://cdm.unfccc.int/UserManagement/FileStorage/18UX32EXPJJA6EZOXJC46A8TXB7F33

1. The tariff is considered based on the biomass order by MERC dated 08.08.2005. The tariff applicable is only for 13 years and for subsequent years the tariff will be revised based on the situation prevailing at the time of revision as specified in the MERC tariff order. The tariff at 11th year is applied for the subsequent years of project life period.

Year	Fixed expenses component (INR)	Variable expenses component (INR)	Total cost per unit (INR.)
I Year	1.70	1.48	3.18
II year	1.67	1.55	3.22
III Year	1.63	1.63	3.26
IV Year	1.59	1.71	3.30
V Year	1.54	1.80	3.34
VI Year	1.49	1.89	3.38
VII Year	1.43	1.98	3.41
VIII Year	1.37	2.08	3.45
IX Year	1.32	2.18	3.50
X Year	1.25	2.29	3.54

XI Year	1.18	2.41	3.59
XII Year	-	-	3.59
XIII Year	-	-	3.59
XIV Year	-	-	3.59
XV Year	-	-	3.59
XVI Year	-	-	3.59
XVII Year	-	-	3.59
XVIII Year	-	-	3.59
XIX Year	-	-	3.59
XX Year	-	-	3.59

The project activity has chosen project IRR to demonstrate the additionality of the project. Project IRR, being the return earned by the project during the reference period 20 years, the same has to be compared with a benchmark to determine the adequacy of the return.

As per the guidance note issued by CDM EB at its 51st meeting "In case where benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average cost of capital (WACC) are appropriate benchmarks for a project IRR" (annex 58, page No.3 of EB 51). Based on this guidance the PP has chosen cost of debt as the benchmark.

At that time of investment decision in the year 2005-06, the BPLR indexed by RBI is 10.25% to 10.5%, whereas the term loans sanctioned from various banks to the other subsidiaries of the Shalivahana Group of companies are at an interest varying from 10.5% and 11%. Hence in a conservative way the benchmark IRR is considered as 10.25%*.

A sensitivity analysis has also been made for the project activity considering the following probable scenarios and the resultant IRR without CDM revenues are depicted below.

Sensitivity parameters	-10%	Base Line Scenario %	10%
Capacity Utilization (PLF)	-0.18%	5.90%	9.59%
Project cost	9.65%	5.90%	1.41%
Fuel Cost	11.12%	5.90%	-
Selling Price/ Tariff	-	5.90%	13.46%
O&M cost	7.19%	5.90%	4.23%

With the above mentioned assumption of parameters financial analysis has been done and the IRR is worked out to 5.90% which is far below the benchmark IRR 10.25%. With this IRR of 5.9% the project activity is financially not viable unless some other source of income is identified.

The IRR improves to 14.40% with the CDM revenues.

*.http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/69418.pdf

The project IRR reaches its bench mark IRR 10.25% in the following scenarios:

- PLF increase by 12.1%, i.e., at PLF of 92.1% (or)
- Project cost reduces by 11.62% (or)
- Fuel cost reduction by 7.86% (or)
- Tariff increase by 4.91% (or)
- O&M costs reduces by 42.2% (or)

The plant load factor has been fixed as 70% for 1st year and 80% from 2nd year onwards from commercial date of operation of the plant by MERC[1]. The PLF is fixed based on the industry norms. MERC while determining tariff in its tariff order has held that:

"The PLF is an important performance parameter for any power plant installation and is dependent on factors such as continuous availability of reliable quality fuel supply, plant availability and unconstrained off-take (high load factor).

The Commission notes that APERC, in its Order dated July 5, 2004 (R.P.No.3/2004 and R.P.No.4/2004) has referred to the submission made by NEDCAP that PLF of an average of 80% is achievable for the life of such projects. Further it is understood that APERC has reviewed the PLFs achieved by the biomass power plants during the past 2-3 years, and considered a threshold PLF of 80% for the purpose of determination of Tariff for such projects in Andhra Pradesh".

Considering the above scenario MERC has fixed a PLF of 80%. Further as per the EPA, article 12, section 12.1, subsection e and paragraph 2,
"the project is entitled to recover the fixed charge component of Tariff rate for generation (including deemed generation) up to threshold PLF level of 80%. For actual generation in excess of this threshold level, an incentive component at the rate of INR 0.25 per unit shall be payable in addition to variable charge component. The incentive shall be paid only if the actual generation exceeds 80% PLF (i.e., excluding the deemed generation)."
From this it is evident that the if project activity achieves PLF more than 80% the excessive generation shall attract INR 0.25 per unit as incentive as against losing the fixed charged component which varies from INR 1.7 to INR 1.17 per unit. Hence for this excess generation PP would get less rate than for the generation up to 80% PLF.

Under these circumstances the PLF crossing 92.1% is remote.

A steep increase in the price of biomass fuels during the operational stage from the experience of other biomass plant developer in the adjoining state, there is no possibility in price reduction for biomass fuels. Further the average biomass price has increased by more than 100% in the project region from the from investment decision time (financial year 2005-2006) to the last financial year 2009-2010 at a whopping rate of 20% as against anticipated 5% per year.

The PP has already entered into an EPA (Energy Purchase Agreement) with the state utility MSEDCL, whereby the tariff structure for the project activity has already been fixed. MERC the state regulator has fixed the tariff for biomass based power projects for a period of 13 years and for this project activity the tariff is applicable for a period of 11 years based on its commencement of activity.

This tariff is fixed for a period of 13 years and for the subsequent period the tariff is likely come down as explained below.

- By that time there will not be any element of interest as the loans would have been fully paid.

- In the absence of a liberalized electricity market, the PP will have a very weak negotiating position with the state utility that have a strong interest to minimize the tariff.

According to MERC in its tariff order 2009, page 8, increase in tariff was warranted due to high increase in the average price of biomass leading to high cost of generation, the commission enforced the revision in the tariff rate applicable. Hence it is confirmed that, the revision in tariff was mainly due to increase in the fuel price. Sensitivity analysis with the revised fuel price at the time of validation and revised tariff and project cost of INR 40 millions/MW has been carried out and which results in an IRR of 8.57%, which is less than the stipulated benchmark. It is also to be noted that, this tariff is applicable for the subsequent period, hence if we consider the actual project cost incurred as per annual report of INR 469.78 millions, the IRR goes further down making the condition more unviable.

Therefore, the IRR reaching benchmark due to increase in revenue is not envisaged.

O & M Costs includes salaries and wages, repairs and maintenance, insurance and various other expenses required for the operation as well as maintenance of the plant. This cost is estimated at 4% on capital cost. The regulatory commission (MERC) while determining the tariff payable for biomass based power projects has fixed the cost of O & M at 4%. The IRR reaches benchmark only where O & M Costs is reduced by more than 42.2%. This is not a practical scenario as the costs are going up every year due to inflation and the possibility of the cost coming down below 42.2% is not expected.

The necessary documentary proofs / market statistics related to construction materials like steel, cement, etc. and also biomass fuel prices are furnished to DOE for verification. Thus the project justifies the need of CDM funds for the project activity, which will help in improving the project competitiveness and financial sustainability.

Other Barriers:

Fluctuations in price of biomass:

The viability of biomass based power plant depends on the availability of biomass material in required quantity and at an affordable price. Availability and the price depend on so many factors on which the project proponent has no control. The main factors are:

- The availability of biomass is subject to seasonal fluctuations due to vagaries of nature. If drought conditions prevail in any year which is common in India, the availability of biomass will get affected and depending on the availability price is determined.
- Biomass prices unlike fossil fuel are not regulated by any agency. The farmers at times sell at his own convenience. Further any material which has hitherto no commercial value; once usage is established, price tend to change with the demand. Nobody could force a farmer sell his product at a particular price.

At present the cost of biomass is ranging between INR2000 to INR2500 per tonne. Prices fluctuate continuously depending on seasonal variations making cost of generation unstable. It has been experienced in states, where the biomass plants are established that price variation is substantial, ranging from 25% and even up to 50%. Evidence is also found from some of the registered

biomass projects under CDM, the fluctuation in price of biomass after the plants commence operations.

Prevailing practice:

In the Indian power sector, the common practice is investing in medium or large scale power projects, which is evident from a host of planned projects. The same is applicable to the Western region as well as Maharashtra state.

The share of electricity from biomass electric projects in India's total installed capacity is negligibly low.

According to the latest statistics published by the Ministry of New and Renewable Energy (MNRE)[7], the total installed capacity of biomass projects is only 1101.83 MW, where as the India's total installed capacity is around 134,716 MW[8] which accounts for less than 1%.

The future capacity addition in the state of Maharashtra primarily is of thermal based. The total likely capacity addition in Western region during the 11th plan is 18062 MW[9]. Out of which the share of thermal power is 17342 MW, which is about 96% of the total capacity addition planned in Western Region. The total private sector participation in Western region during 11th plan is 6502 MW[10], out of which the thermal power plants contributes to 6102 MW. This is obvious from the above that the investors in both public and private sector are interested to invest in thermal energy projects. This shows the dependence in future will continue on thermal energy and increase in carbon intensity of grid. Hence, investing in a biomass based power plant is not a common practice in the region.

In the state of Maharashtra, there is an estimated potential of 781 MW, and only one project of 8 MW biomass capacity is commissioned at Gondia Dist in Oct. 2006 (http://www.mahaurja.com/PDF/BiomassMAH.pdf). However this is registered as a CDM Project. (Reference No:1530). The existing Maharashtra state grid mix comprises of 70.41% thermal, 16.45% hydro, 9.43% renewable energy (including wind, Small Hydro, biomass and urban & industrial waste bases power projects) 3.68 % nuclear (as observed from below statistics from CEA)). This clearly illustrates that establishing a biomass based power plant is not common practice in the state of Maharashtra.

2. INSTALLED CAPACITY AS ON 30-09-2007 (FIGURES IN MW)

Sector	Hydro	Thermal				Nuclear	Wind/ RES.$/ S.H.P	Total
		Coal	Gas	Diesel	Total			
STATE	2635.9	6800.0	912.0	0.0	7712.0	0.0	214.7	10562.6
PRIVATE	447.0	1650.0	180.0	0.0	1830.0	0.0	1553.3	3830.3
CENTRAL	0.0	1775.3	1871.9	0.0	3647.2	690.0	0.0	4337.2
TOTAL	**3082.9**	**10225.3**	**2963.9**	**0.0**	**13189.2**	**690.0**	**1768.0**	**18730.1**

Source: Page no 35, Power Scenario at a Glance for Maharashtra - 2007, Central Electricity Authority

Moreover at the time of project conceptualization there were under implementation have also seeking CDM revenues (i.e., CDM registered projects are GAPS Power & Infrastructure Pvt.

Ltd(936), Shalivahana Green Energy Limited(1473) and Saradambika Power Plant Private Limited(1541), this confirms that projects are viable only with support of CDM revenues.

Prevailing practice: It has been argued that, the Indian power sector is predominantly based on fossil fuel like coal and share of renewable energy, especially in the state of Maharashtra where the project is located is very less. Out of estimated potential of 781MW thus far only one 8 MW project was commissioned at the time of conceptualisation of this project activity. Moreover at the time of project conceptualization there were under implementation have also seeking CDM revenues (i.e., CDM registered projects no: 936, 1473 and 1541), this confirms that projects are viable only with support of CDM revenues.

[4]Ministry of Power, Government of India (www.powermin.nic.in).

[5] Reference for all figures in this paragraph Ministry of Non-conventional Energy Sources (www.mnes.nic.in)

[7] Central Electricity Authority (www.cea.nic.in)

[6] Reference for all figures in this paragraph Ministry of Non-conventional Energy Sources (www.mnes.nic.in)

Early consideration of CDM:

CDM – Executive Board

The project proponents have considered CDM revenues right at the planning stage of the project activity.

In principle clearance for setting up 10 MW biomass plant in Saoneer Industrial Area in Nagpur district has been given by MEDA on 26th February 2003 and a resolution was passed by the Board of Directors of the company considering the necessity of CDM revenue for the project activity on 02nd April 2003. The governing body for the allotment of land for in Industrial Area in the state of Maharashtra MIDC (Maharashtra Industrial Development Corporation) had rejected the request to allot the required land area for the project in Saoneer Industrial Area vide their letter no. MIDC/RO/Saoneer/4288/2003 dated 21st November 2003. Hence there was a delay in project activity because of search for finding appropriate alternate location for the project and also the delay in the release of biomass policy for the state of Maharashtra. Meanwhile MERC had released its order on biomass tariff in the state of Maharashtra on 08.08.2005 had been received in October 2005. Based on the guidelines of the order a Feasibility Study Report had been submitted by M/s Energy & Environment Group in October 2005 and based on which negotiations were carried with the suppliers for the crucial machinery viz., boiler, turbine and alternator in 2005.

After considering all the feasible locations in the Nagpur district, finally the project has got approval from MEDA and MIDC in March 2006 for its present location at village Patgowri in Nagpur district. Since then registration of project activity for CDM has been pursued seriously. In September 2006, Banker – 1 had approved the loan on the condition that Banker – 1 should be sole adviser to project activity for all the CDM related activities including trading of CERs and on the condition to execute the power purchase agreement with MSEDCL (Maharashtra State Electricity Distribution Company Ltd) as per MERC tariff. As per the advice of the Banker -1, an agreement had been entered with consultant for availing CDM consultancy services in October 2006. DOE had been appointed in January 2007. The PDD of the project activity had been first webhosted on UNFCCC website on 21st February 2007. Because of the extended delay in registration of the project activity, new DOE and the CDM consultant have been appointed in January 2009 and February 2009 respectively, to speed up the registration process. The chronology of the key events of project activity is as follows:

	Date	Description
1	26 Feb 2003	In-principle clearance for setting up 10 MW biomass based power plant in Nagpur District from MEDA
2	02 Apr 2003	Board resolution to start a project which can attract the benefits of CDM
3	28 May 2003	Feasibility report for 10 MW biomass power plant in Nagpur district
4	10 Aug 2004	Extension of In-principle clearance for setting up 10 MW Biomass based power project in Nagpur District from MEDA
5	08 Sept 2004	Letter from MEDA regarding carbon credits for biomass power projects
6	17 Sept 2004	Letter from MEDA regarding opportunities in carbon credits
7	03 Oct 2005	Feasibility report for setting up 10 MW biomass based power plant
8	10 Dec 2005	Board resolution to speed up the project keeping in view of importance of carbon credit benefits.
9	26 Dec 2005	Request to MEDA for change of location of proposed 10 MW biomass based power project to MIDC Katol industrial growth area in Nagpur district
10	02 Jan 2006	Letter Of Intent to supplier of turbine and generator
11	07 Feb 2006	Letter from MEDA rejecting the request to change the project location to MIDC Katol industrial growth area in Nagpur district
12	08 Feb 2006	Request to MEDA for change of location of proposed 10 MW biomass

		based power project to Patgowri village near Saoneer in Nagpur district
13	16 Mar 2006	Letter of In principle clearance and follow up for Issuance of final consent for the proposed biomass power project from MEDA at Patgowri village near Saoneer in Nagpur district
14	20 Mar 2006	Detailed Project Report for the 10MW biomass power project near Patgowri village in Nagpur district
15	20 Mar 2006	CA opinion on investment and IRR
16	03 Apr 2006	Board resolution to adopt CDM for the project activity
17	08 Sept 2006	Loan approval letter from Banker – 1 with condition of appointment of Banker -1 as sole adviser for CDM activities of project activity
18	22 Sept 2006	Agreement with MEDA
19	07 Oct 2006	Biomass EPA with MSEDCL
20	26 Oct 2006	Joint offer for CDM consultancy services from Banker – 1 and consultant
21	05 Jan 2007	Supply agreement with supplier for turbine and generator
22	17 Jan 2007	Work order to DOE for validation of project activity under CDM
23	19 Jan 2007	Stake holders meeting
24	21 Feb 2007	First web hosting on UNFCCC website
25	21 Mar 2007	Environmental clearance from Environment Dept., State Govt.
26	04 June 2007	Host country approval
27	20 July 2007	Agreement between MITCON, IDBI & Rake power Limited
28	27 Nov 2007	Statement of Modalities of Communication
29	26 May 2008	Letter of request to speed up the CDM registration from Banker – 1
30	25 July 2008	Commercial Operation commencement of project activity
31	04 Nov 2008	E-mail from CDM consultant in response to the delay of registration
32	17 Dec 2008	Letter to DOE regarding delay in submission of validation report
33	17 Jan 2009	Letter to DOE seeking NOC for appointing other DOE
34	06 Feb 2009	Proposal for CDM validation services from new DOE
35	12 Feb 2009	Appointment of new DOE
36	27 Feb 2009	Appointment of M/s GIFTech Solutions as CDM consultant
37	12 Mar 2009	Appointment of advisor for sale/ trading/ commercialization of carbon credits Banker -1

All the above barriers go to prove that the project is additional and is not a business as usual scenario. Hence the proposed project is additional and not the same as the baseline scenario and would not occur without the CDM benefits.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

The project activity is grid connected renewable electricity generation. Emission reductions due to the project activity are considered is equivalent to the emissions avoided in the baseline scenario by displacing the non-renewable electricity from the grid. Emission reductions are related to the net electricity exported to the grid by the project activity and the actual generation mix of the grid system.

CDM – Executive Board

Baseline:
The project activity does not modify or retrofit an existing electricity generation facility and hence the baseline scenario is electricity exported to the grid by the project activity that would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources.

The baseline emissions are calculated based on the net electricity exported to the grid (GWh/year) and an emission factor for the displaced grid electricity (tCO_2/GWh).

$BE_y = EG_y * EF_y$

Where,

BE_y = baseline emissions during the year y
EG_y = net electricity exported to the grid during the year y
EF_y = emission factor of the grid to which the project activity exports electricity

The data of emission factors for Indian grid systems are published and made publicly available by Central Electricity Authority (CEA) of Ministry of Power, Government of India, for every year in its "CO_2 Baseline Database" according to the guidelines of CDM UNFCCC website.

Project Emission Calculation:

Project emissions would arise due to the import of power from the grid in case of grid failure and use of diesel during exigencies. Hence the project emissions would be:

Due to Import

$$PE_{imp,y} = EF_{CO_2} \times E_{imp,y}$$

Where,

$PE_{imp, y}$ - Project Emissions due to the import of power in the year y measured in tCO2
$E_{imp,y}$ - Electricity imported from the grid in the year y measured in MWh.
EF_{CO_2} -CO_2 emission factor of the grid in year y (t CO_2/MWh)

Due to the less volume of units consumption per annum compared to total export, the same quantity has not been considered for the ex-ante calculation. However, the same will be monitored every month for the records purpose for the verification process. If the quantity of electricity import is considerable, the same will be deducted from the export units accordingly during verification process.

Due to diesel consumption

Diesel is used during complete blackouts. The quantity of diesel used in the plant will be monitored and the emissions due to the same would be considered as project emissions. However, for ex-ante purpose, the same is being considered as Zero. However, during the annual verification, the emissions would be calculated using the formula given below and deducted from the overall emission reductions.

$$PE_{diesel, y} = (Q_{diesel, y} \times Density_{diesel} \times NCV_{diesel} \times 4179/10\text{^}12) \times EF_{diesel}$$

Where

CDM – Executive Board

$PE_{diesel, y}$ = Project emissions due to diesel consumption in the year, y
$Q_{diesel, y}$ = Quantity of diesel used during the year, y
$Density_{diesel}$ = Density of diesel, kg/l
NCV_{diesel} = Net Calorific Value of diesel, TJ/kg
EF_{diesel} = Emission factor of diesel, tCO_2/TJ

Project Emissions due to transportation:

$PE_{diesel,y} = F_{d,y} * D * NCV_{Diesel} * EF_{CO2} * OXID / 10^6$

$PE_{diesel,y}$ = The emissions due to usage of diesel by The project activity during year y (tCO2)
$F_{d,y}$ = The quantity of diesel used during the year (Litre)
D = Density of diesel (0.82 kg/Litre)
NCV_{Diesel} = The calorific value of diesel (43.3 TJ/Gg as per IPCC 2006 default value)
EF_{C02} = The CO2 emission factor of Diesel (74.8 t CO2/TJ as per IPCC 2006 default value)
OXID = The oxidation factor of the Diesel (1 as per IPCC 2006 default value)

Leakage:

As per EB 47 meeting, Annex 28, Attachment C to Appendix B "General guidance on leakage in biomass project activities" version 03,
"For small-scale energy CDM project activities involving renewable biomass, there are three types of emission sources that are potentially significant (>10% of emission reductions and attributable to project activities.

A. **Shifts of pre-project activities..** Decreases of carbon stocks, for example as a result of deforestation, outside the land area where the biomass is grown, due to shifts of pre-project activities.

B. **Emissions** related to the production of the biomass.

C. **Competing uses for the biomass.** The biomass may in the absence of the project activity be used elsewhere, for the same or a different purpose."

As the project activity is a renewable biomass power generation project based on biomass residues available in the project region, and as the project activity is not involved in production of biomass the applicable leakage source is "Competing uses for biomass".

B.6.2. Data and parameters that are available at validation:

(Copy this table for each data and parameter)

Data / Parameter:	**EF_y**
Data unit:	tCO_2/MWh
Description:	combined margin CO_2 emission factor for the NEWNE grid system
Source of data used:	CEA published grid emission factors -Version 4
Value applied:	0.80 (year 2007 – 08)
Justification of the choice of data or description of measurement methods and procedures actually applied :	Central Electricity Authority (CEA) of Govt. of India is publishing annually "CO_2 baseline database" prepared according to the guidelines of UNFCCC CDM website and is made publicly available with a view to obtain uniformity of approach in the country towards a common objective.
Any comment:	

Data / Parameter:	**EF_{fuel}**
Data unit:	tCO2/MJ
Description:	Emission factor of the Diesel
Source of data used:	2006 IPCC Guidelines for National Green House gas Inventories, Volume2, Chapter 1, Table 1.4
Value applied:	74.8
Justification of the choice of data or description of measurement methods and procedures actually applied :	The source of data is as per guidelines. IPCC default values are conservative.
Any comment:	IPCC default factor or country specific data may be applied, resulting no error due to measurement

Data / Parameter:	**ρ_i**
Data unit:	Kg/lt
Description:	Density of Fossil fuel used for project site (Diesel)
Source of data used:	Society of Indian automobile manufacturers (SIAM) www.siamindia.com/scripts/Diesel.aspx
Value applied:	0.82
Justification of the choice of data or description of measurement methods and procedures actually applied :	The SIAM value is considered as it is publicly available and can be referred as authentic source.
Any comment:	---

Data / Parameter:	**SFCBi**
Data unit:	Kg/kWh
Description:	Specific Fuel Consumption of Biomass i during the year y
Source of data used:	Specific fuel consumption for each fuel will be calculated using the following formula: $SFCBi = \frac{SHR}{GCVBi}$ Where, SHR – Station Heat Rate of the Power Plant – 3650 kCal/kg GCV – Gross Calorific value of Biomass fuel type i
Value applied:	

Biomass	SFC (kg/kWh)
Main biomass fuel	
Cotton stalks	1.123
Paddy straw/stalks	1.123
Rice/ wheat husk	1.123

	Secondary/ Supplementary biomass fuel |
	Soyabean stalks & husk | 1.259
	Red gram & other gram stalks | 1.259
	Jowar/ Maize stalks | 1.259
	Ground nut shell | 1.259
	Woody biomass (Juliflora twigs) | 1.259
	i.e., for main biomass fuel SFC is 1.123 kg/kWh and for secondary biomass fuel SFC is 1.259 kg/kWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	**The specific fuel consumption has been adopted from the value suggested in the Detailed Project Report. The same may be cross-checked against standard values available in the public domain.**
Any comment:	---

Data / Parameter:	**SFC_{FFi}**
Data unit:	Kg/kWh
Description:	Specific Fuel Consumption of Fossil Fuel i during the year y
Source of data used:	Specific fuel consumption for each fuel will be calculated using the following formula: $SFC_{FFi} = \frac{SHR}{GCV_{FFi}}$ Where, SHR – Station Heat Rate of the Power Plant GCV – Gross Calorific value of Biomass fuel type i
Value applied:	GCV (Coal) – kCal/kg | SFC (kg/kWh) 3384 | 1.079
Justification of the choice of data or description of measurement methods and procedures actually applied :	The specific fuel consumption has been adopted from the value suggested in the Detailed Project Report.
Any comment:	---

Data / Parameter:	Calorific value Diesel
Data unit:	Kcal/kg
Description:	Calorific value of Diesel used in project plant for transportation of biomass and DG Set.
Source of data to be	2006 IPCC Guidelines for National Green House gas Inventories,

used:	Volume2, Chapter 1, Table 1.3
Value of data	43.3 TJ/Gg
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC Default value is being used.
Any comment:	--

B.6.3 Ex-ante calculation of emission reductions:

>> Baseline emissions are calculated as the kWh produced by the project activity multiplied by an emission coefficient for the NEWNE grid, calculated as combined margin (CM) emissions (in kg CO_2equ/kWh) of the current generation mix.

$BE = EGy * EF_{grid}$

Where EGy is the net quantity of electricity generated by the project in year y, and EF_{grid} is the Emission Factor of the NEWNE grid.

Electricity generation

Year	Gross Generation	Auxiliary consumption	Net Energy export
	GWh	GWh	GWh
1	63.360	6.336	57.024
2	63.360	6.336	57.024
3	63.360	6.336	57.024
4	63.360	6.336	57.024
5	63.360	6.336	57.024
6	63.360	6.336	57.024
7	63.360	6.336	57.024
8	63.360	6.336	57.024
9	63.360	6.336	57.024
10	63.360	6.336	57.024
Total	**633.60**	**76.03**	**570.24**

Estimated Fuel consumption

Year	Biomass consumption, t/y										
	Main biomass fuel			Secondary biomass fuel							Total
	Cotton stalks	Paddy straw /stalks	Rice /wheat husk	Soyabean stalk & husk	Red gram stalks	Other gram stalks	Maize stalks	Jowar stalks	Ground nut shell	Woody biomass	
1	33096	0	9600	10564	13360	0	0	0	0	0	66620
2	33096	0	9600	10564	13360	0	0	0	0	0	66620
3	33096	0	9600	10564	13360	0	0	0	0	0	66620

4	33096	0	9600	10564	13360	0	0	0	0	0	66620
5	33096	0	9600	10564	13360	0	0	0	0	0	66620
6	33096	0	9600	10564	13360	0	0	0	0	0	66620
7	33096	0	9600	10564	13360	0	0	0	0	0	66620
8	33096	0	9600	10564	13360	0	0	0	0	0	66620
9	33096	0	9600	10564	13360	0	0	0	0	0	66620
10	33096	0	9600	10564	13360	0	0	0	0	0	66620

Fuel type		GCV, kcal/kg*	SFC, kg/kWh
Biomass	**Main fuel**		
	Cotton stalks	3250	1.123
	Paddy straw/stalks	3250	1.123
	Rice/Wheat husk	3250	1.123
	Supplementary fuel		
	Soyabean stalk & husk	2900	1.259
	Red gram stalks	2900	1.259
	Other gram stalk	2900	1.259
	Maize stalks	2900	1.259
	Jowar stalks	2900	1.259
	Ground nut shell	2900	1.259
	Woody Bio mass (Julie flora twigs)	2900	1.259
Fossil	Coal	3384	1.079

* From MERC order dated 08.08.2005, for primary and supplementary biomass fuels and fossil fuel.

Sample calculation of Specific Fuel Consumption (SFC):
For Cotton stalk in the first year
GCV of cotton stalk : 3250 kcal/kg
Station heat rate of the plant : 3650 kcal/kWh
(SHR as per the MERC order dated 08.08.2005, page No. 52)
SFC of cotton stack : 3650/3250 = 1.123kg/kWh

Approach 1 (16) (Net electricity generation adjusted to coal)

Year	Electricity export	Coal Consu-mption	SFC of Coal	Electricity generation - Coal	Aux. consu-mption of power generation from coal	Exportable power from coal	Net Electricity export adjusted to coal
	GWh	tons	kg/kWh	GWh	GWh	GWh	GWh
1	57.024	6,834	1.079	6.336	0.634	5.70	51.32
2	57.024	6,834	1.079	6.336	0.634	5.70	51.32
3	57.024	6,834	1.079	6.336	0.634	5.70	51.32
4	57.024	6,834	1.079	6.336	0.634	5.70	51.32
5	57.024	6,834	1.079	6.336	0.634	5.70	51.32
6	57.024	6,834	1.079	6.336	0.634	5.70	51.32
7	57.024	6,834	1.079	6.336	0.634	5.70	51.32

8	57.024	6,834	1.079	6.336	0.634	5.70	51.32
9	57.024	6,834	1.079	6.336	0.634	5.70	51.32
10	57.024	6,834	1.079	6.336	0.634	5.70	51.32
Total							**513.21**

Sample calculation for first year:
Coal consumption :6834 ton
Electricity generation : consumption / SFC
= (6834 x 1000 / 1.079) / 10^6
= 6.336GWh
Corresponding auxiliary consumption: 10% x electricity generation
= 10 % x 6.336
= 0.634 GWh
Exportable electricity from coal: Generation – Auxiliary consumption
= 6.336 – 0.634
= 5.70 GWh
Net electricity generation adjusted to coal:
= Electricity export – Exportable electricity from coal
= 57.024 – 5.70
= 51.32 GWh

Approach 2 (18) (Net electricity generation calculated using SFC of biomass)

Year	Gross Electricity generation using biomass,GWh											Auxiliary consumption from biomass	Net Electricity export using biomass
	Cotton stalks	Paddy straw/ stalks	Rice/ wheat husk	Soya - bean stalk & husk	Red gram stalks	Other gram stalks	Maize stalks	Jowar stalks	Ground nut shell	Woody biomass	Total	GWh	GWh
1	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
2	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
3	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
4	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
5	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
6	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
7	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
8	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
9	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
10	29.468	0.000	8.548	8.393	10.615	0.000	0.000	0.000	0.000	0.000	57.024	5.702	51.321
Total	294.684									0.000	570.238	57.024	513.210

Sample calculations for first year:

Gross electricity generation using each type of biomass
= Biomass consumption / SFC of biomass
Using cotton stalk = (33096 x 1000 / 1.123) x 10^{-6} = 29.468 GWh
Using rice husk = (9600 x 1000 / 1.123) x 10^{-6} = 8.548 GWh
Using soyabean stalk & husk = (10564 x 1000 / 1.259) x 10^{-6} = 8.393 GWh
Using redgram stalks = (13360 x 1000 / 1.123) x 10^{-6} =10.615 GWh

Gross electricity generation using biomass
= 29.468 + 8.548 + 8.393 + 10.615
= 57.024 GWh
Corresponding auxiliary consumption
= 10% x 57.024
= 5.702 GWh
Net electricity generation using biomass
= 57.024 – 5.702
= 51.32 GWh

Baseline emissions:

Baseline emissions or CERs generated by the project are estimated as under:

Baseline emissions = Emission coefficient x Power exported to grid from the Project
(tCO_2) ($t\ CO_2$/GWh) (GWh)
Sample calculations for base line emission reductions for first year:
Net renewable electricity export
= Net renewable electricity generation – Electricity import
= 51.321 – 0
= 51.321 GWh

Base line Emission reductions (tCO_2)

Year	Net Electricity generation	Baseline Emission factor	Emission Reductions
	GWh	tCO_2/GWh	tCO_2
1	51.321	800.0	41057
2	51.321	800.0	41057
3	51.321	800.0	41057
4	51.321	800.0	41057
5	51.321	800.0	41057
6	51.321	800.0	41057
7	51.321	800.0	41057
8	51.321	800.0	41057
9	51.321	800.0	41057
10	51.321	800.0	41057
Total	513.210		410570

Baseline emission factor = Grid emission for NEWNE grid for year 2007 - 08

= 800 tCO_2/GWh

Baseline emissions = 51.321 x 800

= 41057 tCO_2

Leakage:

As per the biomass assessment study carried by M/s Synergy consortium for the year 2008 - 09, as given in the following table there is 73% surplus biomass unutilised in the project region after considering the project activity consumption. No leakage emissions would occur due to the implementation of project activity, as the quantity of available biomass residues in the project region i.e., 50 km radius from project site is 25% larger than the quantity of biomass residues that are utilised, including the project activity. Hence, the leakage emissions due to implementation of the project activity would be negligible and not considered.

Residue Generation / Surplus within 50 km From Site (In MT/Yr)

Residues	Generation	Consumption	RPL consumption (with a conservative assumption of 100% PLF)	Surplus	Surplus in %
Field Level (Crop residues)					
Cotton stalks	205960	54475	41370	110115	53%
Paddy straw/stalk	146550	58620	0	87930	60%
Soyabean Stalks& Husk	680680	102065	13205	565410	83%
Jowar stalks	19320	7728	0	11592	60%
Maize stalks	3910	1564	0	2346	60%
Red Gram stalks	167500	16996	16700	133804	80%
Other Gram (green & black gram) Stalks	2970	891	0	2079	70%
Sub Total	**1226890**	**242339**	**71275**	**913276**	**74%**
Agro-Industrial Residue:					
Rice/Wheat Husk	92534	18507	12000	61027	67%
Groundnut shell	15000	6000	0	9000	60%
Woody biomass (Juliflora twigs etc)	151400	49100	0	102300	68%
Total	**1485824**	**315946**	**83275**	**1086603**	**73%**

As per the approach L2, the surplus of each type of biomass used is greater than 25% of that is used in the project region including the project activity, hence the leakage is zero. However, as per the

requirement of Attachment C of Appendix B, a latest biomass assessment report would be submitted at the starting time of the crediting period.

If for a certain biomass residue type k other than mentioned above used in the project for the year y and its surplus is less than 25% of that is used in the project region including the project activity, leakage effects for the year y shall be calculated as follows:

$$LE_y = EF_{CO2,LE} \cdot \sum_n BF_{LE,n,y} \cdot NCV_n$$

Where:

LE_y = Leakage emissions during the year y (tCO2/yr)

$EF_{CO2,LE}$ = CO2 emission factor of the most carbon intensive fuel used in the country (tCO2/GJ)

$BF_{LE,n,y}$ = Quantity of biomass residue type n used for heat generation as a result of the project activity during the year y and for which leakage can not be ruled out using one of the approaches L1, L2, L3 or L4 (tons of dry matter or liter)7

NCV_n = Net calorific value of the biomass residue type n (GJ/ton of dry matter or GJ/liter)

n = Biomass residue type n for which leakage can not be ruled out using one of the approaches L1, L2, L3 or L4

In case of approaches L2 or L3, $BF_{LE,n,y}$ corresponds to the quantity of biomass residue type k used in the project plant as a result of the project activity during the year y ($BF_{LE,n,y}$ = $BF_{PJ,k,y,}$ where n=k).

Project Emissions due to transportation:

$PE_{diesel,y} = F_{d,y} * D * NCV_{Diesel} * EF_{CO2} * OXID / 10^6$

$PE_{diesel,y}$ = The emissions due to usage of diesel by The project activity during year y (tCO2)

$F_{d,y}$ = The quantity of diesel used during the year (Litre)

D = Density of diesel (0.82 kg/Litre)

NCV_{Diesel} = The calorific value of diesel (43.3 TJ/Gg as per IPCC 2006 default value)

EF_{C02} = The CO2 emission factor of Diesel (74.8 t CO2/TJ as per IPCC 2006 default value)

OXID = The oxidation factor of the Diesel (1 as per IPCC 2006 default value)

Total quantity of fuel transported per annum: 73454 MT

No. of trips of trucks: 73454/6 = 12242 (@6MT fuel/truck)

Maximum distance covered within project boundary for each trip: 100 km

Total distance covered for fuel transport per annum: 12242 x 100 = 1224200 km

The quantity of diesel used for transportation per annum: $F_{d,y}$ = 1224200/4* = 306050 litre

$PE_{diesel,y}$ = 306050 x 0.82 x 43.3 x 74.8 x 1/10^6

=813 tCO_2

<u>Due to diesel consumption for DG set</u>

CDM – Executive Board

Diesel is used during complete blackouts. The quantity of diesel used in the plant will be monitored and the emissions due to the same would be considered as project emissions. However, for ex-ante purpose, the same is being considered as Zero. However, during the annual verification, the emissions would be calculated using the formula given below and deducted from the overall emission reductions.

Emission Reductions:

The emission reduction (ERy) are calculated as

$ERy = BEy – PEy - LEy$

Where,

ERy = Emission reductions in year y (tCO_2/yr)
BEy = Baseline emissions in year y (tCO_2/yr)
PEy = Project emissions in year y (tCO_2/yr)
LEy = Leakage emissions in year y (tCO_2/yr)

Sample calculation for first year of crediting period

$ER_1 = 41057 – 813 – 0$
$= 40244\ tCO_2/yr$

B.6.4 Summary of the ex-ante estimation of emission reductions:

>>

Year	Baseline Emissions	Project Emissions	Leakage Emissions	Net Emission reductions
	tCO_2e	tCO_2e	tCO_2e	tCO_2e
1	41057	813	0	40244
2	41057	813	0	40244
3	41057	813	0	40244
4	41057	813	0	40244
5	41057	813	0	40244
6	41057	813	0	40244
7	41057	813	0	40244
8	41057	813	0	40244
9	41057	813	0	40244
10	41057	813	0	40244
Total	**410570**	**8,128**	**0**	**402442**

CDM – Executive Board

*http://www.pcra.org/english/transport/mdpCS.htm

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	Electricity Exported
Data unit:	kWh
Description:	Electricity exported by project
Source of data to be used:	Monthly billing records of the Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) for the electricity supplied to the grid.
Value of data	57024000
Description of measurement methods and procedures to be applied:	The power will be recorded at the plant using meter installed in the switch yard in the plant. The meter reading will be taken on 1st date of every month by MSEDCL officials[1] in the presence of RPL representative and reading will be jointly certified.
QA/QC procedures to be applied:	The data will be directly measured and monitored at the project site. All relevant records will be checked to ensure consistency. The meter will be calibrated and accuracy level of 0.2 will be maintained as per Energy Purchase agreement[1]. The archiving of data will be done both electronically and paper for a period of crediting period + 2 years. The meter will be calibrated annually.
Any comment:	The power exported would be cross checked using meters installed for power generation and for auxiliary consumption. The difference between reading for power generation and auxiliary consumption should be equal to the power exported.

Data / Parameter:	Electricity Imported
Data unit:	kWh
Description:	Electricity imported by project plant during shutdowns and emergency periods
Source of data to be used:	Monthly billing records of the Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) for the electricity imported from the grid.
Value of data	---
Description of measurement methods and procedures to be applied:	The power will be recorded at the plant using meter is installed in the switch yard in the plant. For applying monthly bill to MSEDCL the meter reading will be taken on 1st date of every month by MSEDCL officials in the presence of RPL representative and reading will be jointly certified.
QA/QC procedures to be applied:	The data will be directly measured and monitored at the project site. All relevant records will be checked to ensure consistency. The meter will be calibrated and accuracy level of 0.2 will be maintained as per Energy Purchase agreement. The archiving of data will be done both electronically and paper for a period of crediting period + 2 years. The meter will be calibrated annually.
Any comment:	None

Data / Parameter:	Electricity Generation
Data unit:	kWh

Description:	Electricity generated by project
Source of data to be used:	Meter is installed in the control room in the plant.
Value of data	63360000
Description of measurement methods and procedures to be applied:	The electricity generation will be recorded daily in the plant using meter is installed in the control room in the plant.
QA/QC procedures to be applied:	The data will be directly measured and monitored continuously at the project site. All relevant records will be checked to ensure consistency. The meter will be calibrated annually.
Any comment:	Electricity generated would be cross verified as per methodology with electricity generation calculated using SFCs (Fixed ex-ante) and quantities of biomass fuel and coal consumed and the lowest value would be considered for CER calculations.

Data / Parameter:	Auxiliary Consumption
Data unit:	KWh
Description:	Electricity consumed by project plant
Source of data to be used:	Auxiliary consumption is taken as the difference of the generation units and exported units. However, a meter is installed in the control room in the plant.
Value of data	---
Description of measurement methods and procedures to be applied:	The power will be recorded daily at the plant using meter is installed in the control room in the plant.
QA/QC procedures to be applied:	Auxiliary consumption is taken as the difference of the generation units and exported units. The data will be directly measured and monitored at the project site and would be cross checked. All relevant records will be checked to ensure consistency. The meter will be calibrated annually.
Any comment:	None

Data / Parameter:	Quantity for each type of biomass residue
Data unit:	Tonnes
Description:	Biomass consumed by project plant
Source of data to be used:	Plant Records
Value of data	-----
Description of measurement methods and procedures to be applied:	The quantity of biomass will be measured using weigh bridge installed at the plant and recorded daily.
QA/QC procedures to be applied:	The data will be directly measured and monitored at the project site. All relevant records will be checked to ensure consistency. The weigh bridge will be calibrated annually. The accuracy of the weigh bridge is +/- 5kg.
Any comment:	none

Data / Parameter:	Coal Quantity
Data unit:	Tonnes

Description:	Coal consumed by project plant
Source of data to be used:	Plant Records
Value of data	-----
Description of measurement methods and procedures to be applied:	The quantity of coal will be measured using weigh bridge installed at the plant.
QA/QC procedures to be applied:	The data will be directly measured and monitored at the project site. All relevant records will be checked to ensure consistency. The meter will be calibrated annually.
Any comment:	none

Data / Parameter:	$NCV_{Biomass}$
Data unit:	Kcal/Kg
Description:	Calorific value of biomass used in project plant for power generation
Source of data to be used:	Periodic Analysis
Value of data	NA
Description of measurement methods and procedures to be applied:	RPL will undertake periodic biomass fuel analysis by external third party laboratory testing to estimate the value.
QA/QC procedures to be applied:	NA
Any comment:	None

Data / Parameter:	NCV_{coal}
Data unit:	Kcal/Kg
Description:	Calorific value of coal used in project plant for power generation
Source of data to be used:	Either Data provided by Suppliers or External Laboratoy test reports
Value of data	-----
Description of measurement methods and procedures to be applied:	RPL will undertake periodic biomass fuel analysis by external third party laboratory testing to estimate the value.
QA/QC procedures to be applied:	--
Any comment:	None

Data / Parameter:	Diesel Quantity
Data unit:	Litre
Description:	Quantity of Diesel consumed in DG Set.
Source of data to be used:	RPL log Book
Value of data	--
Description of	The quantity will be measured and monitored through dedicated log

measurement methods and procedures to be applied:	book for diesel consumption in DG set. The log book will have details of total quantity of diesel used in DG set. A level gauge is used for the same purpose.
QA/QC procedures to be applied:	--
Any comment:	None

Data / Parameter:	Average truck load
Data unit:	MT per truck
Description:	Average quantity of biomass per truck
Source of data to be used:	The quantity of biomass transported by each truck will be measured using weigh bridge installed at the plant.
Value of data	
Description of measurement methods and procedures to be applied:	The data will be directly measured and monitored at the project site. All relevant records will be checked to ensure consistency. The meter will be calibrated annually.
QA/QC procedures to be applied:	NA
Any comment:	None

Data / Parameter:	Average round trip distance of each truck
Data unit:	Kilometres
Description:	Average distance from source to plant
Source of data to be used:	RPL log Book or calculated value from the distance travelled by trucks for collection of biomass which will be maintained through a log book.
Value of data	NA
Description of measurement methods and procedures to be applied:	The quantity will be monitored through dedicated log book for transportation of Biomass. If not it will be calculated using distance travelled as done in ex-ante calculation. Monthly records will be maintained. No accuracy level needed as no instrument is involved.
QA/QC procedures to be applied:	--
Any comment:	The parameter is not used in ex-ante calculation, but will be monitored and will be available for verification.

B.7.2 Description of the monitoring plan:

>>

Monitoring methodology / guidelines mentioned in the UNFCCC document of "Annex B of the simplified modalities and procedures for small scale CDM project activities" for small scale projects (Type – I: D) is considered as basis for monitoring methodology for the proposed activity.

This monitoring plan is developed in accordance with the modalities and procedures for small-scale CDM project activities and is proposed for grid-connected Biomass based renewable energy project being implemented in Maharashtra in India. The monitoring plan, which will be implemented by the project proponent, describes about the monitoring

organization, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

Project proponent formed a CDM team/committee comprising of persons from relevant departments, which will be responsible for monitoring of all the parameters mentioned in this section. In the CDM team, will be formed who will be assigned responsibility of monitoring of different parameters and record keeping. On daily basis, the monitoring reports will be checked and forwarded to management level.

All the parameters mentioned in the monitoring plan have been monitoring in the plant. The entire process of monitoring has been streamlined and will be made available in the required format during the verification process and for subsequent useful purposes. The Fuel Consumption data, etc are being maintained in different formats.

1 Routine Maintenance Services

Routine Maintenance Labour Work involves making available suitable manpower for operation and maintenance of the equipment and covers periodic preventive maintenance, cleaning and upkeep of the equipment including -

a) Boiler
b) Turbine
c) Fuel Logbooks

2 Management Services

a) Data logging in for power generation
b) Preparation and submission of monthly performance report in agreed format.
c) Taking monthly meter reading of power generated by the biomass power plant.

3 Technical Services

a) Visual inspection of the power plant and accessories
b) Technical assistance including checking of various technical, safety and operational parameters of the equipment, trouble shooting and relevant technical services.

4 Project Monitoring

a) The power generation will be metered through a kWh meter installed on the main panel.
b) The net electricity supplied to the grid is the difference between the generation meter and the main meter or check meter.
c) The quantity of each type of biomass combusted in the project plant will be recorded equal as the quantity of biomass purchased.
d) GCV of each type of biomass utilized in the plant will be measured based on reliable authorized data nationally or locally on annual basis.
e) The generation and main consumption meters will be tested and calibrated for accuracy at regular intervals. Periodical testing, sealing and maintenance of meters in the presence of authorized representatives will be carried out. Copies of test reports will be available for evidence. The calibration of meters will be carried out at a frequency of every year.

f) Project performance will be evaluated in terms of the specific fuel consumption i.e. kWh/kg of biomass and coal consumption. This data will be estimated on monthly basis. If the plant performance degrades, the specific fuel consumption value will also go down.

g) In order to maintain a consistent performance of the plant the regular maintenance of the plant will be carried out as per the maintenance schedule.

5 Responsibilities

- **Director:** He will be in charge of all CDM related matters. He will be responsible for preparing required documentation and reviewing the accuracy of various reports with counter checks along with project developer. He will be responsible for internal audit regarding CDM project matter.
- **Project Manager:** Responsible for operation, maintenance and management of plant. He will be reviewing the monitored parameters daily and presenting a daily executive summary report, duly signed by himself, to the Chief Engineer.
- **Electrical Supervisor:** Responsible for proper operation of electrical equipment and taking meter reading for electricity generation. The report will then be sent to the Project Manager for his review on a daily basis.
- **Boiler In charge**: Responsible for proper operation of the mechanical equipment and reporting daily data of steam generated, steam fed to turbine, parameters of steam and flow meter reading of the power plant. The report will then be sent to the Project Manager for his review.

6 Emergency Preparations

Emergency preparedness is an important part of RPPL's operation of power plant. The plant will be designed and constructed for safe, reliable operation with safety systems and highly qualified employees. RPPL has prepared a disaster management plan for the plant which includes the fire safety, electrical safety etc provisions. A regular awareness is created for the different safety procedures.

7 Training procedures

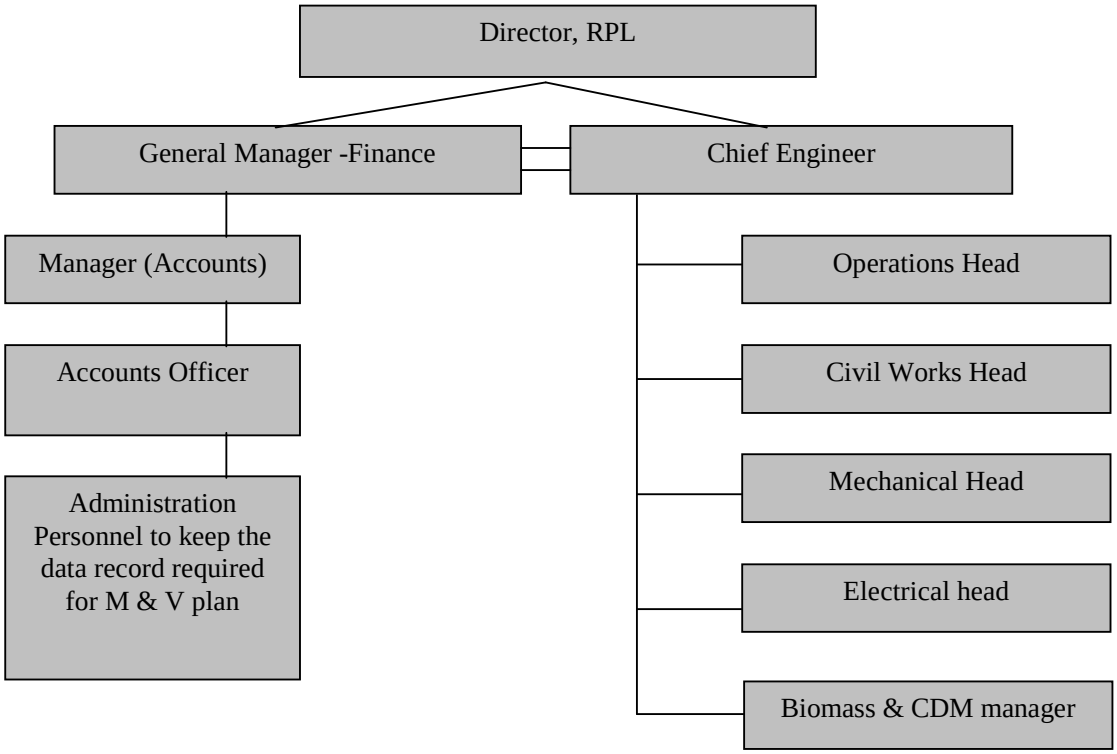
Engineers/ technicians recruited will have experience of working in the similar fields. Equipment suppliers will depute their commissioning engineers to train the engineers/ technicians and supporting operating manuals will be provided by them.

8 CDM Internal Audit:

RPL CDM internal audit requirements will be covered in the internal Audit conducted by accredited auditors every half yearly once

RPL formed a CDM team comprising of persons from relevant departments, which will be responsible for monitoring of all the parameter mentioned in the section. In the CDM team, a special group of operators will be responsible of monitoring of different parameters and record keeping. On periodical basis, the monitoring reports will be checked and discussed. On monthly basis report will be forwarded at the management level.

CDM – Executive Board



B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

>> Date of completion of baseline and monitoring methodology – 01/07/2009

Name of the responsible person –Rake Power Limited along with their consultants has developed the baseline and monitoring methodology. Details are provided in Annex – 1 of the document

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>02/01/2006 based on Letter of intent for supply of steam turbine.

C.1.2. Expected operational lifetime of the project activity:

>>20 years & 0 months.

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

Not Opted For

C.2.1.1. Starting date of the first crediting period:

>> Not applicable

CDM – Executive Board

C.2.1.2. Length of the first crediting period:

>> Not applicable

C.2.2. Fixed crediting period:

Opted For

C.2.2.1. Starting date:

>>15 February 2011

C.2.2.2. Length:

>>10 years & 0 months

SECTION D. Environmental impacts

>>

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

>>

The project being a renewable energy biomass based power project, it does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. . Subsequently, as per the Government of India notification dated June 13, 2002 based on environment protection rule, 1986, public hearing and EIA is required for those industries/projects which are listed in the predefined list of Ministry of Environment and Forest. Thermal power projects with investment of less than Rs. 100 crore have been excluded from the list.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>> RPL had conducted the Environment Management Plan (EMP) through reputed consultant and the report on the same is attached in DPR and can be made available to DOE during the validation time. Brief description on the measures taken towards the environment protection in the plant is given below:

1. Stack height of 45 m is provided for effective dispersion of pollutants.
2. The water requirement for the power plant will be met from Pench river (6.0 km). This water is pretreated with the help of filters. The effluent generated in the plant will be treated in the Effluent Treatment Plant (ETP). The effluent characteristics after the treatment are in complying with the standards stipulated by Maharashtra Pollution Control Board. (MPCB)
3. Electrostatic precipitator (ESP) is provided to bring down the SPM emissions from boiler to 115 mg/m^3. Acidic and alkaline effluent streams coming from cation and anion units of DM plant are neutralized in a neutralization tank. The service water is passed through oil & grease trap to remove the oil content present in the effluent.
4. The boiler blow down due to its higher pH is neutralized before mixing with other effluent streams. Plantation of small and tall trees is done around the plant area for better environment.
5. The ash collected is utilized for brick manufacturing
6. The water used in the surface condenser to condensate the steam, is cooled in cooling tower of forced draft type.

As per EMP suggestions are adequately taken care during implementation the project activity.

E.1. Brief description how comments by local stakeholders have been invited and compiled:

>> A meeting was organized by the project proponent at the project site to get comments and suggestions of the local stakeholders on their project activity. Invitation was sent in the form of individual letters addressed to the different stakeholders identified for the project. Representatives of a wide cross section of the society of the local inhabitants were invited to express their views. Representatives of the project proponent were present to clarify queries and receive feedback on the project activity.

The stake holders meeting conducted on 19th January 2007 at the 'Factory premises" of RPL Plant at Patgowari(V), Ramtek(T) Nagpur District Maharashtra. To get an organized and structured feedback from the stakeholders, the meeting was designed in a question answer format, where social, economic and environmental issues were put up in the form of questions and comments were invited on them. Project proponent replied to their queries appropriately and suggestions came up in this meeting have been given due consideration and future actions were planned accordingly.

Stakeholder Consultation:

The local stakeholders are immediately affected by the activities of the project. The effect is on the local environment, social life and economics. All the individuals and organizations falling in the above effects are perceived as stakeholders. They can be within the boundaries of the village, district, state or nation. RPL checked the opinion of the stakeholders on the project through consultation of stakeholders. The following stakeholders were identified:

- Gram Panchayat
- The rural population living in the neighborhood of the plant
- Licensing and regulatory authorities

Rural Local Population:

The rural population is directly involved with the project. First of all they will be confronted with the construction and operation of a biomass plant in their vicinity. During construction of the plant at the selected site and designing the project, attention was given to maintain a very good relationship with the local population. The project depends on the supply of biomass from the rural farmers and therefore a good and mutually beneficial relation is essential. In addition to this, the project would also lead to local manpower working at the plant site. Since, the project will provide good direct and indirect employment opportunities, the local populace is encouraging the project.

The project did not require displacement of any local population. Thus, the project will not cause any adverse social impacts on local population rather helps in improvising their quality of life.

The project has also secured a no – objection certificate from the Gram Panchayat, for establishing the power project. The project has been given a green signal by the rural people as it aims towards development by empowering them, socially & economically.

- **Licensing and Regulatory Authorities:**
  MPCB has prescribed standards of environmental compliance and monitors the adherence to the standards. The project has already received No Objection Certificate (NOC) from MPCB towards establishing the biomass based power project.

  The project has sought all the requisite legal and regulatory clearances for establishing this project.

Fig.3: Local Stakeholder Meeting

E.2. Summary of the comments received:

>> No negative comments have been received in context of the project. All stakeholders welcome the project as it is environmentally benign, it generates income and jobs, it supports the development of the nearby rural areas and the state, and it helps bridging the gap between the demand and supply of electricity and empowers the local community.

E.3. Report on how due account was taken of any comments received:

>> No negative comments were received and hence, there was no need to take due account of the comments.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Rake Power Limited
Street/P.O.Box:	7th Floor, Minerva Complex,
Building:	S.D. Road
City:	Secunderbad
State/Region:	Andhra Pradesh
Postfix/ZIP:	500 003
Country:	India
Telephone:	+ 91 – 40 –27846420,
FAX:	+ 91 – 40 – 66310072
E-Mail:	--
URL:	--
Represented by:	
Title:	General Manager (Finance)
Salutation:	Mr.
Last Name:	Killam
Middle Name:	--
First Name:	Jogarao
Department:	Finance
Mobile:	+91- 9989500511
Direct FAX:	Not Available
Direct tel:	+91-40-32588284
Personal E-Mail:	killamjogarao@yahoo.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

- The project has not received any public funding and Official Development Assistance (ODA).
- The project is a unilateral project.

Annex 3

BASE LINE INFORMATION

The project uses grid emission factor calculations officially published by the Central Electricity Authority (CEA) of India, following the approaches and rules defined in METHODOLOGICAL TOOL. For details further information on data please refer the following link.
http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm.

Annex 4

MONITORING INFORMATION

The calibration of monitoring equipment will be maintained as per the requirement of MSEDCL and the same will be done regularly. Power generation, export & auxiliary consumption, fuel consumption will be recorded daily and the same will be verified and approved by Plant Manager. These records will be sent to the Head Office for review by the Director and for corrective actions if necessary.

Internal Auditors will also verify the monitoring data. As per the advices of the Internal Audit team, corrective actions will be taken up for more accurate future monitoring and reporting.

The plant will be equipped with energy meters/export meters for monitoring and control purpose. The energy meters will be tested and calibrated utilizing a standard meter. The standard meter will be calibrated once in a year at the approved laboratory of Govt. of India or Govt. of Maharashtra as per terms and conditions of supply. The tests of meters will be jointly conducted by authorised representatives of both the parties and the results and correction so arrived at mutually will be applicable and binding on both the parties. The energy meters will not be interfered with, tested or checked except in the presence of representatives of company and MSEDCL. If any of the meters is found to be registered inaccurately, affected meter will be immediately replaced. The meters will be checked in presence of both the parties on mutually agreed periods. If during the test checks both the meters are found beyond permissible limit of error, both the meters will be immediately replaced and the correction applied to the consumption registered by the main meter to arrive at the correct energy exported for billing purposes for the period of one month up to the time of test check, computation of exported energy for the period thereafter till next monthly reading will be as per the replaced meter. Corrections in exported energy will be applicable to the period between the two previous monthly reading and the state and time of test calibration in the current when error is observed.

Power generation, export and auxiliary consumption will be recorded at the plant from the installed meters. However, for applying monthly bill to MSEDCL the meter readings will be taken on 1st of every month by MSEDCL officials in presence of company representatives and readings will be jointly certified.

The following log sheets will be maintained for the critical equipment of the plant and readings will be recorded on day to day basis:

1. Turbine log
2. Boiler log
3. Electrical log

If both the both and check meters fell to record or if any of the PT fuses are blown out, the export energy will be computed on a mutually agreeable basis for the point of defect.

Power generation, export and auxiliary consumption, fuel consumption will be recorded at the plant daily and the same will be verified by Manager of the plant These records will be sent to the head office for review by the director and for corrective actions if necessary.

- - - - -