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

CONTENTS

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:

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VNCPPL Biomass Based Power Project
Version 1
19/02/2007

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

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Background

The subject activity is a biomass based power project with an installed capacity of 4 MW, located in the Kurumaddali Village, Pamarru Mandal of Krishna District of Andhra Pradesh. The power plant is designed with multi-fuel firing capability in order to use various agricultural residues such as rice husk, sugarcane trash, bagasse, ground nut shell, maize husk, corn studs and other agricultural waste. The project is under the ownership of Veeraiah Non-Conventional Power Projects Limited (VNCPPL) of Kurumaddali, Pamarru Mandal, Krishna District, Andhra Pradesh. The project is also supplying steam to the Veeraiah Solvents Pvt. Ltd., a sister concern of VNCPPL.

Purpose

The purpose of the project activity is to generate electricity using abundantly available biomass as fuel. The generated power is being exported to the local grid at the Pamarru sub-station. The project is helping in bridging the demand and supply gap of electricity in the power sector. In addition, the project is helping in the reduction of the Green House Gas (GHG) emission as it is based on a green, non-conventional and environmental-friendly fuel.

The VNCPPL is utilizing the available fuel rice husk, blackgram husk, bagasse, ground nut shell, maize husk, corn studs and sugarcane trash from Krishna District. The average distance of biomass availability from the plant is approximately 70 km. The biomass fuel requirement for the operation of the power plant at 100% capacity is approximately 65,000 MT[1] per year as against the availability of 330,000[2] Tons/Year.

[1] Reference from the DPR

[2] Reference from the Socio Economic Impact Assessment of Biomass Power Plants in India prepared by Administrative Staff College of India (ASCI) and submitted to Ministry of Non Conventional Energy Sources (MNES), GoI dated 27 June 2005

Contribution to Sustainable Development

The subject project activity contributes to the sustainable development[3] in the following way:

Social well being: The project activity, being located in a rural area, has led to development of the region. The involvement of local people in biomass collection, storage, preparation and transportation has generated additional employment and sources of income.

Economical well being: The growth and development in the region as a result of the project activity has provided economic value to agricultural wastes and is providing stable and quality power to neighbouring small industries, farmers and households. The project has created business opportunities for local stakeholders such as bankers, suppliers, manufacturers, contractors etc during construction stage and for O&M of plant.

Environmental well being: Since, the project uses only biomass materials, which is considered to be Carbon neutral, for power generation, the project does not lead to GHG emissions. Combustion of biomass materials in the project results in GHG emissions of CO_2, Methane (CH_4) and Oxides of Nitrogen (NOx). The major constituent of GHG emissions is CO_2 which is about 98%, whereas CH_4 and NOx constitute the remaining 2% (also evidenced from the typical ultimate analysis of biomass materials indicating the maximum Nitrogen content is 2.25%), therefore CH_4 emission is negligible. Hence the CO_2 is considered as the only GHG emissions from the biomass combustion. The CO_2 released due to combustion of biomass is assumed to be equal to the amount of atmospheric CO_2 fixed by photosynthesis. Again the CO_2 released during the combustion will be consumed by the plant species for their growth. Hence, biomass combustion and growth of biomass and associated CO_2 consumption and release can be treated as cyclic process resulting in no net increase of CO_2 in the atmosphere.

Technological well being: The technology being used for the project is a more energy efficient technology due to the following features: (1) The project uses a steam turbo generator with matching boiler of traveling grate type capable of firing multiple fuels with highest possible system efficiency; and
(2)In addition, the auxiliary power consumption for traveling grate type is relatively less than other efficient combustion system types.

[3] As stipulated by Ministry of Environment and Forest social, economic, environmental and technological well being are the sustainable development indicators for a CDM project activity. MoEF Web site http://envfor.nic.in/cdm/host_approval_criteria.htm#

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Veeraiah Non Conventional Power Projects Limited (Private entity. Project developer.)	No

See contact information in Annex-1 to this PDD

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

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

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A.4.1.1. Host Party(ies):

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India

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

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Andhra Pradesh

A.4.1.3. City/Town/Community etc:

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Kurumaddali, KrishnaDistrict

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

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The plant is located at Kurumaddali village (at latitude of approximately 16.31 N and longitude of approximately 80.39 E), Krishna district of Andhra Pradesh. The site is well connected by roads and railway line. The nearest railway station is at Gudivada and airport is at Vijayawada. The site is generally plain and is more suitable for paddy crop. Power generated from the plant is being evacuated through 132 kV/33 kV Pamarru sub station which is about 6.1 km from the plant.

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

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As per Clause 2 of Type I.D of Appendix B of **simplified modalities and procedures for small-scale CDM project activities (Version 10),** in case of unit which co-fires non renewable biomass or fossil fuel the capacity of the entire unit shall not exceed the limit of 15 MW, for the project to qualify as a small-scale CDM project. As this project activity is a 4 MW Biomass based Power project which is less than 15 MW with a thermal firing capacity of 20.4 MWth which is less than 45 MWth, this project activity can be defined under

Main Category: Type I - Renewable Energy Projects (Small Scale)
Sub Category: "D", Grid connected Renewable Electricity Generation (Renewable Biomass based Power Project)

Technology of the project

Project is a grid-connected biomass based power plant with high-pressure steam turbine configuration. The technology adopted for the project activity is a standard and widely accepted practice for power generation using renewable sources. No technology transfer is required though know how for the project technology was not well established during project implementation stage in the state.

The steam generating system for the Power Plant consists of a 25 TPH capacity travelling grate type boiler with the outlet steam parameters at 67 ata and 485 ^{o}C and one single extraction cum condensing turbogenerator of 4.5 MW nominal capacity. The steam parameters at the outlet of the superheater are 67 ata and 485 ^{o}C. The turbine is designed to operate with steam inlet parameters of 64 ata and 480 ^{o}C, which gives controlled extraction steam at 9 ata. The balance of the steam supplied to the turbine (horizontal, single cylinder, single extraction cum condensing type) flows through the LP section of the turbine into the surface condenser at a pressure of 0.1 ata, from which power is generated and exported to the grid.

The plant also has all the necessary auxiliary facilities such as fuel storage and handling system, condensate and feed water system, compressed air system, ash handling system, fire protection system and electrical system including power evacuation facilities, etc.

The boiler is capable of firing multiple fuels such as rice husk, sugarcane trash, agricultural residues and coal fines also.

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

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Years	Annual estimation of emission reductions in tonnes of CO_2e
2007 – 2008	20,397
2008 – 2009	20,397
2009 – 2010	20,397
2010 – 2011	20,397
2011 – 2012	20,397
2012 – 2013	20,397
2013 – 2014	20,397
2014 – 2015	20,397
2015 – 2016	20,397
2016 – 2017	20,397
Total estimated reductions (tones of CO2e)	**203,970**
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2 e)	20,397

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

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No public funding is available to the project. Project is implemented with equity of project proponent (VNCPPL) and long term debt by Andhra Bank.

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

According to Appendix C of Simplified Modalities & Procedures for small scale CDM project activities, 'Debundling' is defined as the fragmentation of a large project activity into smaller parts.

With reference to the criteria mentioned, this biomass power plant is not a de-bundled component of a large project activity as there is no registered small scale CDM project activity (previous 2 yrs) or an application to register another small scale CDM project activity:

- With the same (VNCPPL) project proponent;
- In the same project category and technology/measure;
- Registered within the previous two years; and
- For which the project boundary is within 1 km radius of the project boundary of this project activity at

the closest point.

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:

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Title:

Grid connected Renewable electricity generation

Reference:

The project activity meets the eligibility criteria to use the simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7.

Details of methodology for baseline calculations for CDM projects of capacity less than 15 MW are available in the "Appendix B[4] of the simplified modalities and procedure for small scale CDM project activities". Reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects less than 15 MW) project activity categories.

Renewable technologies that supply electricity to the grid are covered in category I.D. The category comprises renewable such as small hydro, 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 generation unit.

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

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As per Clause 2 of Type I.D of Appendix B of **simplified modalities and procedures for small-scale CDM project activities (Version 10),** in case of unit which co-fires non renewable biomass or fossil fuel the capacity of the entire unit shall not exceed the limit of 15 MW, for the project to qualify as a small-scale CDM project. As this project activity is a 4 MW Biomass based Power project which is less than 15 MW with a thermal firing capacity of 20.4 MWth which is less than 45 MWth, this project activity can be defined under

Main Category: Type I - Renewable Energy Projects (Small Scale)
Sub Category: "D", Grid connected Renewable Electricity Generation (Renewable Biomass based Power Project)

[4] http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html

B.3. Description of the project boundary:

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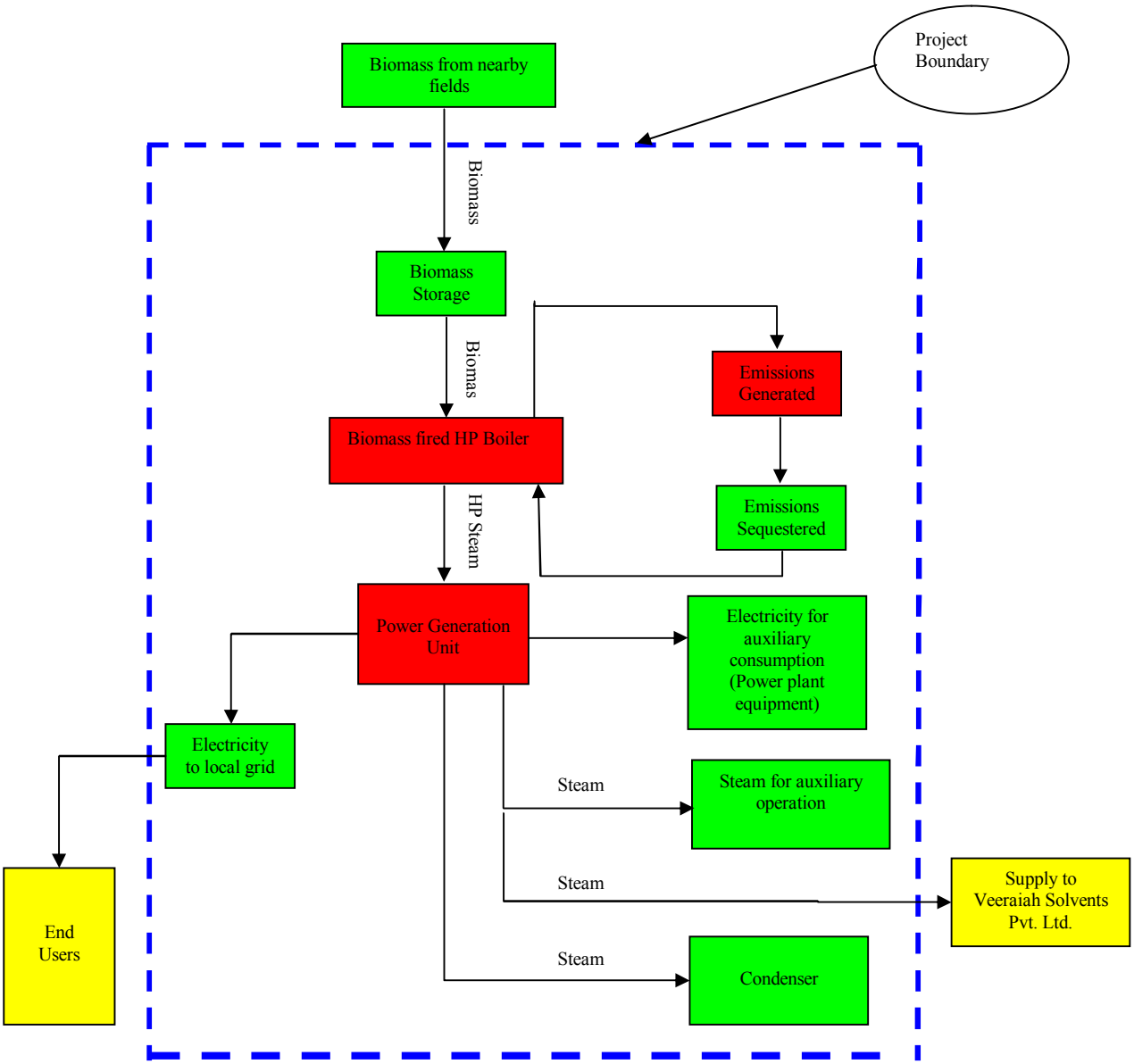
As per the guidelines mentioned in Type I. D. of Annex B of the simplified modalities and procedures for small-scale CDM project activities, project boundary encompasses the physical and geographical site of the renewable generation source.

Hence, the project boundary covers the point of fuel supply to the point of power export to the grid where the project proponent has a full control. Hence, project boundary is considered within these terminal points. However, for the purpose of calculation of baseline emissions, Southern Regional grid is also included in the project boundary. As the plant uses only biomass residues or wastes (rice husk, ground nut shell, maize, etc.), the area where the biomass is extracted or produced is not included in the boundary.

Thus, boundary covers fuel storage and processing, boiler, Steam Turbine Generator (STG) and all other power generating equipments, auxiliary consumption units and electricity grid.



B.4. Description of baseline and its development:

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As per the Kyoto Protocol (KP) baseline should be in accordance with the additionality criteria of article 12, paragraph 5(c), which states that the project activity must reduce emissions that are additional to any that, would occur in the absence of the certified project activity.

Document Annex B to attachment 3 regarding indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, provides guidelines for preparation of Project Design Document (PDD) including baseline calculations. The category and the sub type of the activity are given above.

Baseline methodology mentioned in the paragraph no. 9 of Type I. D. of Appendix B of the simplified modalities and procedures for small scale CDM project activities, states that the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2equ/kWh) calculated in transparent and conservative manner as under:

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 kgCO_2equ/kWh) of 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.

Based on the above guidelines provided in Version 10 of AMS I.D, the baseline emission factor is estimated using the combined margin approach as per the procedures laid in ACM0002.

A complete analysis of Southern Regional grid has been carried out with the study of various related issues like technology scenario, policy matters, economic conditions, development of renewable energy projects etc. for preparation of baseline scenario and calculation of baseline emission factor of the grid.

The project activity would displace an equivalent amount of electricity that would have been drawn from the grid generation mix. Since the displaced electricity generation is the element that is likely to affect both the operating margin in the short run and the build margin in the long run, electricity baselines should

reflect a combination of these effects. Therefore the most appropriate approach for baseline methodology would be as descried in Paragraph no. 9 under category I.D of Appendix B of the simplified M&P for small scale CDM project activities of the UNFCCC.

In this project case, the project is small scale only having generating capacity of 4.0 MW. Hence, this is an operating margin scenario where we can assume that the principal effect will be on the operation of current or future power plants. However in view of the predicted power deficit status in the state in future, a delay effect in future power plants may creep in due to the occurrence of this project although to a limited extent. Ideal baseline approach is envisaged as the one that combines both operating and build margin as prescribed in first alternative given in paragraph 9 under Category I.D of the UNFCCC M&P for small scale projects.

However, the key information and data used to determine the baseline scenario (variables, parameters, data sources, etc.) are listed in the following table.

Key Parameter	**Value**	**Data Source**
P_{wlc}	Power generation by all sources, excluding hydro, biomass and nuclear	All related authentic sources like APTRANSCO, TNEB, KPTCL, KEB, CEA, etc.
P_{fuel}	Share of power generation by each fuel used	Calculated for power plants in Southern Regional Grid
CMF	Base line "Combined Margin" emission factor calculated for grid electricity generation	Calculated for power plants in Southern Regional Grid
OM_{bef}	CO_2 operating margin emission factor for grid	Calculated for power plants in Southern Regional Grid
BM_{yr}	CO_2 build margin emission factor for grid	Calculated for power plants in Southern Regional Grid
TP_{gen}	Total power generated by the project activity	Measured from the plant records
TP_{exp}	Power exported to the grid per annum	From plant and APTRANSCO records
WA_{bef}	Weighted average emission factor of baseline calculated	Calculated for power plants in Southern Grid
Text	Identification of power source / plant for the OM	
Text	Identification of power source / plant for the BM	

The baseline emissions and the emission reductions from project activity are estimated based on the quantum of electricity to be exported by the project activity to the grid and the **Baseline Emission Factor**

(BEF) of the southern regional grid calculated as a **combined margin (CM)**, consisting of the combination of **operating margin (OM)** and **built margin (BM)** factors. The project proponent wishes to use BEF calculated ex-ante and fixing the same for whole crediting period.

The detailed calculation procedures are provided in Annex 3 in line with the procedures explained above and with necessary inputs from ACM0002.

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 activity meets the eligibility criteria to use simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7.

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

Further referring to Attachment A to Appendix B document of indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories, project participants shall provide a qualitative explanation to show that the project activity would not have occurred anyway, at least one of the listed elements should be identified in concrete terms to show that the activity is either beyond the regulatory and policy requirement or improves compliance to the requirement by removing barrier(s) ;

1. Prevailing Practice Barrier

The installed capacity of biomass based power plants operational at the time of construction of VNCPPL plant in Andhra Pradesh was 60.75 MW, which was only 14.79% of the total sanctioned capacity of 410.55 MW by NEDCAP and the details are as follows:

Sl. No	Plant Name	Capacity, MW	Commissioning Date
1	Gowthami Solvents Oils Pvt Ltd	2.75	March 1996
2	HCL Agro Power Ltd	6	October 2000
3	Ind-Bharat Energies Limited	6	October 2000
4	Jyothi Bio-Energy	4.5	November 2000

	Limited		
5	Sudha Agro Oils and Chemical Industries Ltd.	4	December 2000
6	Gayathri Agro Industrial Power Limited	6	February 2001
7	Jocl Limited	6	March 2001
8	Vamshi Power Plant	4	April 2001
9	Sri Rayalseema Green Energy Limited	5	April 2001
10	Gowthami Bio-Energies Pvt. Ltd	6	July 2001
11	Matrix Power (P) Ltd	4.5	August 2001
12	SLS Power Ltd.	6	August 2001
	Total	**60.75**	

This is due to the fact that there is a financial risk involved in the implementation and operation of these projects. This proves the low penetration of the non-conventional energy based projects in AP. Hence, the project is not a common practice and determines the additional activity.

During the initial stages of the project activity, project participant had taken the below mentioned risks apart from the financial risk due to low penetration as mentioned above:

a. Availability of Biomass at competitive prices: At the preparation of the detailed project report, the availability of biomass in the region was assessed as abundant for the power generation, however, the effect of variation on fuel prices due to the likelihood of replication of such projects in the region and seasonal variation on availability of biomass fuels on the sustainable operation of plant was not known.

b. Technology risk: The biomass based power generation was a relatively new concept and very few projects were set up in the state prior to the construction start of the project activity, hence the long term effects of combustion of biomass fuels with different characteristics on the plants equipments was not yet established at the time of construction start of the project activity and the extent of risk due to the same was not known.

Plant has taken risk due to these factors considering the availability of future revenue through carbon credits that could offset some of the difficulties.

2. Financial barrier

The CDM fund for the project was initially considered to cover the project risk related to the fuel (biomass) price increase in the future. The CDM fund is critical considering biomass availability and prices are seasonal, which depends on many external factors whereas the earnings for the power plant are at long term fixed rate. Therefore, the revenue from CDM could prove to be vital, as they would significantly improve the sustainability of the project, as the project can be rendered financially unstable due to

a. The increase in cost of fuel ; and
b. The change in tariff by virtue of revised tariff by the off taker

The above factors are true for the project activity and in absence of CDM funds it is very likely that project activity would have used (or may use) more financially viable option such as coal as fuel.

Unexpected increase in Cost of Fuel

Comparison of Actual Fuel Prices relative to Prices Considered in DPR
The table below provides the comparison between the actual fuel cost (in terms of husk) and cost based on the DPR at the time of commissioning and present.

Year	Anticipated fuel cost escalation by the project proponent as per DPR[5]	Actual Average Fuel cost (in terms of husk) in Rupees	% Increase in Fuel Cost
2002	580	725	26
2006	670	1300	94

At the time of the preparation of the detailed project report, the average cost of biomass was considered Rs. 550/- with a 5% increase in cost every year. The table above clearly reveals the phenomenal rise (from 26 % to 94 % in 4 years) in the fuel cost when compared to the fuel cost anticipated for these years at the time of inception of the project activity.

[5] Detailed Project Report (DPR) dated February 2001

Increase in Average Fuel Cost since Inception

The average cost of the fuel (in terms of husk) has increased significantly from Rs. 725/- at the time of commissioning of the plant in 2002 to Rs. 1300/- in 2006, i.e., an increase of 79% has been observed. In the year 2005-2006, the average fuel cost was approximately Rs. 1000/-. This increase may be attributed to the following reasons:

1. Seasonal variation in the availability of biomass thus impacting the cost
2. Competitive prices available from other biomass consumers, specifically power plants
3. Variation in the cost of fuel handling over years, such as collection, storage and transportation

Impact of Increase in Fuel Cost: Increase in Cost of Generation

The table below provides the comparison between the total cost of generation considered at the time of DPR and the actual cost of generation:

Year	**A = DPR Cost Per Unit of Generation (Rs./kWh)**	**Actual Cost Per Unit of Generation (Rs./kWh)**				**% Increase relative to DPR cost =((B-A)/A)*100**
		Fuel	**O&M**	**Admin**	**B = Total**	
2002-2003	*2.34*	1.17	0.15	0.71	*2.03*	*-13*
2003-2004	*2.36*	1.70	0.11	0.62	*2.42*	*2.5*
2004-2005	*2.39*	1.91	0.23	0.72	*2.86*	*20*
2005-2006	*2.37*	2.05	0.44	0.68	*3.17*	*34*

Based on the above table, the following can be concluded:

1. With the exception of the first year of operation, for all years of operation, the cost of generation was higher than the cost considered for the respective years at the time of DPR preparation.
2. The cost of generation has increased by 56% (i.e. from 2.03 to 3.17) since inception.

This increase is primarily attributed to the increase in the fuel cost. The increase in fuel cost and generation cost has resulted in reduced cash inflow each year and thus, impacting the financial sustainability of the project. The CDM funds would assist the project proponent in mitigating the increased financial burden being experienced due to the increased cost of fuel and power generation.

CDM Benefits for 10 years

	CERs	Rate (Euros)	Exchange rate	Million INR	Million Units replaced	Cost per unit (Rs.)
VNCPPL	203,970	8	55	89.747	247	0.36

The CDM benefit per unit (kWh) of power replaced is about Rs. 0.36. Based on the previous years' data, it is envisaged that the raw material cost would further increase, which in turn would lead to increase in the generation cost in coming years. VNCPPL also faces poor financial returns due to the policy changes and poor returns from the off takers. The IRR for the project is estimated at 10.01% with out CDM benefits and is 14.27% with CDM benefits.

Thus the project justifies the need of CDM funds for the project activity, which will help in significantly improving the project competitiveness and financial sustainability due to reduction in tariffs and increase in raw material cost.

2. Policy related barriers

The initial purchase power agreement of VNCPPL with APTRANSCO was signed on 7 January 2000 as per which third party sale was permitted at 2% wheeling. It also allowed VNCPPL to sell 100% of the power generated. However, this PPA was canceled and a new PPA was entered into on 16 April, 2002 with the following key points:

1. The revised tariff rate of Rs.2.25 and at an escalation of 5% per annum with 1994-95 as base year and to be revised on 1st of April of every year up to the year 2003-2004 subject to the condition that the purchase price so arrived does not exceed 90% of the prevailing H.T. tariff of APTRANSCO.
2. Beyond the year 2003-2004, the purchase price would be decided by APERC.
3. Third party sale was not allowed.

Based on the above stated condition, the project promoters expected the tariff rates to be changed but did not anticipate a decrease. The power purchase tariff was revised by APERC vide their tariff order6, as per which, the tariff comes to Rs. 2.88 for the operating year 2007-2008, which is approximately 32% lower than the expected tariff rate of Rs. 4.24 based on the PPA.

Also, at the time of inception the project participant was allowed third party sale but the same has been restricted as per current PPA resulting in revenue loss to the project promoters.

[6] APERC tariff order, R.P. No.84 / 2003 in OP No 1075 / 2000 dated 20.03.2004

As per the APERC tariff order, the tariff rate consists of two parts – fixed and variable. The fixed cost is based on the year of commissioning and comes down gradually over a period of 10 years, whereas variable cost goes up by 5% every year.

The year wise (for credit period) effect of tariff changes with respect to fixed and variable price & cost

Fixed cost tariff:

Year of operation	fixed cost (Rs./unit)
1st	1.61
2nd	1.57
3rd	1.53
4th	1.49
5th	1.45
6th	1.41
7th	1.37
8th	1.33
9th	1.26
10th	0.87

Variable cost

Financial year	Variable cost (Rs./unit)
2004-05	1.27
2005-06	1.33
2006-07	1.40
2007-08	1.47
2008-09	1.54

Based on the tariff order, plants operating with 80% PLF are paid a fixed rate (based on fixed and variable cost) as stated above and the additional units generated at the additional PLF will be paid only variable cost of Rs. 1.40 and incentive of 21.5 paise per unit. Thus, it is imperative that present incentive is not sufficient and the sustainability of the project is at risk. To generate renewable power in excess of 80% PLF, the CDM funds can contribute towards improving the viability of generation of green power beyond 80% of PLF, this will indirectly help in reduction of CO_2 emission, if not generated.

The unexpected decrease in the tariff rates offered by APTRANSCO led the project proponent through the Biomass Energy Developers Association to approach the Hon'ble High Court[7] "*challenging the order passed by the Andhra Pradesh Electricity Regulatory Commission in R.P. No. 84 of 2003 in O.P. No. 1075 of 2000 dated 20th March 2004 regarding revision of rate for purchasing electrical energy and common order dated 05th July 2004 in R.P. No.3 of 2004 with respect to drastic reduction in tariff, as being ultra vires, unjust, unreasonable, discriminatory and essentially being violative of principles of natural justice*".

An interim order was released by the Hon'ble High Court on 20 August 2004 in W.P. No. 12921 of 2004 for paying the 50% of difference amount between the old tariff and the new tariff from the billing month of

[7] http://aptel.gov.in/judgements/1-80_of_2005.pdf

June 2004 to the Biomass Energy Developers for the entire energy delivered[8]. This is an indication that there is no economic viability of the project with the APERC tariff. Therefore, the VNCPPL is currently being offered a tariff rate of Rs. 3.16, which is temporary as the prices may further decrease to Rs. 2.81 once the final verdict is released. The uncertainty related to the Supreme Court verdict may result in cash outflow from VNCPPL for last three years and may impact the sustainability of the project. Therefore, CDM benefits have become essential for the projects.

The existing APTRANSCO generation mix[9] comprises of (as on 30th November 2005):

- ✓ 60% thermal power plants (including gas based);
- ✓ 34% hydro projects; and
- ✓ 6% Renewable and other projects

This illustrates that biomass plants are still considered as rather financially risky proposition and with changing scenario, the CDM revenue will contribute to their financial stability.
This discussion also suggests that there are clear policy related threats and barrier to the proposed project activity, which can be mitigated to certain[10] extent from CDM benefit.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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Monitoring methodologies / 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 activity. The document states that the monitoring shall consist of metering the electricity generated by the renewable technology.

The project activity meets the eligibility criteria to use simplified modalities and procedure for small-scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7.

Details of approved methodology for baseline calculations for CDM projects of capacity less than 15 MW are available under Project category I.D. in the "Appendix B of the simplified modalities and procedure for small scale CDM project activities". As the power plant is of 4.0 MW capacity, reference has been taken from indicative simplified baseline and monitoring methodologies for selected small scale (CDM projects

[8] Letter BEDA/APTRANSCO/2004-05 with subject "Interim orders passed by the Hon. High Court on 20 August 2004 in W.P. No. 12921/2004-05" from the Biomass Energy Developers Association to the Chairman & Managing Director of APTRANSCO dated 21 August 2004

[9] http://aptranscorp.com/pact01.html

[10] Uncertainty related to carbon market and cash flows is also a deterrent.

less than 15 MW) project activity categories.

As per the latest guidelines in I.D to estimate the baseline emissions, the emission factor is calculated as per the procedures laid in paragraph 9 (a) & (b). As this methodology suggested to adopt the procedures laid in ACM0002, the same has been considered for calculations. The baseline emissions and the emission reductions from project activity are estimated based on the quantum of electricity to be exported by the project activity to the grid and the **Baseline Emission Factor (BEF)** of the southern regional grid calculated as a **combined margin (CM)**, consisting of the combination of **operating margin (OM)** and **built margin (BM)** factors. The project proponent wishes to use BEF calculated ex-ante and fixing the same for whole crediting period.

Southern Regional grid is considered for baseline analysis and calculation of anthropogenic emissions by fossil fuels during power generation. It is observed that, in the southern regional grid generation mix, coal, diesel and gas based power projects are responsible for GHG emissions. The data published by Central Electricity Authority (CEA) has been used as the baseline emission factor. The baseline emission factor for southern grid as published by CEA is 0.860[11].

Leakage

As per the latest general guidance on leakage in biomass projects, 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 the project activities. These emission sources may be project emissions (if under the control of project participants, i.e. if the land area where the biomass is grown is included in the project boundary) or sources of leakage (if the source is not under control of project participants). The following table summarises for different types of biomass, the cases where the emission source is relevant and the cases where it is not.

Biomass Type	Activity/Source	Shift of pre-project activities	Emissions from biomass generation / cultivation	Competing use of biomass
Biomass from forests	Existing forests	-	-	X
	New forests	X	X	-
Biomass from croplands or grasslands (woody or non woody)	In the absence of the project the land would be used as cropland	X	X	-
	In the absence of the	-	X	-

[11] Source: CEA, www.cea.nic.in

	project the land would be abandoned			
Biomass residues or wastes	**Biomass residues or wastes are collected and used**	**-**	**-**	**X**

For the project activity, the following are considered to calculate the possible emissions due to leakage:

1. As the project activity uses only biomass residues and wastes, the implementation of activity did not lead to shift of pre project activities.
2. Also, the biomass that is being used in the plant is waste that is generated from various crops. This waste will anyhow be generated even in the absence of the project activity and would have burnt without using for any other purpose. Hence there are no emissions from the production of renewable biomass due to application of fertilizer and from clearance of lands.
3. The availability of surplus biomass material (rice husk, cane trash, bagasse, ground nut shell, maize husk, corn studs and blackgram husk) in the Krishna district where plant is located is approximately 330,000[12] Tons/Year tones per annum, however, the average biomass requirement for the operation of the power plant is approximately 65,000 MT. Therefore, the quantity of biomass that is available in the region is more than 25% of the quantity of biomass that is utilized including the project activity and hence the leakage can be neglected.

From the above analysis, it can be concluded that the project activity does not have any sources of leakage due to type of biomass utilised.

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

(Copy this table for each data and parameter)

Data / Parameter	BEF
Data Unit:	t_{CO2}/GWh
Description:	Baseline Emission Factor for Southern Grid
Source of data used:	CEA
Value Applied:	860
Justification of the choice of data or description of measurement methods and	Combined Margin data for southern grid

[12] Reference from the Socio Economic Impact Assessment of Biomass Power Plants in India prepared by Administrative Staff College of India (ASCI) and submitted to Ministry of Non Conventional Energy Sources (MNES), GoI dated 27 June 2005

procedures actually applied.	
Any Comments	Details of the calculation provided in Annex - 3

Data / Parameter	EF
Data Unit:	kg_{CO2}/kWh
Description:	CO_2 emission factor for coal
Source of data used:	IPCC Default Value
Value Applied:	Coal: 1.079 (Source: IPCC)
Justification of the choice of data or description of measurement methods and procedures actually applied.	IPCC value has been used as no country specific value is available.
Any Comments	--

B.6.3 Ex-ante calculation of emission reductions:

>>

Baseline Emissions (Emission Reductions due to displacement of electricity or $ER_{electricity,y}$)

The basic assumptions for calculating baseline emissions of the project activity are due to the displacement of grid electricity. Hence, the following formula is applied for estimation of baseline emissions.

$ER_{electricity,y} = EF_{electricity,y} * EG_y$

The anticipated electricity export from the project activity during the year *y*, multiplied with emission factor as published by CEA (Combined Margin) for southern region grid 860 tCO2/GWh.

Project Emissions

The project proponent uses biomass as fuel. APPCB has issued Consent for Establishment to the project proponent allowing the use of coal upto a maximum of 20% as an alternate fuel during exigencies. Based on the coal consumption details of the plant, the average consumption over the last 3 years has been approximately 3 %. The same has been considered for calculation of the project emission. However, during the verification stage the CERs will be based on the actuals.

The project emissions due to use of coal will be calculated using the following formulae:

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

$$C + O_2 = CO_2$$

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

$$PE_{tCO2} = (EF * G)*1000$$

where,
PE - Project Emission due to coal burning at project, t_{CO2}
EF - Emission Factor for Coal, kg_{CO2}/kWh
G – Generation of Electricity using coal, %
In addition to coal, plant also consumes electricity from grid during start up and emergency. Due to the less volume of units consumption per annum compared to total export, the same quantity has not been considered in the 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.

Leakage

No leakage emissions would occur due to implementation of project activity as the quantity of available biomass residues in the region is 25% larger than the quantity of biomass residues that are utilized, including the project activity.

The leakage activity identified, which contributes for GHG emissions outside the project boundary is transportation of biomass from biomass collection centers to biomass power project site. Calculation of leakage has been carried-out as under:

▪ Biomass to be procured	-	65,000 MT
▪ Average Distance between project site and biomass collection centers	-	70 km
▪ Biomass load per truck	-	10 MT
▪ Number of return trips	-	6,500
▪ Consumption of Diesel per trip	-	18 liters (4km/litre)
▪ Total Diesel consumption	-	117,000 liters p.a
▪ CO_2 emission factor for Diesel (as per IPCC guidelines)	-	74.10 tons CO_2 / TJ
▪ CO_2 emission per annum	-	310 tons

This leakage due to transportation of biomass being very small compared to the total emission reductions has been neglected from the calculations and estimations of emission reductions.

In addition to above, project emissions also occur due to transportation of the fly ash for disposal. Plant generates around 6000 tons of fly ash per annum. Number of trips to dispose fly ash to destination is around 3 per day. However, the average distance of transport of fly ash from the plant to brick manufacturers in the area is approximately 20 km and the number of truck trips per annum is less than 1000, hence the emissions due to the same have also been neglected.

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

>>

	Operating Years	Baseline Emissions (tonnes of CO_2)	Project Emissions (tonnes of CO_2)	Emission Reductions (tonnes of CO_2)
1.	2007-2008	21,277	880	20,397
2	2008-2009	21,277	880	20,397
3	2009-2010	21,277	880	20,397
4	2010-2011	21,277	880	20,397
5.	2011-2012	21,277	880	20,397
6.	2012-2013	21,277	880	20,397
7.	2013-2014	21,277	880	20,397
8.	2014-2015	21,277	880	20,397
9.	2015-2016	21,277	880	20,397
10.	2016-2017	21,277	880	20,397
	Total	**212,770**	**8,800**	**203,970**

Therefore, conventional energy equivalent of 247 Million kWh for a period of 10 years in Andhra Pradesh would be saved by exporting power from the 4 MW Biomass based power plant which in turn will reduce 203,970 tons of CO_2 emissions considering baseline calculations.

Baseline data used for the calculation is provided in Annex-3 and the detailed calculation using the formulae is presented in an Excel Sheet (refer Enclosure – I to this PDD.)

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

B.7.1 Data and parameters monitored:

Parameter	E_{Gen}
Unit:	kWh
Description:	Electricity Generated
Source of Data:	Tri-vector Energy Meter

Value of Data:	27.1872 million kWh per annum
Brief description of measurement methods and procedures to be applied:	The parameter is measured using a tri-vector energy meter available in the control room at VNCPPL.
QA/QC procedures to be applied (if any):	The data will be directly measured and monitored at the project site. All relevant records will be checked to ensure consistency. The meters will be calibrated as per the standards
Any Comments	

Parameter	E_{Exp}
Unit:	kWh
Description:	Power Export
Source of Data:	Tri-vector Energy Meter
Value of Data:	24.74 million kWh per annum
Brief description of measurement methods and procedures to be applied:	The parameter is measured using a tri-vector energy meter available in the control room at VNCPPL and APTransco sub-station.
QA/QC procedures to be applied (if any):	The data will be directly measured and monitored at the project site as well as by APTransco. All relevant records will be checked to ensure consistency. The meters will be calibrated as per the standards.
Any Comments	

Parameter	E_{Aux}
Unit:	kWh
Description:	Auxiliary Consumption
Source of Data:	E_{Gen} (Electrcity generated) and E_{Exp} (Power export)
Value of Data:	2.447 million kWh per annum
Brief description of measurement methods and procedures to be applied:	The data is estimated based on the difference between power generated at the plant and exported to the grid ($E_{Aux} = E_{Gen} - E_{Exp}$)
QA/QC procedures to be applied (if any):	The data will be estimated based on the difference between power generated at the plant and exported to the grid. All relevant records will be checked to ensure consistency. The meters will be calibrated as per the standards
Any Comments	

Parameter	Q_{bio}

Unit:	MT
Description:	Fuel Used (Biomass)
Source of Data:	Weigh Bride reading
Value of Data:	-
Brief description of measurement methods and procedures to be applied:	The parameter is measured using a weigh bridge located at the project site. The truck carrying the fuel will be weighed twice upon entry and exit.
QA/QC procedures to be applied (if any):	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 as per the standards.
Any Comments	The data on quantity of fuel will be separate for all types of fuels

Parameter	GCV_{bio}
Unit:	kCal/kg
Description:	GCV (Biomass)
Source of Data:	Analysis reports
Value of Data:	-
Brief description of measurement methods and procedures to be applied:	Through sample testing in outside authroised laboratories, which will be done quarterly / half yearly.
QA/QC procedures to be applied (if any):	The data will be based on the laboratory analysis.
Any Comments	Test will be done frequently if source of fuel is different

Parameter	$Q_{Fossil, i}$
Unit:	MT
Description:	Fuel Used (Coal)
Source of Data:	Weigh Bride reading
Value of Data:	-
Brief description of measurement methods and procedures to be applied:	The parameter is measured using a weigh bridge located at the project site. The truck carrying the fuel will be weighed twice upon entry and exit.
QA/QC procedures to be applied (if any):	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 as per the standards.
Any Comments	The data on quantity of fuel will be separate for all types of fuels

Parameter	GCV_{Fossil}

Unit:	kCal / kg
Description:	Gross Calorific Value of fossil fuel
Source of Data:	Coal: Lab Analysis Report
Value of Data:	Coal: 3000
Brief description of measurement methods and procedures to be applied:	The lab analysis of the coal samples will be done quarterly / half yearly in authorised laboratory.
QA/QC procedures to be applied (if any):	The data will be based on the laboratory analysis.
Any Comments	--

B.7.2 Description of the monitoring plan:

>>

Project proponent implemented the following operational and management structure in order to monitor emission reductions and any leakage effects, generated by the project activity

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, a special group of operators is formed, who are assigned responsibility of monitoring of different parameters and record keeping. On daily basis, the monitoring reports will be checked and discussed.

On monthly basis, these reports will be forwarded at the management level.

Identified CDM Team at the plant:

1. K. Kamala Prasad, Dy. Manager (O)
2. K. Venkateswararao, Dy. Manager (M)
3. P. J. Suresh Kumar, Dy. Manager (E)
4. G. Satya Srinivas, Chemist
5. T. V. Sheshagiri, Weigh Bridge / Time Office Incharge

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 completing the final draft of this baseline section: ***DD/MM/YYYY***

19/02/2007

CDM – Executive Board

Name of person/entity determining the baseline:

Veeraiah Non Conventional Power Projects Limited, who is also a project participant (as mentioned in Annex-I)

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:

>>

Start date of the project is 13/08/2001 which is after 1 January 2000 and is operational since 26 October 2002.

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

>>

Life time of the project: 20 years

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

C.2.1. Renewable crediting period

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

>>

Not applicable

C.2.1.2. Length of the first crediting period:

>>

Not applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

01/05/2007. However, if the project activity gets registered before or after 01/05/2007, the crediting period will start from the date of registration.

C.2.2.2. Length:

>>

10 years (10y)

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 does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India. 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. Hence, it is not required by the host party.

However, the company is taking the following measures towards the environment protection in the plant:

1. Based on the guidelines given by APPCB for dispersion of emissions into the atmosphere, stack height of 50 m is provided for the 25 TPH, 67 ata, 485 ^{o}C biomass / coal fired boiler.
2. Electrostatic precipitators are installed for the plant steam generator to contain the dust emission from plant to a level of less than 115 mg/nm^3 during biomass firing.
3. The ash collected from the ESP hoppers, air heater hoppers and furnace bottom hoppers is utilized for brick manufacturing.
4. The acid and alkali effluent generated during the regeneration process of the ion-exchangers is drained into an epoxy lined underground neutralizing pit, where the effluents are neutralized using acid or alkali as required.
5. A close circuit cooling water system with cooling towers is installed. This eliminates the letting out of high temperature into the canals and prevents thermal pollution.
6. Sewage from various buildings in the power plant area, through separate drains, goes to the septic tank. The effluent from the septic tank is disposed off in soil by providing disposing trenches. Occasionally, sludge is removed and transported to land fill for disposal.
7. The treated effluent is utilized for green belt development within the plant premises.
8. The rotating equipment in the power plant is designed to operate with a total noise level not exceeding 85-90 bd (A) as per the requirement of Occupational Safety and Health Administration (OSHA) standards. The rotating equipment is provided with silencers wherever required to limit the noise pollution.
9. The characteristics of the effluent from the plant is maintained so as to meet the requirements of APPCB and them minimum national standards for effluents from thermal power plants.
10. Air quality monitoring of suspended particulate matter and oxides of nitrogen is being performed to

ensure that the concentration levels are within the prescribed limits.

The company is maintaining green belt at the plant location for better environment following the requirements specified by APPCB in the consent order for operation of the plant.

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:

>>

Not Applicable

SECTION E. Stakeholders' comments

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

>>

The local stakeholder comment invitation and compilation process involved is as follows:

The local stakeholders are those who face the immediate effect due to the project activities which involves effect on the local environment, social life and economics. They can be within the boundaries of the village, district, state or nation.

On deciding above criteria for qualification of the stakeholders, the idea was to decide the most appropriate representatives who are covering above. During interaction of the corporate headquarter and the plant management, the stakeholders were identified as:

- Office bearers of the neighbouring villages local bodies
- Biomass suppliers
- Customer (APTRANSCO)
- Licensing and regulatory authorities like
  - APPCB
  - NEDCAP

VNCPPL had received the necessary approvals and consents from various authorities, required for project implementation like APPCB, M/s NEDCAP, Village Panchayat, Irrigation and CAD Department. The project was welcomed by all stakeholders because of various environmental, socio economic benefits.

VNCPPL had invited the stakeholders on 23 November 2006 to provide their general feedback on the project activity and specifically asked the villagers and their representative to give them information on how the project has helped them improve their livelihood. The biomass supplier/s were asked to provide them information on how they procure the biomass for the plant and also about the difficulties faced during the procurement. They were also asked whether there has been any improvement on the business opportunities in the area.

Stakeholders Involvement

The village *Panchayat* /local elected body of representatives administering the local area are true representative of the local population in a democracy like India. Hence, their consent / permission to set up the project is necessary. VNCPPL has already completed the necessary consultation and documented their

approval for the project.
Local population comprises the local people in and around the project area. The roles of the local people are as a beneficiary of the project. The local population is involved in the supply of the biomass and hence the project is a beneficial project for the local population. In addition to this, the project also leads to local manpower working at the plant site. Since, the project provides good direct and indirect employment opportunities the local populace encourages the project.

The project did not require displacement of any local population. In addition, the local population is also an indirect consumer of the power that is supplied from the power plants.

The distance between the electrical substation for power evacuation and the plant is less, installation of transmission lines have not created any inconvenience to the local population.

Andhra Pradesh Pollution Control Board (APPCB) has prescribed standards of environmental compliance and monitors the adherence to the standards. The project has the approval from NEDCAP to operate the plant.

As a buyer of the power, the APTRANSCO is a major stakeholder in the project. They hold the key to the commercial success of the project. VNCPPL has cleared the project and VNCPPL has signed Power Purchase Agreement (PPA) with APTRANSCO.

The government of India, through Ministry of Non-conventional Energy Sources (MNES), has been promoting energy conservation, demand side management and viable renewable energy projects including wind, small hydro and bagasse cogeneration / bio-mass power. The project meets their requirements.

E.2. Summary of the comments received:

>>

As mentioned above, VNCPPL has already received the approvals and clearances for their project from the following stakeholders:

- Consent order of Establishment and operation from Andhra Pradesh Pollution Control Board;
- Power Purchase Agreement with APTRANSCO;
- Clearance from the Gram Panchayat, Kurumaddali village
- Clearance from Non-Conventional Energy Development Corporation of Andhra Pradesh Ltd. (NEDCAP)
- Clearance from Irrigation & CAD Department, Government of Andhra Pradesh

Although, in India, public participation at any stage of project implementation is not required, being a CDM activity, project proponent has invited the local stakeholders including Secretary of Gram Panchayat,

representative of local population and biomass suppliers to express their views on the project by arranging a meeting at the project site. The summary of the feedback received is presented as below.

The Secretary of Village Panchayat mentioned that the Village Panchayat is receiving revenue in terms of non-agricultural taxes from the biomass based power project. He also expressed that the project activity has resulted in the local economic development as it has created small business opportunities for local people. It has helped in holding the interest of farmers in farming as they have income not only from the farm yield but also from the agricultural residues & waste. In addition, some local shops came into existence in the vicinity of the power plant to cater the needs of the plant labour and workers.

The other villagers mentioned that the plant has helped in creating employment opportunities for the villagers and have resulted in reduced migration of villagers to cities in search of employment. Some of the farmers are self-employed as they supply biomass to the plant directly. The additional income from the sale of agricultural residues & waste, which was earlier being burnt or wasted, and the employment opportunities at the power plant have helped in improving the standard of living of the villagers. The villagers also acknowledged the reduction in power fluctuations and low voltage issues observed since the project started. They also said that earlier, unused agricultural residue was spread and burnt on the land with the help of additional paid labour resulting in expenditure on the labour, wasting of biomass and environmental. Now, the surplus biomass is being supplied to the power plant without significant additional expenditure.

Representative biomass supplier also expressed their support to the project activity by VNCPPL in this area. Rice husk supplier expressed that prior to supplying rice husk to the power plant, it was being supplied to hotel industry locally but now hotel industry switched to natural gas for cooking and heating, therefore, they stopped buying rice husk from the suppliers. They also stated that brick manufacturing facilities also used to buy rice husk for burning of clay bricks, but with the pre-fabricated fly-ash based brick manufacturing, the use of rice husk has reduced, therefore, surplus rice husk is being supplied to the biomass plant resulting in continued income of farmers. Earlier, sugarcane trash was being burnt in the fields but with setting up of the plant, it is being utilized providing income to the farmers.

The representative from APPCB and APTRANSCO, in general, supported the project activity.

In summary, every stakeholder expressed that the project activity is helping the socio-economic development of the village and nearby area without affecting the local environment adversely.

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

>>

Not applicable. All positive comments received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Veeraiah Non Conventional Power Projects Limited
Street/P.O.Box:	
Building:	Kurumaddali, Pamarru Mandal
City:	Krishna Dist
State/Region:	Andhra Pradesh
Postfix/ZIP:	521 157
Country:	India
Telephone:	+91-8674-254445
FAX:	+91-8674-254323
E-Mail:	kamala_prasadh@yahoo.com
URL:	
Represented by:	
Title:	Executive Director
Salutation:	Mr.
Last Name:	Rao
Middle Name:	
First Name:	K.R.K
Department:	-
Mobile:	-
Direct FAX:	+91-8674-254323
Direct tel:	+91-8674-254445
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No Public Funding is available to the project.

Annex 3

BASELINE INFORMATION

Generation Data, Emission Data published by Central Electricity Authority, Government of India.

Gross Generation Total (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	144,292	151,185	155,385	165,735	168,438
East	58,936	64,048	66,257	75,374	85,776
South	128,983	131,902	136,916	138,299	144,086
West	162,329	165,805	177,399	172,682	183,955
North-East	5,314	5,292	5,811	5,880	7,904
India	499,854	518,231	541,766	557,970	590,158

Net Generation Total (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	135,230	141,415	144,741	155,043	157,290
East	53,350	58,097	59,841	68,428	77,968
South	121,144	123,612	127,780	128,165	134,691
West	150,412	153,125	164,448	159,780	170,726
North-East	5,185	5,169	5,669	5,758	7,776
India	465,321	481,417	502,480	517,174	548,451

20% of Net Generation (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	27,046	28,283	28,948	31,009	31,458
East	10,670	11,619	11,968	13,686	15,594
South	24,229	24,722	25,556	25,633	26,938
West	30,082	30,625	32,890	31,956	34,145
North-East	1,037	1,034	1,134	1,152	1,555
India	93,064	96,283	100,496	103,435	109,690

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	25.9%	25.7%	26.1%	28.1%	26.8%
East	10.8%	13.4%	7.5%	10.3%	10.5%
South	28.1%	25.5%	18.3%	16.2%	21.6%
West	8.2%	8.5%	8.2%	9.1%	8.8%
North-East	42.3%	42.1%	45.8%	41.8%	55.4%
India	19.2%	18.9%	16.3%	17.1%	18.0%

Net Generation in Operating Margin (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	100,189	105,076	106,940	111,449	115,151
East	47,570	50,308	55,377	61,378	69,746
South	87,100	92,085	104,441	107,396	105,584
West	138,071	140,173	150,889	145,264	155,731
North-East	2,992	2,995	3,071	3,350	3,469
India	375,923	390,638	420,718	428,838	449,681

Net Generation in Build Margin (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North					32,067
East					15,818
South					27,195
West					34,587
North-East					2,052
India					111,718

Emission Data

Absolute Emissions Total (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	97,863,848	102,743,113	106,777,065	109,980,786	112,199,697
East	58,025,890	61,436,757	66,595,529	75,515,998	83,956,860
South	88,728,956	92,484,478	104,180,940	108,406,007	105,960,087
West	135,147,507	141,597,621	148,313,340	144,127,175	157,781,065
North-East	2,009,681	1,976,535	2,090,087	2,088,985	2,294,430
India	381,775,882	400,238,503	427,956,961	440,118,951	462,192,140

Absolute Emissions OM (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	97,863,848	102,743,113	106,777,065	109,980,786	112,199,697
East	58,025,890	61,436,757	66,595,529	75,515,998	83,956,860
South	88,728,956	92,484,478	104,180,940	108,406,007	105,960,087
West	135,147,507	141,597,621	148,313,340	144,127,175	157,781,065
North-East	2,009,681	1,976,535	2,090,087	2,088,985	2,294,430
India	381,775,882	400,238,503	427,956,961	440,118,951	462,192,140

Absolute Emissions BM (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05
North					17,108,583
East					14,303,611
South					19,525,581
West					26,881,491
North-East					206,514

India	78,025,780

Emission Factor (The highlighted value has been used for the preparation of PDD)

Simple Operating Margin (tCO2/MWh) (incl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.98	0.98	1.00	0.99	0.97
East	1.22	1.22	1.20	1.23	1.20
South	1.02	1.00	1.00	1.01	1.00
West	0.98	1.01	0.98	0.99	1.01
North-East	0.67	0.66	0.68	0.62	0.66
India	1.02	1.02	1.02	1.03	1.03

Build Margin (tCO2/MWh) (not adjusted for imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North					0.53
East					0.90
South					0.72
West					0.78
North-East					0.10
India					0.70

Combined Margin in tCO2/MWh (incl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.76	0.76	0.77	0.76	0.75
East	1.06	1.06	1.05	1.07	1.05
South	0.87	0.86	0.86	0.86	0.86
West	0.88	0.89	0.88	0.88	0.90
North-East	0.39	0.38	0.39	0.36	0.38
India	0.86	0.86	0.86	0.86	0.86

Annex 4

MONITORING INFORMATION

All the parameters mentioned in the monitoring plan have been monitored 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. As per the monitoring plan, plant monitors electricity generated, exported, imported and auxiliary consumption. In addition, plant monitors fuel Consumption data of various types of biomass. The various biomass fuels are analysed on regular intervals as per the monitoring plan for their CV and all are being maintained in standard formats. The data formats for CDM have already been finalized and started monitoring accordingly to ensure and demonstrate existence of MVP in the plant.

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 and approved by General Manager of the plant. These records are being sent to Head Office for review by the Director and for corrective actions if necessary.

Further, Internal Auditors 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 system.

The Plant is equipped with energy meters/export meters for monitoring and control purpose. There are two energy meters at APTRANSCO sub station to measure the export power, namely main meter and check meter with 0.2 class accuracy. The energy meters shall be tested and calibrated utilizing a standard meter. The standard meter shall be calibrated once in a year at the approved laboratory of Govt. of India or Govt. of Andhra Pradesh as per terms and conditions of supply. The tests of meters shall 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 shall not be interfered with, tested or checked except in the presence of representatives of company and APTRANSCO. If any of the meters is found to be registered inaccurately, the 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 limits of error, both the meters shall 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 shall be as per the replaced meter. Corrections in exported

energy shall be applicable to the period between the two previous monthly reading and the date and time of test calibration in the current month when error is observed.
Power generation, export and auxiliary consumption are being recorded at the plant from the installed meters. However, for applying monthly bill to APTRANSCO the meter readings will be taken on 23rd of every month by APTRANSCO officials in presence of company representatives and readings will be jointly certified.

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

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

If both the main and check meters fail 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 are being recorded at the plant daily and the same is being verified by Manager of the plant. These records sent to head office for review by the director and for corrective actions if necessary.

Plant emission levels are being monitored as per the statutory requirement by APPCB at regular intervals.

Appendix A

Abbreviations

APPCB	Andhra Pradesh Pollution Control Board
APTRANSCO	Transmission Corporation of Andhra Pradesh
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reductions
cm	Centimeter
CO_2	Carbon Dioxide
DPR	Detailed Project Report
VNCPPL	Veeraiah Non Conventional Power Projects Limited
GHG	Greenhouse Gas
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producers
IREDA	Indian Renewable Energy Development Agency
kCal	Kilo Calories
kg	Kilogram
km	Kilometer
KP	Kyoto Protocol
kW	Kilowatt
kV	Kilovolts
kWh	Kilowatt hour
LP	Low Pressure
MNES	Ministry of Non-Conventional Energy Sources
MT	Metric Tons
MU	Million Units
MW	Megawatt
NEDCAP	Non-Conventional Energy Development Corporation of Andhra Pradesh
NGO	Non Government Organizations
NOC	No Objection Certificate
PDD	Project Design Document
PIN	Project Idea Note
PLF	Plant Load Factor
PPA	Power Purchase Agreement
QA	Quality Assurance
QC	Quality Control
RE	Renewable Energy

SEB	State Electric Board
STG	Steam Turbine Generator
T&D	Transmission and Distribution
TJ	Tera Joule
UNFCCC	United Nations Framework Convention on Climate Change

Appendix B

REFERENCE LIST

Sr. No	References
1.	Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) http://cdm.unfccc.int
2.	Website of United Nations Framework Convention on Climate Change, http://unfccc.int
3.	UNFCCC decision 17/CP.7: Modalities and procedures for a clean development mechanism as defined in article 12 of the Kyoto Protocol
4.	UNFCCC document: Appendix B to attachment 3, Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories
5.	Detailed project report on 4.0 MW Biomass based power plant – Veeraiah Non Conventional Power Projects Limited
6.	Website of Central Electricity Authority (CEA), Ministry of Power, Govt. of India- http://cea.nic.in
7.	CEA published document "16th Electric Power Survey of India"
8.	Website of APGENCO, www.apgenco.com
9.	Website of Ministry Non-Conventional Energy Sources (MNES), Government of India, http://mnes.nic.in
10.	Website of Indian Renewable Energy Development Agency (IREDA), www.ireda.nic.in
11.	Andhra Pradesh Power Profile at www.bisnetworld.net/bisnet/states
12.	www.infraline.com/power/
13.	APERC tariff order, R.P. No.84 / 2003 in OP No 1075 / 2000 dated 20.03.2004.
14.	Website of Climate Change Cell, Ministry of Environment & Forest, Govt. of India. http://envfor.nic.in

Appendix C

Calculation of Emission Reductions

CALCULATION OF EMISSION REDUCTIONS DUE TO 4 MW BIOMASS BASED POWER PROJECT (VEERAIAH NON-CONVENTIONAL POWER PROJECTS LIMITED)

Methodology Used: The combined margin emissions of current generation mix (Veeraiah Non-Conventional Power Projects limited)

Year of offer	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
On-Site Project Emission Reductions										
Generation capacity , KW	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Plant load factor, %	80	80	80	80	80	80	80	80	80	80
No. of hours of plant operation per annum	8496	8496	8496	8496	8496	8496	8496	8496	8496	8496
No. of units generated in a year, millions	27.1872	27.1872	27.1872	27.1872	27.1872	27.1872	27.1872	27.1872	27.1872	27.1872
Auxilliary consumption per annum	2.447	2.447	2.447	2.447	2.447	2.447	2.447	2.447	2.447	2.447
No. of units exported to grid, millions	24.74	24.74	24.74	24.74	24.74	24.74	24.74	24.74	24.74	24.74
T&D losses considered on exportable power	0	0	0	0	0	0	0	0	0	0
No. of units replaced in the grid, millions units	24.74	24.74	24.74	24.74	24.74	24.74	24.74	24.74	24.74	24.74
Baseline emission factor considered, $kgCO_2/kWh$	860.000	860.000	860.000	860.000	860.000	860.000	860.000	860.000	860.000	860.000
Baseline emissions, tones	21276.70	21276.70	21276.70	21276.70	21276.70	21276.70	21276.70	21276.70	21276.70	21276.70
Generation by coal as supplementary fuel (3% - 2007 onwards), millions	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Emission factor considered for coal, kgCO2/kWh	1.079	1.079	1.079	1.079	1.079	1.079	1.079	1.079	1.079	1.079
Project emissions, tones	880.05	880.05	880.05	880.05	880.05	880.05	880.05	880.05	880.05	880.05
Net greenhouse gas emissions, tones	20396.65	20396.65	20396.65	20396.65	20396.65	20396.65	20396.65	20396.65	20396.65	20396.65
Carbon emission reductions in a year	20397	20397	20397	20397	20397	20397	20397	20397	20397	20397

Year	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2007-2008	Total
Baseline emissions	21277	21277	21277	21277	21277	21277	21277	21277	21277	21277	21277	**212770**
Project emissions	880	880	880	880	880	880	880	880	880	880	880	8800
Emission reductions	20397	20397	20397	20397	20397	20397	20397	20397	20397	20397	20397	203970

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