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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Sustainable Wind Energy Based Power Generation

Version 01

25/09/07

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

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The project activity is an initiative undertaken by the project participant to mitigate the Greenhouse gas effects and thereby contribute towards the global measures to reduce the impact of Greenhouse gases on environment. The project activity influences the use of renewable energy to generate electricity and in case of this project activity the source used for generating electricity is 'Wind' which is one of the abundantly available energy sources. The project activity comprises of twelve Wind Energy Generators (WEGs) installed across two states Tamil Nadu and Karnataka respectively, the two states form the part of Southern Regional Grid of India. Bellary Iron Ores Private Limited (BIOPL) has installed 10 WEGs and Vibutigudda Mines (VGM) Private Limited which is a sister a concern of BIOPL owns 2 WEGs. The total installed capacity of the project activity is 7.5 MW. The specific details about the WEGs and their location details have been clearly illustrated in the following sections of A.4.1.4 and A.4.2.

Project contributes towards sustainable development has been explained below.

The Indian government has a goal which states that ***"10% share from Renewable Energy or 10,000 MW in the power generation capacity to be added during the period up to 2012[1]".***

The project towards sustainable development needs to be explained against these four pillars "Social Well being, economic well being, technological well being and environmental well being".

- The project activity clearly contributes towards achieving the nation's goal.
- The project participant has clearly opted for wind based power project as a *voluntary initiative*.
- Using wind energy for generating electricity does not give rise to any GHG emissions.
- Operation of WEGs does not have any ill effects on the human health.
- Skilled technicians are employed during the entire operational lifetime of the Wind Energy Generators for operation and maintenance purposes.

- Local people are hired as security guards, which is another way of generating employment.

The project activity and other project activities of similar kind have contributed to indirect employment opportunities in the surrounding areas like improvement of local transportation, Tele-communication facilities for wind mill operators and also helps small time business groups.

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	Bellary Iron Ores Private Limited (Private entity)	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):

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Country: India

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

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The 12 WEGs as mentioned in section A.2 have been installed in two different states, WEGs installed in Karnataka State are located in Chitradurga district and WEGs installed in Tamil Nadu State is in Tirunelveli District (Tenkasi- Taluk).

A.4.1.3. City/Town/Community etc:

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A brief description with specific details like WEG No, Village name HTSC No has been clearly illustrated in the table below:

Table: 4.1

Sl no	Village	No. of WEGs	Capacity	WEG No./ HTSC No.	State
1	Gonnur	1	0.95 MW	LCS I	Karnataka
2	Chikkappanahalli	1	0.95 MW	LCS II	Karnataka
3	Bettadanagenahalli	1	0.5 MW	325	Karnataka

[1] Reference: http://www.mnre.gov.in/business%20oppertunity/policies.htm

4	Bettadanagenahalli	1	0.5 MW	327	Karnataka
5	Bettadanagenahalli	1	0.5 MW	321	Karnataka
6	Bettadanagenahalli	1	0.5 MW	320	Karnataka
7	Keelaveeranam	1	0.6 MW	HTSC 1485	Tamil Nadu
8	Keelaveeranam	1	0.6 MW	HTSC 1427	Tamil Nadu
9	Kasikuvaithan	1	0.6 MW	HTSC 1425	Tamil Nadu
10	Kasikuvaithan	1	0.6 MW	HTSC 1426	Tamil Nadu
11	Urmelagalagian	1	0.6 MW	HTSC 1470	Tamil Nadu
12	Urmelagalagian	1	0.6 MW	HTSC 1471	Tamil Nadu
	Total	**12**	**7.5 MW**		

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

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Location 1: Keelaveeranam, Kasikuvaithan in Tenkasi taluk situated in Tirunelveli district of Tamil Nadu, India.

Location 2: Bettanaganahalli, Chickkappanahalli and Gonur villages in Chitradurga district of Karnataka, India.

Specific location details have discussed in Appendix 4 of this document

Project Locations

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

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Project Type: I- Renewable Energy Projects

Category: I.D. Grid connected renewable electricity generation

The project is a renewable energy project with an installed capacity of 12.20 MW which is less than the 15 MW threshold limit under the Appendix B of the simplified modalities and procedures for small-scale CDM project activities.

Technology:

The project promoters have installed WEG's of different capacities from two different manufacturers, the technical description of each WEG has been clearly listed below:

Manufacturers	Capacity of WEG's	No. of WEG's
NEG-Micon	950 kW	2
Vestas – V 39	500 kW	4
Vestas –Pawanshakthi (PS)	600 kW	6

NEG-Micon

Nominal output	950 kW
Hub Height:	55 mts
Rotor Diameter:	54.5 mts
Power Regulation	Active stall
Controller Type	Microprocessor based computer control system
No. of Blades	3
Blade Material	With lighting protection and receptor in the blade tips
Generator Type	Asynchronous
Braking	Aerodynamic brake and Mechanical brake
Yaw System	Ball bearing slewing ring with gearing and yaw brakes

Vestas

Model:	**V-39**
Rated Power	500 KW
Hub Height:	47 mts
Rotor Diameter:	50 mts
Turbine type	Gearless horizontal axis wind turbine with variable Rotor speed
Pitch Control	Three synchronized blade pitch system with battery Back-up
Operating range rotational speed	16.0-31.5rpm
No. of Blades	3
Blade Material	Fiberglass (reinforced epoxy) with integral lightning protection
Generator Type	Synchronous Type

Braking	3 independent Aero Brakes
Yaw System	Active through adjustment gears, friction damping
Model:	**Pawanshakthi (PS)**
Rated Power	600 KW
Hub Height:	47 mts
Rotor Diameter:	50 mts
Turbine type	Gearless horizontal axis wind turbine with variable rotor speed
Power Regulation	Independent electromechanical pitch system for each blade
Operating rotational speed range	18.0-33.0 rpm
No. of Blades	3
Blade Material	Glass fibre reinforced Epoxy
Generator Type	Synchronous generator
Braking	Aerodynamic
Yaw System	Active yawing with 4 electric yaw drives with brake motor & Friction braking

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

>> Please refer version 05 of the guidelines for the format and wordings in table

Year	Estimation of annual emission reduction in tonnes of tCO_2e
2008-09	15,362
2009-10	15,362
2010-11	15,362
2011-12	15,362
2012-13	15,362
2013-14	15,362
2014-15	15,362
2015-16	15,362
2016-17	15,362
2017-18	15,362

Total estimated reductions (tonnes of CO_2e)	**153,620**
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period (tCO_2e)	**15,362**

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

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The project participant has not availed any public funding for this project activity from any of the Annex I countries of Kyoto Protocol.

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

Appendix C of the simplified Modalities and Procedures for small scale CDM project activities says that, "Debundling" is defined as the fragmentation of a large project activity into smaller parts. With reference to the criteria mentioned, this project activity is not a de-bundled component of a large project activity as there is no registered small scale CDM project activity (in the previous 2 years) or an application to register another small scale CDM project activity by the same Project Promoter, in the same project category and technology / measure with project boundary within one kilometer radius of this project activity.

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: "AMS I.D. Grid connected renewable electricity generation", Version 12, EB 33

Reference: http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html.

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

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AMS I.D Applicability conditions	Project applicability
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 involves the installation of wind energy generating units supply electricity to the Southern Grid. The installation of WEG minimizes the quantity of fossil fuel being in the high carbon intensive power plants. Hence applicability condition is satisfied.
If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component.	The project has only renewable components with a capacity of 7.50 MW (is lower than 15MW eligibility limit). Hence applicability condition satisfied.
For project activities adding renewable energy capacity, to qualify as a small scale CDM project activity, the aggregate installed capacity after adding the new units should be lower than 15 MW.	The project activity is the installation of new renewable energy capacity where currently no power generation occurs. The aggregate capacity of these units is 7.50 MW which is lower than the threshold limit of 15 MW.

Eligibility as a small-scale CDM project activity:

The table below demonstrates, following the "Simplified modalities and procedures for small-scale project activities" and its recent revisions, the eligibility of the project activity as a small-scale project activity and confirms that it will remain under the small-scale limits over the crediting period.

Criteria	Eligibility
For Type I: Demonstrate that the capacity of the project activity will not exceed 15 MW.	The project activity involves 12 WEGs of various capacities. The sum of maximum rated capacity of all the WEGs is 7.50 MW (Within the 15 MW threshold).

B.3. Description of the project boundary:

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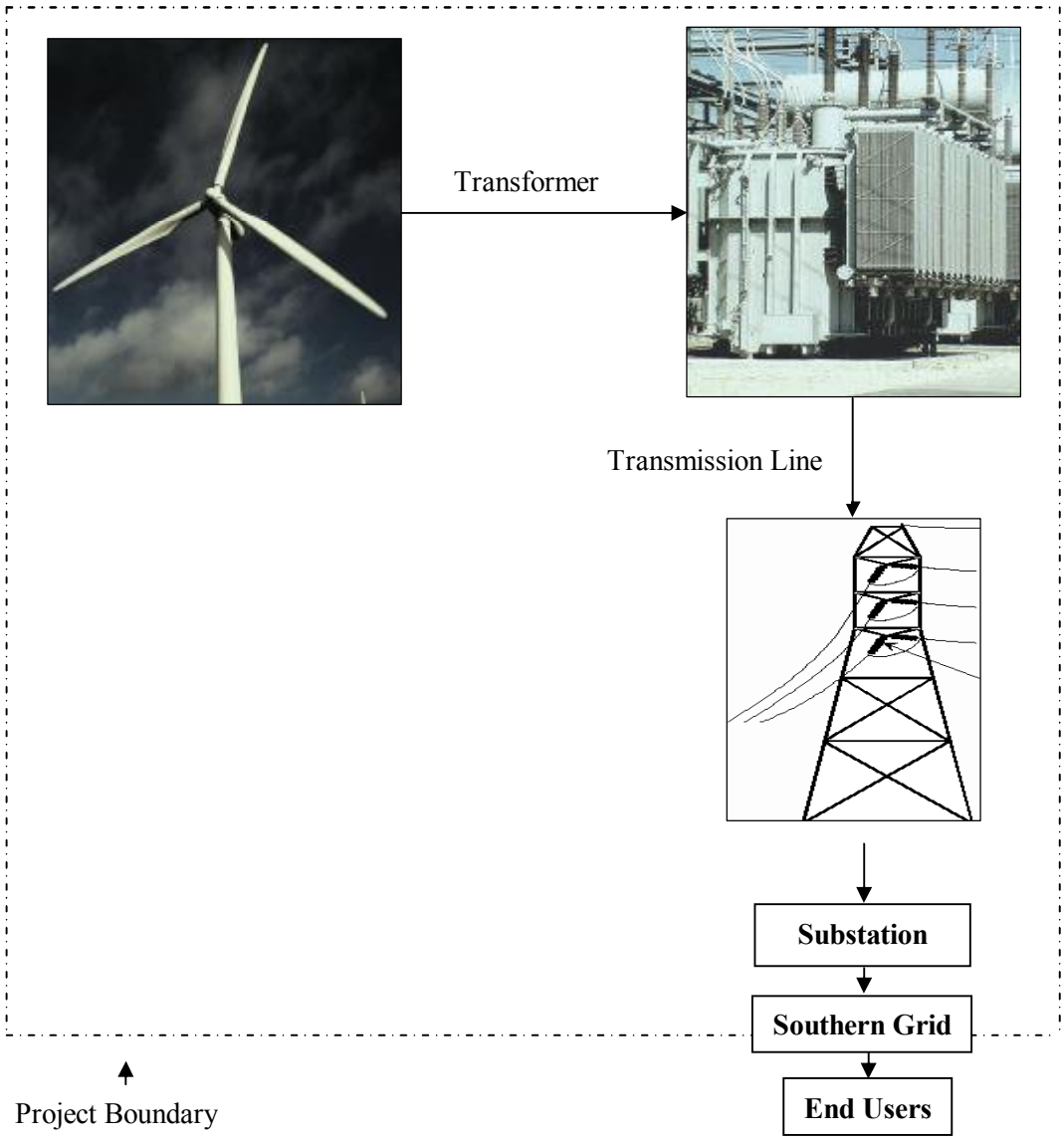
The project has spread across two southern states of India, the specific location details have been clearly discussed in the A.4.1 section. The project activity exports electricity southern regional grid. The project boundary pertaining to this project activity has been clearly illustrated below:



B.4. Description of baseline and its development:

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Baseline for projects under Methodology I.D has been detailed in paragraph 9 described in Annex B of the simplified modalities and procedures for small-scale CDM project activities. It states that the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2 / kWh) calculated in a transparent manner. The project activity would displace an equivalent amount of electricity that would have been drawn from the grid. The electricity is routed through TNEB, MESCOM which form the part of the southern regional grid hence, the emission factor for southern regional grid has been adopted to determine emission reductions.

Since the displaced electricity generation is the element that are likely to affect both the operating margin in the short term run and the build margin in the long run, electricity baselines should reflect a combination of these effects. Therefore *"Combined Margin Emission Factor" has been adopted for calculating emission reductions for this project activity. Further elaboration is required on why CM is chosen etc*

The project activity has deduced values from the Central Electricity Authority (CEA) of India database for calculating the emission reduction. CEA has used the latest adopted ACM0002 Version: 06 for the calculations.

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:

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Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activities states that:

1. Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following 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.

Barriers and Additionality:

The project promoter had to face the following barriers prior to commissioning of the project activity.

Investment Barrier:

The core area of business of the project promoter is iron ore mining. This is the first time the project promoter had ventured into wind based power project. The project promoter was indecisive to go ahead with the wind power project, since the area of expertise of promoter was mining. The BIOPL management decided to carry out financial analysis to assess the feasibility of project activity.

The parameters and assumptions considered by the BIOPL finance team for financial analysis are as follows:

a) Estimated electricity generation: The wind energy potential is dynamic in nature and it continuously changes. The realisation of wind potential depends on Plant Load Factor[2] (PLF) and power evacuation facilities at the site where the wind farm or WEG is located. A conservative PLF of 25% was used for the calculations.

b) Revenue from the sale of power: The rate at which each generated unit (kWh) is sold.

c) Return on Equity: 16% was used (As per the "Central Electricity Regulation Commission (CERC)" order[3] dated 15/05/2001 for private sector participation).

d) Rate of Interest on Loans: The prevailing rates in the market for project financing by financial institution was adopted.

e) Return on Investment (RoI): Return on Investment was calculated after taking the weights of Return on Equity and Rate of Interest. RoI was considered as the benchmark for the project activity.

Capacity	IRR without CDM revenue	RoI
7.5 MW	11.63	13.83

[2] Reference: http://mnes.nic.in/html_folder/ch5_pg3.htm

[3] Reference URL: http://cercind.gov.in/080601/pet2301211200.pdf

Post financial assessment the results were not so encouraging since the IRR was low when compared to benchmark (RoI) and this was a significant barrier for the project promoter. The analysis proved that investing in the project activity would prove to be business risk since the returns were not attractive and the wind power business would not be a sustainable option in the long run. The project promoter had only few options

a) To drop the project activity, or
b) Look for other alternative business where the returns are higher, or
c) Look for alternatives which may increase the returns of the project activity (wind power business)

The BIOPL team was aware of CDM and the associated revenue from the sale of carbon credits. The BIOPL team also came across a newspaper article[4] that renewable projects were eligible for availing carbon credits and this news was encouraging. The project promoter decided to include CDM (carbon credits) revenue component into the financial analysis. The following parameters were considered for the financial analysis:

a) Estimated electricity generation
b) Revenue from sale of power
c) Return on Equity
d) Rate of Interest on Loans
e) Return on Investment (RoI) taking CDM revenue component (carbon credit) into consideration.

Capacity	IRR without CDM revenue	IRR with CDM revenue	RoI
7.5 MW	11.63	14.60	13.8

The financial analysis results post considerations of CDM revenue component were encouraging for the promoter. The IRR with CDM revenue was higher than internal benchmark (RoI). The project promoter decided to go ahead with wind power project based on the financial analysis. The project promoter believed

[4] http://www.hindu.com/2003/09/21/stories/2003092104020400.htm

that taking the wind power project through CDM would help him overcome the investment barrier of lower returns and presumed that the wind power project with CDM revenue will prove to be a sustainable business.

Other Barriers:

Power evacuation facilities:

During the peak wind season availability of the grid is a major problem, since the hydro power plants would be generating at peak capacities and the grid depend on hydro power plants rather than wind farms. The WEGs are shut down due to this infrastructure problem of non availability of grid[5].

If the same situation occurs for the project promoter's project activity and the WEGs are shut down for short duration this would seriously affect the cost economics of the project activity. The project promoter is aware of his obligations towards the financial institutions to repay the loan which will be accrued for commissioning of the WEGs. If the WEGs do not operate over a period of time the cash inflow gets affected and the project promoter has to pull in extra money for paying back the loans, which again proves to be risk. If the same trend continues, the project activity would not prove to be sustainable business for the project promoter.

Summary:

The project promoter's strong belief on CDM and the carbon credit revenue has helped him to oversee the barriers. The project promoter presumes that revenue from the sale of carbon credits will help his wind power business to be sustainable in a long term. CDM and associated revenue will not only enhance the morale of the project promoter, it will also drive him to invest in few more similar renewable projects. The registration of project activity would also help other promoters to invest in similar ventures and thereby contributing towards the global goal of mitigating the Greenhouse Gas effects.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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[5] http://www.inwea.org/shrivsubramanian.htm

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The methodology AMS I.D states "the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient measured in (kg CO_2e/kWh)".

The emission reductions (ER_y) by the project activity during a given year y is

$ER_y = EG_y * EF_y$……..(1)

Where EG_y is the electricity supplied to the grid, EF_y is the CO_2 emission factor of the grid as calculated below:

The emission factor EF_y of the grid is represented as a combination of the Operating Margin and the Build Margin. Considering the emission factors for these two margins as $EF_{OM,y}$ and $EF_{BM,y}$.

Then, EFy is given by

$EFy = W_{OM} * EF_{OM,y} + W_{BM} * EF_{BM,y}$ ……..(2)

Where,

w_{OM}	Weight of the operating margin emission factor (0.75 for wind power projects as per ACM0002, Ref: Version 06, 19th May, 2006 Pg No. 10)
$EF_{OM, y}$	Operating margin emission factor calculated as per ACM0002, Version 06
w_{BM}	Weight of the build margin emission factor (0.25 for wind power projects as per ACM0002, Ref: Version 06, 19th May, 2006 Pg No. 10)
$EF_{BM,y}$	Build margin emission factor calculated as per ACM0002, version 06

The Operating Margin emission factor $EF_{OM,y}$ is defined as the generation—weighted average emissions per electricity unit generated (tCO_2/GWh) for all sources serving the southern grid, excluding zero- or low-operating cost power (hydro, wind and nuclear) , based on the average of the three years most recent data and using the following equation

$$EF_{OM,y} = \frac{\sum_{i,j} F_{i,j,y} \, x \, COEF_{i,j}}{\sum_{j} GEN_{j,y}} \quad \text{..... (3)}$$

Where,

$F_{i,j,y}$ is the amount of fuel i (in a mass or volume unit) consumed by relevant power sources *j* in year(s) y,

j refers to the power sources delivering electricity to the grid, not including low-operating cost and must-run power plants, and including imports to the grid.

$COEF_{i,j,y}$ = CO_2 coefficient of the fossil fuel, (i) , (tCO_2) / mass or volume unit of the fuel) , taking into account of the carbon contents of the fuels used by relevant power plant j , and the present oxidation of the fuel in year(s) , y , and

$GEN_{j,y}$ electricity (MWh)delivered to the grid by power plant j.

$EF_{OM,y}$ =Total GHG emissions and electricity generation supplied to the grid by the power plants connected to the grid excluding zero- or low-operating cost sources.

The CO_2 emission coefficient COEF is obtained as :

$$COEF_i = NCV_i \otimes EF_{CO2,i} \otimes OXID_i \quad \text{..... (4)}$$

Where:

NCVi is the net calorific value (energy content) per mass or volume unit of a fuel i,

$OXID_i$ is the oxidation factor of the fuel

$EF_{CO2,i}$ is the CO_2 emission factor per unit of energy of the fuel i :

The build margin is calculated as the weighted average emissions of recent capacity additions to the reference grid, based on the most recent information available on plants already built for sample group *m* at the time of PDD submission. The sample group *m* consists of,

- The power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Further, power plant capacity additions registered as CDM project activities have been excluded from the sample group *m* of South India Regional grid mix.

The PDD has adopted *ex-ante* option for build margin calculation.

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \, x \, COEF_{i,m}}{\sum_{m} GEN_{m,y}}$$

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogus to the variables described for the simple OM method above for plants m.

Emission Reductions (ER_y):

The emission reductions from the project activity are equal to the baseline emissions minus project emissions and Leakage. Since the project activity generates electricity from wind, which is a zero emission source, there are no associated project emissions. As per AMS I.D, leakage need not be considered since there is no transfer of energy generating equipment from another activity or transfer of existing equipment to another activity.

Therefore, emission reductions from the project activity directly equal the baseline emissions.

$ER_y = EF_y – PE_Y - L_{y,}$ where

PE_y = Project Emissions in year $_y$ (nil in this case)

L_y = Leakage in y (nil in this case)

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

Data / Parameter:	$EF_{OM,\ y}$
Data unit:	$kgCO_2equ/kWh$
Description:	Approximate Operating Margin Emission Factor for Southern Regional Grid
Source of data used:	CEA Version 02 (Dated: 21/06/07) Ref: http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
Value applied:	1.01
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values are deduced from the CEA's CO_2 Baseline Database.
Any comment:	

Data / Parameter:	$EF_{BM,y}$
Data unit:	$kgCO_2equ/kWh$
Description:	Build Margin Emission Factor for Southern Regional Grid
Source of data used:	CEA Data Version 02 (Dated: 21/06/07)
Value applied:	0.71
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values are deduced from the CEA's CO_2 Baseline Database.
Any comment:	

Data / Parameter:	BEF_y
Data unit:	$kgCO_2equ/kWh$
Description:	Baseline Emission Factor for Southern Regional Grid
Source of data used:	CEA Data Version 02 (Dated: 21/06/07)
Value applied:	0.935
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values are deduced from the CEA's CO_2 Baseline Database, which are best suited to the current scenario.
Any comment:	Baseline emission factor is the sum of operating margin and build margin.

B.6.3 Ex-ante calculation of emission reductions:

>>

Ex-ante Estimation of Energy Generation (EGy):

Energy generation per year works out to be **15,300 MWh/yr**

Ex-ante determination of baseline emission factor (BEFy):

As per formula described in section B.6.1 above,

BEF_y = Combined margin emission factor = $w_{OM}.EF_{OM,\ y} + w_{BM}.EF_{BM\ ,\ y}$

BEFy = 0.75*1.01 + 0.25*0.71 = 0.935 tCO_2e/yr (Calculated as per ACM 0002 Version: 06 May 2006)

Ex-ante calculation of emission reductions (ER_y):

As per formula described in Section B.6.1 above,

$ER_y = EG_y \times EF_y$

$ER_y = (EG_y \times EF_y)$

ER_y = 16,430 MWh/yr x 0.935 tCO_2e/MWh = 15,362 tCO_2e/yr

Simple Operating Margin (OM) values for three years and Build Margin (BM) values have been directly taken from CEA database. Refer Annex 3 for details.

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

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Year	Estimation of project activity emissions (tCO_2e)	Estimation of Baseline emissions (tCO_2e)	Estimation of Leakage tCO_2e	Emission reductions tCO_2e
2008-09	0	15,362	0	15,362
2009-10	0	15,362	0	15,362
2010-11	0	15,362	0	15,362
2011-12	0	15,362	0	15,362
2012-13	0	15,362	0	15,362
2014-15	0	15,362	0	15,362
2015-16	0	15,362	0	15,362
2016-17	0	15,362	0	15,362
2017-18	0	15,362	0	15,362
2018-19	0	15,362	0	15,362
Total (tCO_2e)	**0**	**153,620**	**0**	**153,620**

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

B.7.1 Data and parameters monitored:

Data / Parameter:	**EG_y**
Data unit:	**MWh**
Description:	Net quantity of electricity generated by the project activity during the year y
Source of data to be used:	
Value of data	16,430
Description of measurement methods and procedures to be applied:	Instrument Used : Measured by energy meters Recording Frequency: Continuously Proportion of data to be monitored: 100%

QA/QC procedures to be applied:	The energy meters will be calibrated periodically. The consistency of metered net electricity generation will be cross-checked with receipts from sales.
Any comment:	Net electricity will be calculated after taking into consideration the Wheeling, Transmission and Distribution losses.

B.7.2 Description of the monitoring plan:

>>

The project participant has a dedicated team for operation and maintenance of their 12 WEGs. The responsibilities of operation and maintenance personnel present at the site include

a) Regular monitoring of WEGs by the technicians under the supervision of the site engineer
b) Daily recording the readings in the meters and at the end of every day the meter readings are made available online by the site engineer to the project promoter

At the end of each month the electricity board (TNEB and BESCOM) official record the data from the main meter under the supervision of a site engineer. The readings taken from the main meter by the electricity board personnel are later tabulated by considering the Transmission and Distribution (T&D) losses. The final readings provided by the electricity board are considered for calculating the emission reductions and final payment to the power generators or project participants. The CDM team structure is illustrated in the form of flow chart below. The detailed description of monitoring and monitoring plan has been clearly explained in the Annex 4 of this document.

CDM team at BIOPL

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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 the baseline and monitoring methodology:

10/10/2007

Entity determining the baseline:

M/s. Bellary Iron Ores Private Limited

Regd. Office: Modi Bhavan,

Hospet Road, Allipur,

Bellary - 583105,

Karnataka - India

The project participant is the entity determining the baseline.

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:

>>
13/09/2004. Proof: as per the purchase order placed by the project promoter on the WEG supplier.

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 applicable

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

>>

C.2.1.2. Length of the first crediting period:

>>

C.2.2. Fixed crediting period:

>>
The Project Promoter has opted for a fixed crediting of 10 years

C.2.2.1. Starting date:

>>
30/12/2007 or upon registration with UNFCCC. The project promoter affirms that the crediting period will start only upon registration of the project activity.

C.2.2.2. Length:

>>
10 years 0 Months

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SECTION D. Environmental impacts

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

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The project activity is completely renewable and does not involve any emissions or pollution

Water Pollution is *Nil*

Air Pollution is *Nil*

Soil Contamination / Land Degradation is *Absent* in this project.

The project activity does not fall under the purview of EIA Notification of Ministry of Environment and Forest (MoEF) – Government of India (Reference: Environment Impact Assessment Notification dated 27/01/1994 and its latest amendment dated on 14 September, 2006).

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:

>>

Wind power projects are generally considered to be environmentally friendly, since:

The chances of Air Pollution due to a wind power project is Nil.

Operation of WEGs does not lead to water contamination or soil/land conatmination.

The rotation of blades of the WEG may cause some noise and may cause incovinence for a short period of time.

CDM – Executive Board

SECTION E. Stakeholders' comments

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

>>

The local population in the vicinity of the project activity comprises mainly of farmers and rural population, who are the major stakeholders in the project activity. The major stakeholder is the party off-taking power from the project activity as well as other parties (say consultants, equipment suppliers) involved in the construction, operation of the project activity. The stakeholders identified for the project are listed below:

- Elected body of representatives administering the local area (Village Panchayat)
- Local Residents
- Electricity Board
- Consultants
- Equipment suppliers

All the stakeholders were invited for a discussion on the project activity and the date and venue were informed to them prior to the meeting through formal invitations. The stakeholder consultation meetings were conducted on 09/06/2007 at Courtalam, Tenkasi Taluk, Tirunelveli district and on 11/06/2007 at Kundur village, Davanagere district, Karnataka. The meetings were attended by concerned stakeholders. The equipments and technology used in the project activity, prospective benefits of GHG reduction and contribution to sustainable development were appraised by the project promoter to the stakeholders through a presentation in English and in the regional languages (Tamil & Kannada) respectively. Detailed reports on the stakeholder consultation process including the written feedback is available and would be made available to the Designated Operational Entity (DOE) at the time of Validation.

E.2. Summary of the comments received:

>>

Include the summary of comments

The consultation process was taken up in a good note by the stakeholders, which was very clearly visible during the interaction session. The stakeholders appreciated project promoters for being instrumental in implementing the project activity and no negative comments were put forth by the stake holders. Further they have encouraged the project promoter to initiate similar project activities in future.

CDM – Executive Board

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

>>

The stakeholder comments were recorded in the form of questionnaire's which were circulated during the stakeholder meetings held at respective locations. The completed questionnaire's are documented and have been archived. The responses received through the stakeholder consultation process were positive and encouraging. There were no negative comments received from any of the stake holders and hence no corrective action was to be made. The list of attendees and their documented responses are available with the Project Promoter and will be made available to the Designated Operational Entity (DOE) /Validator.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Bellary Iron Ores Private Limited
Street/P.O.Box:	Allipur
Building:	Modi Bhavan
City:	Bellary
State/Region:	Karnataka
Postfix/ZIP:	583 105
Country:	India
Telephone:	+91 8392 243900
FAX:	+91 8392 243990
E-Mail:	sk_vgm@123india.com
URL:	
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Modi
Middle Name:	Kumar
First Name:	Santhosh
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	sk_vgm@123india.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project promoter has not availed any public funding from any of the Annex-I parties.

Annex 3

BASELINE INFORMATION

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE						
VERSION			**2.0**			
DATE			**21 June 2007**			
BASELINE METHODOLOGY			**ACM0002 / Ver 06**			
EMISSION FACTORS						
Simple Operating Margin (tCO2/MWh)						
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
North	0.98	0.98	1.00	0.99	0.97	0.99
East	1.22	1.22	1.20	1.23	1.20	1.16
South	1.02	1.00	1.01	1.00	1.00	***1.01***
West	0.98	1.01	0.98	0.99	1.01	0.99
North-East	0.73	0.71	0.74	0.74	0.71	0.70
India	1.02	1.02	1.02	1.03	1.03	1.02
Build Margin (tCO2/MWh)						
	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
North					0.53	0.60
East					0.90	0.97
South					***0.71***	***0.71***
West					0.77	0.63
North-East					0.15	0.15
India					0.70	0.68

The combined margin for the project activity works to be 0.935 tCO_2 / MWh

Reference: As per ACM0002 Ver 06, May 2006: For wind and solar projects, the default weights are as follows: wOM = 0.75 and wBM = 0.25. The combined margin for the project activity works to be 0.935 tCO_2 / MWh

Annex 4

MONITORING INFORMATION

Net energy generation and export to the grid (MWh)	
Monitoring methods and procedures	This data will be measured continuously in the Project Promoter (PP)'s energy meters located at the individual WEGs and also in the Electricity Board energy meters located at WEGs. The technicians of the CDM team will record the generation data from the PP's meters on a daily basis in log books. The reading from TNEB and BESCOM meter will be recorded every month by Electricity Board official in the presence of the site Engineer. All power transmission infrastructures downstream of the TNEB and BESCOM meter are the part of southern regional grid and therefore for the calculation of emission reductions, monthly meter readings shall be considered.
QA/QC procedures	The monthly TNEB and BESCOM meter reading would be cross-checked with the PP's meter data. In case of any deviation in TNEB's or BESCOM recorded data is beyond the allowable limits for energy meters, the project promoter would request TNEB/BESCOM to calibrate/rectify the meter at the earliest. For the period of error, data would be adjusted as described under "Data uncertainties and adjustments".
Reporting	The Site Engineers (SE) will review the PP's energy meter log books on a daily basis and record the data in computer. On a daily basis, a compilation of the energy data from each WEG would be available online. The online data would be accessible to the project promoter. The project promoter receives a monthly report from the operation & maintenance team which includes TNEB's and BESCOM monthly report, the Electricity Board's monthly statement is used for cross-checking purposes.
Data archiving	The monthly reports would be documented by the project promoter for ten plus two years after the crediting period.
Data uncertainties and	For this parameter, data uncertainties are likely during the following scenarios: • During error in meter

adjustments	• When meter is dismantled for O&M or calibration • When data is not recorded or records are lost Error in the meter will be usually identified during cross-checking the monthly energy reports. If an error is found in the TNEB/BESCOM meter, the last data recorded on the energy meter (TNEB / BESCOM) minus average transformer losses would be calculated and used for emission reduction determination for the error period. When the PP's meter is dismantled for O&M or Calibration, the reading recorded by the TNEB/BESCOM meter for that period would be noted and adjusted with the PP meter reading. The emission reductions would be calculated based on TNEB's/BESCOM's monthly generation report.

- - - -

Appendix 1

Abbreviations

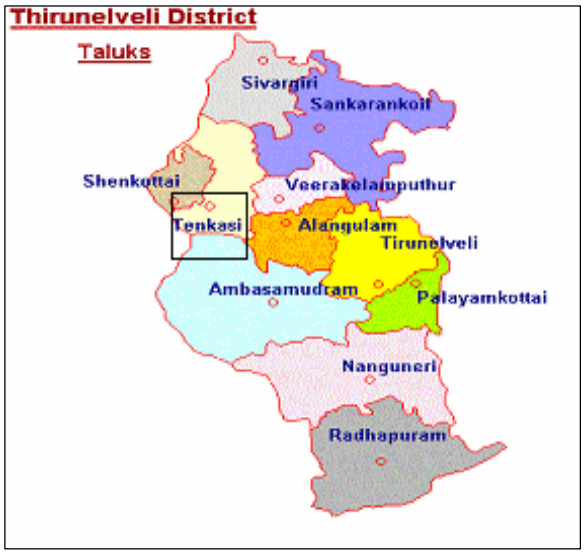
AMS	Approved Methodology Small scale
BEF	Baseline Emission Factor
BIOPL	Bellary Iron Private Limited
BM	Build Margin
CO_2	Carbon dioxide
CER	Certified Emission Reductions
CEA	Central Electricity Authority
CDM	Clean development mechanism
CM	Combined Margin
EIA	Environmental Impact Assessment
EB	Executive Board
GHG	Greenhouse Gas
HT SC	High Tension Service Connection
INR	Indian Rupees
IPCC	Inter Governmental Panel on Climate Change
IRR	Internal rate of return
kW	Kilowatt
BESCOM	Mangalore Electricity Supply Company
MW	Mega watt
MWh	Megawatt hour
MT	Metric Tones
MU	Million Units
MoEF	Ministry of Environment and Forests
OM	Operating Margin
PP	Project Promoter
PPA	Power Purchase Agreement
PDD	Project Design Document
RoR	Rate of Return
Rs	Rupees
tCO_{2e}	Tonnes of carbon dioxide equivalent
TNEB	Tamil Nadu Electricity Board
UNFCCC	United Nations Framework Convention on Climate Change
VGM	Vibhutigudda Mines Private Limited
WPP	Wind Power Project
WEGs	Wind Energy Generators

Appendix 2
List of References

- Kyoto Protocol to the United Nations Framework Convention on Climate Change
- Website of United Nations Framework Convention on Climate Change (UNFCCC), http://unfccc.int
- UNFCCC document: Clean Development Mechanism, Simplified Project Design Document for Small Scale Project Activities (SSC-PDD), Version 03
- UNFCCC document: Simplified modalities and procedures for small scale Clean Development Mechanism project activities
- Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Reference manual
- Central Electricity Authority: CO_2 Baseline Database
- http://cea.nic.in
- http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
- http://cercind.gov.in/080601/pet2301211200.pdf
- http://envfor.nic.in
- http://www.hindu.com/2003/09/21/stories/2003092104020400.htm
- http://mnes.nic.in
- http://www.mapsofindia.com
- http://tn.gov.in
- http://windpowerindia.com

Appendix 3

Site Details



Location 1: Site at Tenkasi Taluk, Tirunelveli District, Tamil Nadu

Keelaveeranam	Degree	Minutes
Latitude	9	3
Longitude	77	22
Kasikuvaithan	Degree	Minutes
Latitude	8	57
Longitude	77	29
Urmelagalagian	Degree	Minutes
Latitude	8	51
Longitude	77	46

Location 1: The nearest railway station to the site is at Tenkasi and nearest airport is at Tuticorin which are at a distance of 15 kilometers and 52 kilometers respectively

Location 2: Bettanaganahalli, Chickkappanahalli and Gonur villages

Chitradurga district, Karnataka

Bettanaganahalli	Degree	Minutes
Latitude	14	12
Longitude	76	25
Chickkappanahalli	Degree	Minutes
Latitude	14	13
Longitude	76	27
Gonur	Degree	Minutes
Latitude	14	10
Longitude	76	24

Location 2: The nearest railway station to the site is at Chitradurga and nearest airport is at Hubli which are at a distance of 11 kilometers and 212 kilometers respectively