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:

"4.00 MW Bundled Wind Power Project at Rajasthan & Maharashtra, India"
Version: 1
Date : 21/06/2010

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

The proposed project activity involves establishment of a Wind Power Project of 4 MW (0.8 MW X 5 No.) installed capacity enabling generation of electricity by total five 0.8 MW Wind Electricity Generators (WEGs). In Sub Bundle I, two WEGs (2 X 0.8 MW) are installed at Jaisalmer district of Rajasthan State & in Sub Bundle II, three WEGs (3 X 0.8 MW) are installed at Satara district of Maharashtra State, by M/s Jsons Foundry Pvt. Ltd. (hereafter JFPL or project participant) & Western Precicast Pvt. Ltd. (hereafter WPPL or project participant). This project is a CDM project activity.

The JFPL has been given the full authority by WPPL to execute the CDM related work.

Purpose of the project activity:

The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, to utilize the generated output for selling it to the state electricity utility (Sub bundle I) and for captive use (Sub Bundle II) and contribute to climate change mitigation efforts.

The electricity generation from the project activity will contribute to GHG reductions estimated at 72,920 tCO_2e over period of 10 years, although the project life is envisaged as 20 years. It is proposed that the project activity needs to mitigate the risks involved in Renewable Energy Technology. The project activity can evacuate approximately 7,900 MWh of renewable power annually to the power deficit NEWNE grid.

Contribution of project activity to sustainable development:

Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met.
This results in excessive demands for electricity and places immense stress on the environment. Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of Renewable Energy (RE) sources.

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

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

1. Social well-being

The proposed project activity leads to alleviation of poverty by establishing direct and indirect employment for erecting the WEGs and for maintenance during operation of the project activity. The infrastructure in and around the project area will also improve due to project activity. This includes development of road network and improvement of the quality of electricity in terms of its availability and frequency as the generated electricity is fed into a deficit grid.

2. Economic well-being

The project activity leads to an investment of about INR 218.0 million to a developing region which otherwise would not have happened in the absence of the project activity. The generated electricity is fed into the NEWNE Regional Grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers and sub-urban habitants) which will provide new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development. The project activity also leads to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

3. Environmental well-being

The project utilizes wind energy for generating electricity which otherwise would have been generated through alternate fuels (most likely - fossil fuel) based power plants, thereby contributing to the reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions. As wind power projects produce no end products in the form of solid waste (ash etc.), they address the problem of solid waste disposal encountered by most other sources of power. Being a renewable source, using wind energy to generate electricity contributes to resource conservation. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

4. Technological well-being

The project activity leads to the promotion of WEGs into the region, demonstrating the success of wind turbines, which feed the generated power into the nearest sub-station, thus increasing energy availability and improving quality of power under the service area of the substation. Hence, the project leads to technological well-being.

A.3 Project participants:

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).	• Private entity - M/s Jsons Foundry Pvt. Ltd.	No.
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party (ies) involved is required.		

Please refer Annex I for contact detail

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

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

A.4.1.1 Host Party (ies):

India.

A.4.1.2 Region/State/Province etc.:

Sub Bundle I : Rajasthan
Sub Bundle II: Maharashtra

A.4.1.3 City/Town/Community etc:

	Sub Bundle I	**Sub Bundle II**
Village	Jodha-Bhopa	Chavaneshwar
Taluka	Jaisalmer	Koregaon
Dist.	Jaisalmer	Satara

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

	Sub Bundle I		**Sub Bundle II**		
PP	**WPPL**	**JFPL**	**JFPL**	**JFPL**	**WPPL**
Capacity	0.8 MW	0.8 MW	0.8 MW	0.8 MW	0.8 MW
Model	E 53	E 53	E 53	E 53	E 53
Machine No.	91/8132	91/8131	91/8299	91/8320	91/8301
Village	Jodha-Bhopa	Jodha-Bhopa	Chavaneshwar	Chavaneshwar	Chavaneshwar
Taluka	Jaisalmer	Jaisalmer	Koregaon	Koregaon	Koregaon
District	Jaisalmer	Jaisalmer	Satara	Satara	Satara
State	Rajasthan	Rajasthan	Maharashtra	Maharashtra	Maharashtra
Country	India				
Commissioning Date	29/09/2009	29/09/2009	31/03/2010	31/03/2010	31/03/2010
Latitude	17°,56',15.0"N	17°,56',18.2"N	17°,56',21.7" N	26°,46',39.3" N	26°,46',37.0" N
Longitude	74°,00',14.3"E	74°,00',10.9" E	74°.00'.07.8" E	71°,01',31.0"E	71°,01',37.4" E

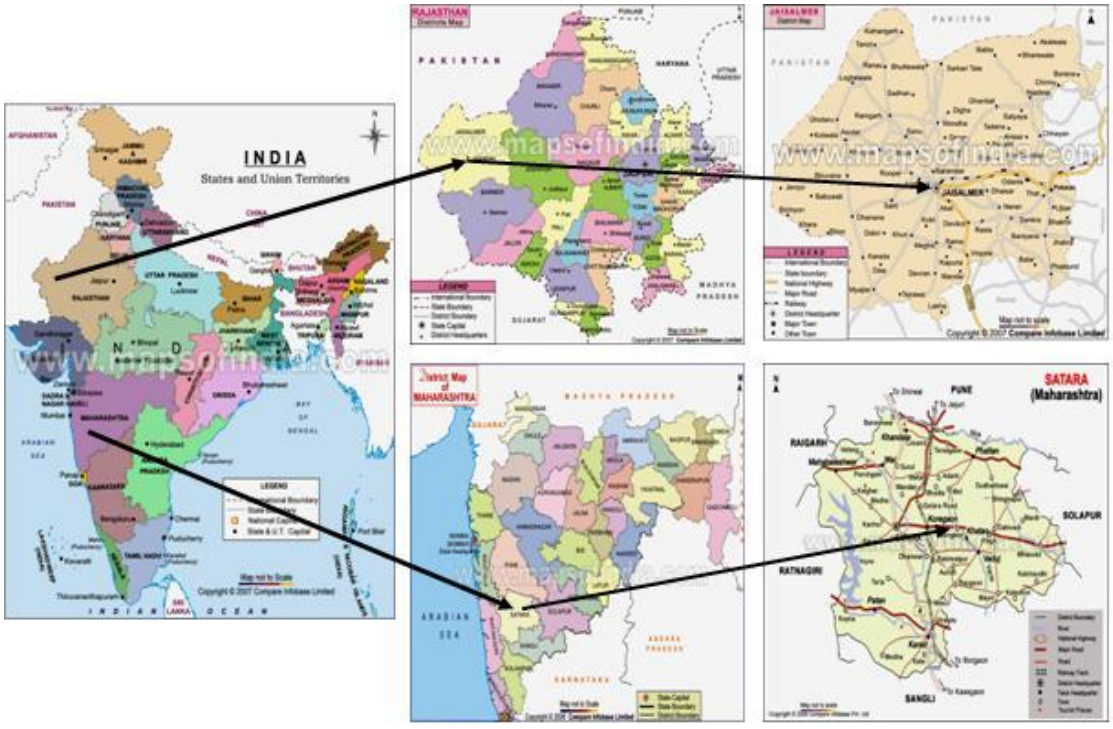


Figure 01: Location Map

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

Type and category:

The project is a small scale CDM project activity. According to the Appendix B[2] of the simplified modalities and procedures (M & P) for small-scale CDM project activities, the project activity falls under the following type and category.

Sub Bundle I

Type : **I –** Renewable Energy Projects
Category[3] : **I.D –** Grid connected renewable electricity generation (Version 16)

Sub Bundle II

Type : Type I – Renewable Energy Projects
Category[4] : I.F. – Renewable electricity generation for captive use and mini-grid (Version- 01, EB- 54)
Reference[5] : Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories

Technology:

[2] http://cdm.unfccc.int/Projects/pac/ssclistmeth.pdf
[3] https://cdm.unfccc.int/UserManagement/FileStorage/TENOK8BM5U3AJIHQZ69YS7CPVDXG41
[4] http://cdm.unfccc.int/UserManagement/FileStorage/CDM_AMSY4C1RWEWUPR4O6WQE6W16789D4HMIS
[5] http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid06.pdf

In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind has considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when it passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby produce electricity.

Figure 02, Major Mechanical Parts of a Wind Turbine

The technology is a clean technology since there are no GHG emissions associated with the electricity generation. The project installs 5 nos. (E-53) ENERCON make WEGs of 0.8 MW capacities each. Salient features of E-53 WEG are as follows.

These gearless wind turbines produce electricity using permanent magnet machines. Traditional wind technology requires moving gears to transmit the power of the slow motion blades to the quickly spinning generator. Permanent magnet machines, on the other hand, allows the motion of the blade to induce a voltage field that directly produces an electrical current.

The large number of blades and the lack of resistance from gears allow the turbine to operate in nearly calm conditions. It can also produce power in those strong breezes that traditional wind technology cannot handle. This is because the turbine does not need shut down to protect gears from grinding damage caused by high wind speeds.

Table-1: Salient Features of 0.8 MW (E-53) WEG

Sr. No.	Particulars	Specification
1.	Turbine Model	Enercon (E-53)
2.	Rated power	800 KW
3.	Rotor diameter	53 m
4.	Hub height	57 m
5.	Turbine Power	Direct driven, upwind, horizontal axis wind turbine with variable rotor speed.
6.	Power Regulation	Independent pitch system for each blades
7.	Design life time	20 Years
8.	Cut-in wind speed	2.5 m/s
9.	Rated wind speed	12m/s
10.	Cut-out wind speed	28-34 m/s

Sr. No.	Particulars	Specification
11.	Extreme wind speed	59.5 m/s
12.	Rated rotational speed	32 rpm
13.	Operating range rot speed	12-29 rpm
14.	Orientation	Upwind
15.	No. of Blades	3
16.	Blade Material	Glass Fibre Epoxy reinforced
17.	Gear box	Gearless
18.	Generator	Synchronous generator
19.	Breaking	Aerodynamic
20.	Output Voltage	400 V
21.	Yaw system	Active yawing with 4 electric yaw drives with brake motor
22.	Tower	56 meter Steel Tubular

This wind project will help to decrease the dependence on fossil fuels for power generation and thus lower air pollution due to SOx/ NOx emissions. The project has also lead to infrastructural development in the areas around the WEGs.

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

The Crediting Period of a CDM project is the period for which the CDM Project can generate Certified Emission Reductions (CERs.)

Years	Estimation of annual emission reductions in tonnes of CO_2e
2010-11	7,292
2011-12	7,292
2012-13	7,292
2013-14	7,292
2014-15	7,292
2015-16	7,292
2016-17	7,292
2017-18	7,292
2018-19	7,292
2019-20	7,292
Total estimated reductions (tones of CO_2e)	72,920
Total number of crediting years	**10**
Annual average of the estimated reductions over the crediting period (tones of CO_2e)	7,292

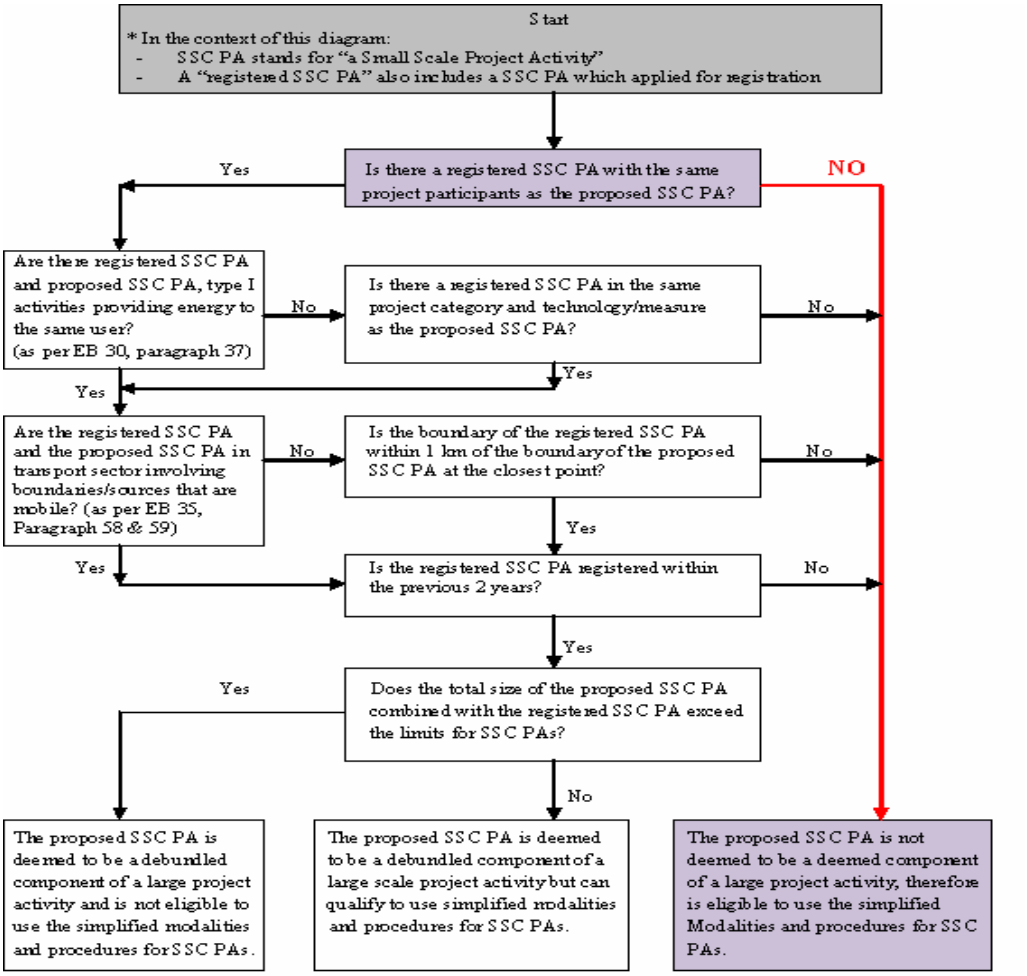
A.4.4 Public funding of the small-scale project activity:

The project has not received any Official Development Assistance (ODA) from Annex I countries. The project is a unilateral project.

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

According to paragraph 2 of Appendix C to the Simplified Modalities and Procedures for Small-Scale CDM project activities (FCCC/CP/2002/7/Add.3), a small-scale project is considered a de-bundled component of a large project activity if there is a registered small-scale activity or an application to register another small-scale activity:

- *With the same project participants*
- *In the same project category and technology*
- *Registered within the previous two years; and*
- *Whose project boundary is within 1 km of the project boundary of the proposed small scale activity at the closest point*



WPPL has two projects which are now under validation stage with DOE but the project boundary is not within 1 km radius.

Therefore, the proposed project is not a de-bundled component of a larger CDM 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:

Sub Bundle I

Title of Methodology : Grid connected renewable electricity generation (Version 16)
Reference[6] : AMS- I. D.

Sub Bundle II

Title of Methodology : Renewable electricity generation for captive use and mini-grid (Version- 01, EB- 54)
Reference[7] : AMS- I. F.

Tools referred along with the above methodology to design Project baseline & additionality are :

- Tool to calculate the emission factor for an electricity system (Version- 02, EB- 50)[8].
- Non-binding best practice examples to demonstrate additionality for SSC project activities[9]
- Additionality tool for small scale project activities (Attachment A to Appendix B, Version 06: 30/09/ 2005)[10].

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

Sub Bundle I

Approved small-scale baseline methodology, *AMS- I.D. (Version- 16)*, is applicable for this project activity. As per section '*Technology/measure*' of the approved small-scale baseline methodology:

Sr No	Category	Justification
1	*This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to a national or a regional grid. Project activities that displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit shall apply AMS I.F.*	The project activity is renewable electricity generation from wind Project activity which will supply electricity to the Integrated NEWNE grid.
2	*This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition ;(c) involve a retrofit of (an) existing*	Not applicable

[6] https://cdm.unfccc.int/UserManagement/FileStorage/TENOK8BM5U3AJIHQZ69YS7CPVDXG41
[7] http://cdm.unfccc.int/UserManagement/FileStorage/CDM_AMSY4C1RWEWUPR4O6WQE6W16789D4HMIS
[8] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf
[9] http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid15_v01.pdf
[10] http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid05.pdf

Sr No	Category	Justification
	plant(s); or (d) involve a replacement of (an) existing plant(s)	
3	*Hydro power plant with reservoirs that satisfy at least one of the following conditions eligible to apply this methodology:* *The project activity is implemented in an existing reservoirs with no change in the volume of reservoir;* *The project activity is implemented in an existing reservoir is increased and the power density of the project activity, as per definitions given in the project emission section, is greater than 4W/m2* *The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4W/m2.*	This is not applicable to the project activity, as the project activity is not a hydro power plant.
4	*In the case of biomass power plants, no other biomass types than renewable biomass are to be used in the project plant.*	Not applicable
5	*If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.*	Not applicable, As this project activity is 1.6 MW (0.8 MWX 2 No.) (< 15 MW) wind power (renewable energy) project and does not have any non-renewable component.
6	*Combined heat and power (co-generation) systems are not eligible under this category.*	Project activity is not a co-generation project.
7	*In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.*	Not applicable, this is a newly installed wind energy generation project and not capacity enhancement project.
8	*In the case of retrofit or replacement, to qualify as a small scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.*	Not applicable, No retrofits and/or *replacement* are involved in this project activity.

Sub Bundle II

Approved small-scale baseline methodology, *AMS- I.F. (Version- 01, EB- 54)*, is applicable for this project activity. As per section '*Technology/measure*' of the approved small-scale baseline methodology:

Sr No	Category	Justification

1.	*This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e., in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below:* *(a) A national or a regional grid (grid hereafter);* *(b) Fossil fuel fired captive power plant;*[11] *(c) A carbon intensive mini-grid.*	It is a captive and sale to grid wind power generation project activity which will displace electricity from regional grid (i.e. NEWNE grid) that is supplied by at least one fossil fuel fired generating unit. In absence of the project activity, the users i.e. captive consumption units would have been supplied electricity from NEWNE grid and the electricity may have generated from fuel fired generating unit.
2.	*For the purpose of this methodology, a mini-grid is defined as small-scale power system with a total capacity not exceeding 15 MW (i.e., the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid.*	The wind power project is connected to NENNE grid for Wheeling and suuply of electricity hence this criteria is not applicable.
3.	*Project activities or project activity components supplying electricity to a grid shall apply AMS-I.D. Project activities for standalone off-the-grid power systems supplying electricity to households/users included in the boundary are eligible under AMS-I.A.*	The project activity will be displacing electricity from grid mix and used it for captive purpose by wheeling through regional grid. Hence this criteria is not applicable.
4.	*Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:* • *The project activity is implemented in an existing reservoir with no change in the volume of reservoir;* • *The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m2;* *The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m2.*	The project is wind power project hence this criteria is not applicable.
5.	*For biomass power plants, no other biomass*	The project is wind power

[11] Where the users of the captive electricity are also connected to the grid in the project site.

	other than renewable biomass[12] are to be used in the project plant	project, hence this criteria is not applicable.
6.	*This methodology is applicable for project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition,[13] (c) involve a retrofit[14] of (an) existing plant(s); or (d) involve a replacement[15] of (an) existing plant(s)*	The project activity is a Greenfield plant. Thus, the project is applicable under above option *(a)* of the methodology.
7.	*In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct16 from the existing units.*	It is a Greenfield project activity. Hence, the criteria is not applicable.
8.	*In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.*	It is a Greenfield project activity. Hence, the criterion is not applicable.
9.	*If the unit added has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel17, the capacity of the entire unit shall not exceed the limit of 15 MW.*	The project is a Greenfield plant having only renewable component with a capacity of 4 MW (0.8 MW x 5 Nos.) which is less than the eligibility limit of 15 MW for a small-scale CDM project activity.
10.	*Combined heat and power (co-generation)*	The project activity has only

[12] Refer to Annex 18, EB 23 for the definition of renewable biomass.

[13] A capacity addition is an increase in the installed power generation capacity of an existing power plant through: (i) the installation of a new power plant beside the existing power plant/units, or (ii) the installation of new power units, additional to the existing power plant/units. The existing power plant/units continue to operate after the implementation of the project activity.

[14] Retrofit (or Rehabilitation or Refurbishment). A retrofit is an investment to repair or modify an existing power plant/unit, with the purpose to increase the efficiency, performance or power generation capacity of the plant, without adding new power plants or units, or to resume the operation of closed (mothballed) power plants. A retrofit restores the installed power generation capacity to or above its original level. Retrofits shall only include measures that involve capital investments and not regular maintenance or housekeeping measures.

[15] Replacement. Investment in a new power plant or unit that replaces one or several existing unit(s) at the existing power plant. The new power plant or unit has the same or a higher power generation capacity than the plant or unit that was replaced.

[16] Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".

[17] Co-fired system uses both fossil and renewable fuels.

	systems are not eligible under this category.	power (electricity) system, hence this criteria is not applicable
11.	*In case electricity produced by the project activity is delivered to another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the electricity will have to be entered into specifying that only the facility generating the electricity can claim emission reductions from the electricity displaced.*	The electricity produced by wind power project is sale to grid and wheeled for captive use at PPs own industrial unit. Hence no separate agreement was made as both parties (supplier & consumer) are same. Hence this criterion is not applicable.

Thus the project activity is complying with requisite criterion for AMS- I. F. (Version- 01, EB- 54).

B.3 Description of the project boundary:

As per paragraph 12 of the chosen project category AMS- I. F. (Version- 01, EB- 54) and paragraph 9 of applicable methodology AMS I.D (Version 16),, '*The physical, geographical site of the renewable generation source delineates the project boundary.*'

The project activity and captive consumption unit both are located in the Maharashtra state which is part of NEWNE grid of India. The project boundary includes wind turbine generators (electricity generating unit for captive use purpose) and its evacuation transmission infrastructure connected to the MSEDCL substation and fed to NEWNE grid. The project activity in Rajasthan is a sale to grid activity and it includes wind turbine generator, its evacuation transmission infrastructure connected to the RVPNL substation and fed to NEWNE grid. The schematic diagram of project boundary is as under:

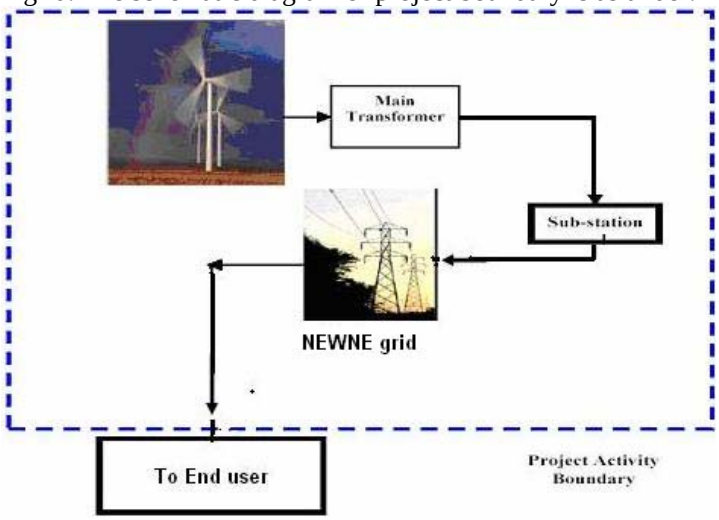


Figure 03, Project Boundary

B.4 Description of baseline and its development:

Description of Baseline Scenario:

As per Para 10 of methodology AMS I.D. (Version16, EB 54) if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid-connected power plants and by the addition of new generation sources.

For the present project activity as per para 11 of methodology AMS I.D. baseline emissions are the product of electrical energy $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

The wind power project produces electricity which is otherwise being generated by power plants in the NEWNE Grid mix which leads to the GHG emissions. The wind power produced being GHG neutral will not only displaces electricity from power plants but will reduce the associated emissions with power generation in the NEWNE regional grid mix of India.

Baseline Estimation:

Baseline methodology for project category *I. F.* has been detailed in paragraphs 13 - 17 of the approved small scale methodology AMS- I. F. (Version- 01, EB- 54). Paragraph 14 of the approved methodology applies to this project activity. As per paragraph 10-

Baseline emissions for other systems are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.

$$BE_y = EG_{BL,y} * EF_{CO_2,y}$$

Where:

BE_y = *Baseline Emissions in year y; t* CO_2
$EG_{BL,y}$ = *Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y (MWh)*
$EF_{CO2,y}$ = *Emission Factor (*tCO_2*/MWh)*

The project activity will be displacing grid electricity with renewable power. Hence, as given in paragraph 14 of AMS I. F, the option "*Emission factor of a grid shall be calculated as per the procedures provided in AMS-I.D"* shall be applicable for the project activity.

As per AMS I.D. (Version- 16, EB- 54) paragraph 12,

The Emission Factor can be calculated in a transparent and conservative manner as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system'.

OR

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix.

The emission factor has been estimated using option *(a)* above.

Hence,
$BE_y = EG_{BL,y}$ x $EF_{grid, CM, y}$

Please refer following section 6.1for detail calculation approach.
The key parameters and data sources are furnished below:

Key Parameter	**Value**	**Data Source**	**Website**
$EF_{grid,CM,y}$ (Ex-ante and will not change throughout the crediting period)	Baseline emission factor for the NEWNE 0.923 tCO_2/ MWh.	CEA published baseline emission factor for NEWNE grid (CM).	http://www.cea.nic.in/planning/c%20and%20e/government%20of%20india%20website.htm
EGy	Quantity of net electricity supplied by project activity to the grid	From Plant and State Electricity Board Records.	------
$EG_{BL,y}$	Quantity of net electricity displaced in year y	Monthly share of electricity certificate and credit note will be used for this variable.	

The emission factor, calculated based on the data published by CEA[18] for the latest year.

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 is not a baseline scenario & is additional, which is one of the imperative pre-requisites of the CDM registration process. The additionality of this proposed wind power project is in accordance with Attachment A to Appendix B.

Attachment A to Appendix B

As per attachment A to Appendix B 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:
(b) Technological barrier:
(c) Barrier due to prevailing practice:
(d) Other barriers:

[18] http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

Project participant have explained the investment barrier for this project activity as follows

Investment Barrier:

The investment analysis for this project activity is done as per the Methodological Tool – *"Tool for the demonstration and assessment of additionality", (Version- 05.2, Annex 10, EB- 39).*

As per this tool, it is to be determined that the project activity is not:

(a) The most economically or financially attractive; or
(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

Applying sub-steps:

Determine appropriate analysis method

As per Sub-step 2a, Paragraph (1), as the project activity is getting financial benefits other than CDM benefits hence, Option- I is not applicable under this situation. The Option II or III was applicable for this project activity. As per para 16, if the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate. Hence project promoter has considered Benchmark analysis to prove the additionality of the project.

Apply benchmark analysis

Additionality Tool (Version 05.2) requires the PP to identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g. levelized cost of electricity production in $/kWh or levelized cost of delivered heat in $/GJ) most suitable for the project type and decision-making context. As the project is funded from both debt and equity, project developer has chosen Project IRR to demonstrate the additionality of the project. Additionality Tool (Ver. 05.2) permits the use of Project IRR, for demonstrating the additionality using benchmark analysis.

The benchmark value has been determined according to the "*Tool for demonstration and assessment of additionality*" *(Version 5.2, Clause- 6(b), Sub-step- 2b, Option- III),* which states that – *Government bond rates, increased by a suitable risk premium to reflect private investment and/or the project type, as substantiated by an independent (financial) expert or documented by official publicly available financial data.*

Annex 58 of EB 51 states that where the project IRR is used to demonstrate the additionality of the project, WACC or the commercial lending rates are suitable benchmarks. The PP has therefore chosen the commercial lending rate – Prime Lending Rate (PLR) – as the benchmark. The investment decision was taken by the PP's in May, 2009. At that point of time the PLR was ranging from 11% to 12.25%[19]. The mid rate of 11.63% has been selected as the benchmark.

[19] http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/4Tab290509.pdf

This benchmark is in conformity with Annex 58 of EB 51, transparent and available publicly for verification by the DOE.

Calculation and comparison of financial indicators

Sub Bundle I
The project IRR and the benchmark of the sub-bundle are given below.

Sr. No.	Project proponent	Internal Rate of Return.	Benchmark
1	WPPL-Rajasthan	5.93%	11.63%
2	JFPL-Rajasthan	5.93%	11.63%

Sub Bundle II
The project IRR and the benchmark of the sub-bundle are given below.

Sr. No.	Project proponent	Internal Rate of Return.	Benchmark
1	WPPL-Maharashtra	5.85%	11.63%
2	JFPL-Maharashtra	5.85%	11.63%

The project IRR value of all the project activities without CDM benefits was found lower than the benchmark rate.

The internal rate of return of all the above project activities is less than the benchmark value Thus, we can conclude that the proposed project activity cannot be considered as financially attractive.

Sensitivity analysis
The Guidance on the Assessment of Investment Analysis, states that only variables, including the initial investment cost, that constitute more than 20 % of either total project costs or total project revenues should be subjected to reasonable variation.

The different parameters that affect the viability of a wind power project as per above clause are mentioned below –

Parameters	Comments
Electricity Generation/PLF	This is the most important and critical parameter for any power project & hence viability of the project will be affected by any fluctuation in this parameter. Sensitivity analysis has therefore been carried out for it.
Operation and Maintenance	Sensitivity has been carried out for this parameter
Project Cost	Sensitivity analysis has also been carried for this parameter, the cost consider for investment analysis is taken from the proposal forwarded by the WTG manufacturer, hence sensitivity analysis is carried out.

Results of Sensitivity Analysis

- **Sub Bundle I**

- Sensitivity based on Annual Generation.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Rajasthan	4.15%	5.05%	5.93%	6.76%	7.53%
JFPL-Rajasthan	4.15%	5.05%	5.93%	6.76%	7.53%

- Sensitivity based on O&M cost.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Rajasthan	6.22%	6.07%	5.93%	5.79%	5.62%
JFPL-Rajasthan	6.22%	6.07%	5.93%	5.79%	5.62%

- Sensitivity based on Project/cost.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Rajasthan	7.72%	6.81%	5.93%	5.09%	4.32%
JFPL-Rajasthan	7.72%	6.81%	5.93%	5.09%	4.32%

- Sensitivity based on Tariff.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Rajasthan	4.22%	5.08%	5.93%	6.73%	7.48%
JFPL-Rajasthan	4.22%	5.08%	5.93%	6.73%	7.48%

➢ **Sub Bundle II**

- Sensitivity based on Annual Generation.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Maharashtra	3.91%	4.92%	5.85%	6.73%	7.55%
JFPL-Maharashtra	3.91%	4.92%	5.85%	6.73%	7.55%

- Sensitivity based on O&M cost.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Maharashtra	6.14%	6.01%	5.85%	5.69%	5.53%
JFPL-Maharashtra	6.14%	6.01%	5.85%	5.69%	5.53%

- Sensitivity based on Project/cost.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Maharashtra	7.55%	6.68%	5.85%	5.05%	4.25%
JFPL-Maharashtra	7.55%	6.68%	5.85%	5.05%	4.25%

- Sensitivity based on Tariff.

Name of Company	-10%	-5%	0	5%	10%
WPPL-Maharashtra	3.91%	4.92%	5.85%	6.73%	7.55%
JFPL-Maharashtra	3.91%	4.92%	5.85%	6.73%	7.55%

It can be seen from the above tables that even a 10% increase in generation, 10% reduction in project cost, 10% reduction in O & M Expenses/ cost and increase in tariff by 10% does not result in the IRR crossing the benchmark settled by the promoter's. The project activity is clearly unattractive in absence of CDM revenues. The promoter's were aware of this fact and considered this investment only in light of CDM revenues being available for this project. Inclusion of CDM revenues in project inflow will help to mitigate the financial risk associated with the project up to some extent.

The above analysis indicates that the project activity is financially not an attractive investment option and it is sensitive to minor variations in the critical assumptions. The CDM revenue is likely to obtain through sale of CERs is critical to sustain the operations of the project activity over its intended lifetime.

Hence the project is additional.

Implementation timeline of CDM project activity

Sub Bundle I

Sr. No.	Activity	Date
1.	Enercon proposal for WTG	08/05/2009
2.	Board Resolution	11/05/2009
3.	Purchase Order release to Enercon	13/05/2009
4.	Commissioning of WTGs	29/09/2009
5.	Stakeholder consultation meeting	15/12/2009

Sub Bundle II

Sr. No.	Activity	Date
1.	Enercon proposal for WTG	8/05/2009
2.	Board Resolution	11/05/2009
3.	Purchase Order release to Enercon	27/05/2009
4.	Commissioning of WTGs	31/03/2010
5.	Stakeholder consultation meeting	05/05/2010

Project activity

Sr. No.	Activity	Date
1.	JFPL appointed MITCON as a CDM consultant	12/06/2009
2.	Intimation to UNFCCC for prior CDM consideration	03/07/2009
3.	Submission of PIN and PDD to MoEF (Ministry of Environment and Forest) for Host Country Approval (HCA)	21/10/2009
4.	Meeting at MoEF for HCA	23/11/2009
5.	Quotation of Validator	20/01/2010

JFPL have appointed MITCON as consultant on 12/06/2009.

B.6 Emission reductions:

B.6.1 Explanation of methodological choices:

In continuation with the above section B. 4, the ex-ante CO_2 emission factor i.e. combined margin emission factor is calculated as per the version 02 of *"Tool to calculate the Emission Factor for an electricity system"*as follows:

Step 1. Identify the relevant electricity system

In sub bundle I the captive consumption unit both are located in the Maharashtra state of India. In sub bundle II power generated is sale to grid.

The relevant electricity system for the project activity is identified as follows;

The electricity of the project is physically connected through transmission & distribution lines of the Rajasthan and Maharashtra grid which comes under geographic scope of NEWNE grid of Indian power sector[20].

The Build margin emission factor is determining by considering the project electricity system (i.e. NENW regional grid mix).

The Operating margin emission factor (Simple OM) is calculated as the generation weighted average of CO_2 emissions per unit net electricity generation (t CO2/MWh) of all generating power plants serving the system, not including low – cost/ must run power plant/units. (please refer below step 3 for detail calculation).

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:
Option I: Only grid power plants are included in the calculation.
Option II: Both grid power plants and off-grid power plants are included in the calculation.

PP has chosen the option I to calculate the operating margin and build margin emission factor.

Step 3. Select a method to determine operating margin (OM)

The calculation of the operating margin emission factor ($EF_{grid, OM, y}$) is based on one of the following methods:
(a) Simple operating margin;
(b) Simple adjusted operating margin;
(c) Dispatch data analysis operating margin;
(d) Average operating margin.

The simple OM method (option a) can only be used if low- cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.
The low cost/ must run resources constitute less than 50% of the total grid generation in the average of the five most recent years. (refer table below)

[20] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver5.pdf Page no.04 Table 2

Table 7: Share of Must-Run (% of Net Generation) [21]

Regional Grid	2005-06*	2006-07	2007-08	2008-09	Average of last years.
NEW NE	18.0%	18.5%	19.0%	17.30%	**18.20 %**
South	27.0%	28.3%	27.1%	22.80%	**26.30 %**
India	20.1%	20.9%	21%	18.6%	**20.15%**

*As per the CEA'S latest baseline CO_2 baseline database for Indian Power sector User Guide version 05, page no. 04 Table 2 *Geographical scope of the two electricity grids.*

The above table clearly shows that the percentage of total grid generation by low-cost/must-run plants (on the basis of average of five most recent years) for the NEWNE grid is only 18.20 % which is much lesser than 50% of the total generation. Thus, Simple OM method can be used for calculating the emission factor.

Step 4. Calculate the operating margin emission factor according to the selected

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM It may be calculated:

Option A: Based on the net electricity generation and a CO_2 emission factor, of each power
or
Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

Option B can only be used if:

(a) The necessary data for Option A is not available; and
(b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
(c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

As the all three conditions for using above option B are applicable for the project, PP has chosen the option B for calculating the simple OM. The Central Electricity Authority (CEA) has calculated and published the simple operating margin emission factor; latest version is used for the simple operating margin emission factor.

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate

[21] http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm Baseline CO_2 emission database version 05

the emission factor for year y is usually only available later than six months after the end of year y,

Out of the above two options, the Ex-ante vintage is opted and the Simple OM selected will remain same throughout the entire crediting period of the project activity.

Hence the published simple operating margin value for the full generation-weighted average for the most recent 3 years i.e. 2006-07, 2007-08, 2008-09 for which data are available at the time of PDD submission is considered for calculating the Ex-ante simple operation margin emission factor.

Table 8: $EF_{grid, OM, y}$ Calculation approach

The $EF_{grid, OM, y}$ for NEWNE region	t CO_2/MWh
For the year 2006-2007	1.0085
For the year 2007-2008	0.9999
For the year 2008-2009	1.0066
Average $EF_{grid, OM, y}$	**1.0049**

Step 5. Identify the group of power units to be included in the build margin

For the vintage data PP has chosen the option 1 i.e. for the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

The value of the data has been taken from the data published by CEA as referred in earlier step. The CEA CO_2 emission database is based on Tool approved and published by CDM Executive Board "Tool to calculate the emission factor for an electricity system" version 2.0, EB 50. The details of the key assumptions considered to calculate the figure can be found in the CEA User Guide[22].

Step 6. Calculate the build margin emission factor

The build margin emission factor of all the power units in the respective regional grid during the most recent year for which power generation data is available was calculated in line with the requirement under "Tool to calculate the emission factor for an electricity system" version 2, EB 50 & by published by the CEA CO_2 Baseline Database, the BM value for the year 2008-09 was considered for calculating the emission factor for an electricity system:

$EF_{grid, BM, y}$ = 0.6752 tCO_2e/MWh

Step 7. Calculate the combined margin emissions factor

[22] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf Page no.03 Para no. 2 & 3

$EF_{grid, CM, y}$ is determined as follows:

The average of latest last three year data for Operating Margin emission factor ($EF_{grid, OM, y}$) and the latest last year data for Build Margin emission factor ($EF_{grid, BM, y}$):

$$\mathbf{EF_{grid, CM, y} = EF_{grid, OM, y} * w_{OM} + EF_{grid, BM, y} * w_{BM}}$$

For wind and solar projects, the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature).

$$\mathbf{EF_{grid, CM, y} = EF_{grid, OM, y} \times 0.75 + EF_{grid, BM, y} \times 0.25}$$

$$= 1.0049 \times 0.75 + 0.6752 \times 0.25$$

$$\mathbf{EF_{grid, CM, y}} = 0.9225 \text{ t } CO_2/MWh$$

Thus, the CM emissions factor ($EF_{grid, CM, y}$) for the project has been calculated to be:

$$\mathbf{EF_{grid, CM, y} = 0.9225 \text{ t } CO_2/MWh}$$

Baseline Emission Factor: 0.9225 t CO_2/MWh

Project Emissions (PE_y):

As per the paragraph no. 19 of approved methodology AMS I. D (version 16), and paragraph 18 of approved methodology AMS- I.F., (Version 01), *For most renewable energy project activities, $PE_y = 0$.*

Leakage Emissions (LE_y):

According to paragraph 20, of approved methodology AMS I.D, (version 16), and paragraph 19 of the approved methodology AMS- I.F. (Version 01), *If the energy generating equipment is transferred from another activity, leakage is to be considered*. The leakage emissions may be considered as zero tCO_2 as no such equipment shall be transferred from another project activity.

Emission Reductions (ER_y):

The emission reductions (ER_y) are calculated as per equation13 under paragraph 19 of approved methodology AMS I.D, (version 16), and paragraph 20 of the approved methodology AMS- I.F. (Version 01).

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = Emission reductions in year *y* (t CO_2e/y)

BE_y = Baseline Emissions in year *y* (t CO_2/y)

PE_y = Project emissions in year *y* (t CO_2/y)

LE_y = Leakage emissions in year *y* (t CO_2/y)

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

Data / Parameter:	**$EF_{grid, CM, y}$**
Data unit:	t CO_2 / MWh
Description:	Ex-ante Combined Margin Carbon Emission Factor of the NEWNE Regional Grid
Source of data used:	Baseline CO_2 Emission Database, Version 5.0
Value applied:	0.9225
Justification of the choice of data or description of measurement methods and procedures actually applied :	The inputs values of OM and BM have been calculated by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable. http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm The $EF_{grid, CM, y}$ calculation is based on the guidelines in "Tool to calculate the emission factor for an electricity system" version 2.0, EB 50
Any comment:	The values based on the data for the year 2008-09.

Data / Parameter:	**$EF_{grid, OM, y}$**
Data unit:	t CO_2/MWh
Description:	CO_2 Operating Margin (including import) Emission Factor of the NEWNE Regional Grid
Source of data used:	Baseline CO_2 Emission Database, Version 5.0
Value applied:	1.0049
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values for OM has been calculated by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable. http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm The $EF_{grid\ OM, y}$ calculation is based on the guidelines in "Tool to calculate the emission factor for an electricity system" version 2.0, EB 50
Any comment:	The values are based on latest last three years average.

Data / Parameter:	**$EF_{grid, BM, y}$**
Data unit:	t CO_2/MWh
Description:	CO_2 Build Margin (including import) Emission Factor of the NEWNE Regional Grid
Source of data used:	Baseline CO_2 Emission Database, Version 5.0
Value applied:	0.6752
Justification of the choice of data or description of measurement methods and procedures actually applied :	The values for BM has been calculated by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable. http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm The $EF_{grid\ BM, y}$ calculation is based on the guidelines in

	"Tool to calculate the emission factor for an electricity system" version 2.0, EB 50.
Any comment:	The values are for the year 2008-09.

B.6.3 Ex-ante calculation of emission reductions:

As per above section B.6.1 above, the emission reductions (ER_y) are calculated as per equation 13 under paragraph 19 of approved methodology AMS I.D, (version 16), and paragraph 20 of the approved methodology AMS- I.F. (Version 01).

$$ER_y = BE_y - PE_y - LE_y$$

As per above section B.4,

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where

BE_y : Baseline Emissions in year y (t CO_2)
$EG_{BL,y}$: Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh).
$EF_{CO2,grid,y}$: CO2 emission factor of the grid in year y (t CO_2/MWh).

The grid emission factor for NEWNE grid) is 0.9225 t CO_2 / MWh.

Generation details of both the sub bundles-

State	Sub Bundle I	Sub Bundle II
No of turbines	2	3
Capacity, kW	1600	2400
Net annual generation from the project, MWh	3,100	4,800
Plant Load Factor (%)	22.12	22.83
Grid	NEWNE	NEWNE
Grid emission factor, tCO_2/ MWh	0.9225	0.9225
Baseline emission, tCO_2/ y	2,862	4,430

BE_y = 7,900 MWh / y X 0.9225 tCO_2 / MWh

BE_y = 7,292 tCO_2 e / y

BE_y = 7,292 tCO_2 e / y

Therefore total baseline emission = 7,292 tCO2/ y

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

Year	Estimation of project activity emission (tCO2e)	Estimation of baseline emissions (tCO2e)	Estimation of Leakage (t CO2e)	Estimation of overall emission reduction (tCO2e)
2010-11	0	7,292	0	7,292
2011-12	0	7,292	0	7,292

Year	Estimation of project activity emission (tCO2e)	Estimation of baseline emissions (tCO2e)	Estimation of Leakage (t CO2e)	Estimation of overall emission reduction (tCO2e)
2012-13	0	7,292	0	7,292
2013-14	0	7,292	0	7,292
2014-15	0	7,292	0	7,292
2015-16	0	7,292	0	7,292
2016-17	0	7,292	0	7,292
2017-18	0	7,292	0	7,292
2018-19	0	7,292	0	7,292
2019-20	0	7,292	0	7,292
Total (tonnes of CO_2e)	0	72,920	0	72,920

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

B.7.1 Data and Parameters Monitored

Sub Bundle I

Data / Parameter:	$EG_{,y}$
Data unit:	MWh/y
Description:	Quantity of net electricity supplied by project activity to the grid
Source of data to be used:	Monthly credit report/ Share of electricity generation by state electricity utility.
Value of data	3,100
Description of measurement methods and procedures to be applied:	This parameter will be calculated based on the measured parameters i.e. import and export of electricity by this project activity. Parameter will be monitored hourly and recorded monthly. Meter calibration frequency = annual Accuracy class = 0.2s, The details are given in section B.7.2.
QA/QC procedures to be applied:	The net electricity in kWh supplied to grid measured by main metering system at substation. The meter used will be calibrated annually by state electricity utility. The net electricity supplied can be randomly cross verified with the monthly invoice raised by PP towards state electricity company.
Any comment:	Data will be archived during the whole crediting period + 2 years.

Sub Bundle II

Data / Parameter:	$EG_{BL,y}$
Data unit:	MWh/y
Description:	Quantity of net electricity displaced in year y
Source of data to be used:	$EG_{BL,y}$ is the Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year *y*

	Monthly share of electricity certificate and credit note will be used for this variable. This data source has been selected because it incorporates both transmission loss (line loss) up to substation. The state utility officials, in the presence of representative/s of PP take the Joint Meter Reading of these meters on a monthly basis as per the Wheeling Agreement.
Value of data	4,800
Description of measurement methods and procedures to be applied:	Monitoring: Tri-vector meter will be used for monitoring Frequency & recording : Continuous monitoring, hourly measurement and monthly recording by state electricity utility in the form of electricity generation report. Archiving Policy: Paper & electronic Responsibility: Respective state electricity utility is responsible for the provides the net electricity generation report to each WEG owner whose WEG is connected through common metering system at state utility substation. Calibration Frequency: once in two years,
QA/QC procedures to be applied:	The net electricity displaced is the gross energy generation by the project activity power plant minus the auxiliary/station electricity consumption
Any comment:	Data will be archived during the whole crediting period + 2 years.

B.7.2 Description of the monitoring plan:

All the relevant data & reports for maintaining accuracy in future monitoring and reporting of GHGs emission reductions will be with the ENERCON on behalf of project participant, which follows Quality Management System (QMS) procedure as per ISO 9001 and is ISO certified organization. The ISO certificate is available for verification by DoE.

The project participant signed an operation and maintenance agreement with the supplier of the wind turbines i.e. ENERCON. The performance of the turbines, safety in operation and scheduled /breakdown maintenances is responsibility of ENERCON and are organized and monitored by them. Operation and Maintenance responsibility lies with ENERCON.

ISO 9001:2000 standard has been adopted by ENERCON, who is responsible for monitoring, calibration and O & M of the project. Training is an essential part of the ISO system. To comply with the ISO standard the training has to be provided to personnel according to their responsibility with in organization.

Apportioning Procedure:

Sub Bundle I

As per AMS- I.D. (Version- 16), the monitoring of the project activity is detailed in paragraph 22, table I.F.2. As per the table, parameters 1 & 5 are applicable for the project activity. They are as follows:

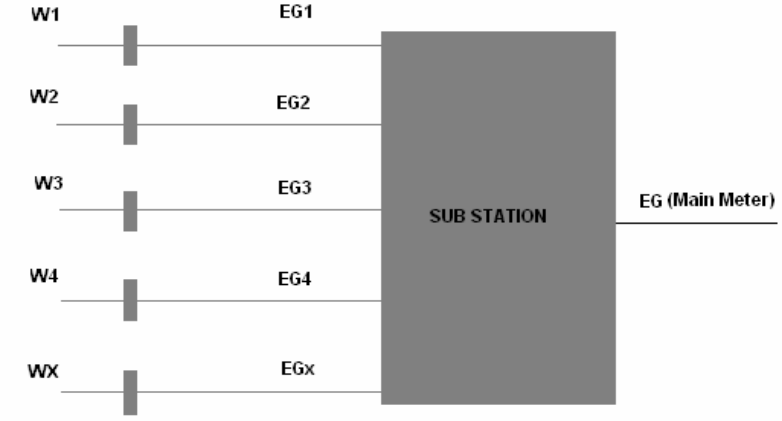
- **CO_2 emission factor for the grid electricity in year *y* ($EF_{CO2,y}$):**

  As given in section B.6.2, the CO_2 emission factor for NEWNE grid has been calculated from Ministry of Power, Central Electricity Authority Govt. of India, CO_2 Baseline Database (Version: 5 , November 2009). It has been determined *ex-ante*, hence will remain fixed and need not be monitored during the crediting period.

- **Quantity of net electricity displaced in year *y* (EG_y):**

  The monitoring of the "*Quantity of net electricity displaced*" is done as below:
  Description of net electricity generation for individual WEG calculation/proportioning procedure

  Each substation is connected to a number of wind turbines. The generation reading is collectively displayed by the substation meter. The net generation of each of the wind turbines is then calculated in the following manner:



  The generated electricity is measured through a two step procedure wherein the first metering is carried out at the controller of the machine with on-board meter. The monitoring of all these wind turbines is done from a common monitoring station as a part of central monitoring system (CMS). The electricity generated from this site is fed to the 33 KV/132 KV Bhu GSS, which is connected with 220 KV GSS Amarsagar Jaisalmer. The apportioning of the electricity at Amarsagar 132 KV GSS, Jaisalmer, Rajasthan is done as per the following method at the wind farm.

  Total numbers of wind turbines are connected to a substation through 33 KV different feeders at Bhu 132/33KV GSS and which is evacuated further to SEB GSS at Amarsagar 132KV GSS. The generation reading is collectively displayed by the Main Billing meter at132 KV Amarsagar, substation. Back up meters are also installed at all 33KV feeders as well as 132 KV Amarsagar GSS for energy auditing purpose.

  The net generation of each of the wind turbine is then calculated considering parameters reading of kWh export (Generation) and kWh import (Consumption).

  Credit subdivision report is prepared based on the import and export of the electricity at the Amarsagar substation. Calculations in credit subdivision report for this site are considered as follows.

1. Export multiplication factor is calculated based on the total export of EB main billing meter reading (net electricity supplied to the grid) divided by panel reading of entire wind farm (gross generation by all the WEGs at CMS) as

   Export Multiplication Factor = (Export of EB main billing meter reading / panel reading of entire wind farm)

2. Import multiplication factor is calculated based on the total import of EB main billing meter reading (electricity imported from grid) divided by panel reading of entire wind farm (gross generation by all the WEGs at CMS) as

   Import Multiplication Factor= (Import of EB meter reading / panel reading of entire wind farm)

   Based on the multiplication factor and customer panel generation reading export and import units are calculated as follows

3. Export units = Export Multiplication Factor X Customer Panel Generation

4. Import units = Import Multiplication Factor X Customer Panel Generation

Ultimately net export units (net electricity supplied to the grid) by the specific customer (project participant) is calculated as

5. Net export units (EGy) = Export Units – Import Units

The responsibility of annual calibration, periodical testing, sealing and maintenance of meters is with the respective state utilities. This is done in the presence of representatives of the promoter. The frequency of meter testing is annual or as decided by the state utility time to time. All meters are tested only at the Metering Point. Additionally, each wind turbine is equipped with an integrated electronic meter. The electricity generated is recorded by the O & M staff of the WTG supplier on 24 hour basis.

Sub Bundle II

As per AMS- I.F. (Version- 01, EB- 54), the monitoring of the project activity is detailed in paragraph 21, table I.F.2. As per the table, parameters 1 & 5 are applicable for the project activity. They are as follows:

- **Quantity of net electricity displaced in year *y* ($EG_{BL,y}$):**

The monitoring of the "*Quantity of net electricity displaced*" is done as below:

- The project activity has two independent monitoring/measurements of generated electricity from the wind turbine.
- The primary monitoring is done at the individual WTG. The WTG is equipped with an integrated electronic controller, which displays generated electricity on its screen. This controller is connected to the Central Monitoring Station (CMS) of technology supplier through SCADA. The generation data of individual machine can be monitored as a real-time parameter at CMS. Furthermore, the WTG controller is a micro-processor based intelligent controller which has been specially designed for control of wind turbines &

which is self calibrated. Woodward relay is having no display and needs special protocol to view energy readings as this relay is communicating digital signal through special communication protocol hence, it is not possible to calibrate. In case of malfunctioning of the controller, the WTG is programmed for automatic shut-down. The probability of error in controller panel meter is negligible.

- The control panel meter of each WTG is connected to the Central Monitoring Station (CMS) through a wireless Radio Frequency (RF) network (SCADA). The generation at controller end data of individual turbine can be monitored as a real-time entity at CMS. Enercon provides each PP individual log-in ID & password for their WEG to get online update about WEG performance.
- The secondary recording of the electricity delivered to the grid is carried out jointly at the sub-station metering system.
- The joint measurement is carried out once in a month in presence of both parties (the developer's representative, officials of MSEDCL) as per the Energy Wheeling Agreement.
- The meters shall be approved, tested & sealed by the state electricity utility. The meters are in the custody of state utility. The calibration of the meters will be carried out by respective state electricity utility at least once in two years.
- Other than periodic calibration of the meters, the reading of both meters will be matched every month. In case of failure of main meter during the monitoring, the metering of the electricity will be done as per the Energy Wheeling Agreement.
- Data will be archived for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later. The data will be archived in paper as well as in the electronic format.

Training of Monitoring personnel:

The WTG provider has a well-trained operation and maintenance setup with multiple teams working at their various wind farms countrywide. The O & M teams are trained on various aspects of wind technology at Enercon Training Academy, Daman through a systematic 20 weeks course by experts in wind technology.

Operation and maintenance of wind farms

1. Operation and maintenance service team
   - Round the clock 365 days a year – operations management
   - Preventive maintenance of installed base of WEGs across India
   - Breakdown maintenance of installed base of WEGs across india
   - Execution of major & minor design changes in WEGs

2. Special task service team provide various services to sites
   - Relocations
   - Blade replacement at site
   - Major breakdown

3. HT operation & maintenance service team
   - Substation
   - HT lines – internal external

4. Facility service team

- SCADA service
- E-repair (Electronic components such as PCB)

5. Other service team
   - Customer support services – generation reporting
   - Liasioning with State Electricity Boards & Nodal agencies

The organizational hierarchy of ENERCON for O& M management is as follows –

Designation	Responsibilities
Project Head	▪ Overall performance monitoring ▪ Project execution
Project Executer and Controller	▪ Operation ▪ Verification of data ▪ Site visit to check authenticity of data and take corrective action, wherever necessary ▪ Storage of data
Site Main Controller	▪ Operation, monitoring and verification of data ▪ Data recording ▪ Storage of data
Operation and Maintenance Contractor	▪ Operation and maintenance ▪ Data recording ▪ Storage of data

Operation and maintenance of wind farms

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Operation and Maintenance Contractor	▪ Operation and maintenance ▪ Data recording ▪ Storage of data

Routine Maintenance Services:

Routine maintenance labour work involves making available suitable manpower for operation and maintenance of the equipment and covers periodic preventive maintenance, cleaning and upkeep of the equipment including –

a) Tower Torquing
b) Blade Cleaning
c) Nacelle Torquing and Cleaning
d) Transformer Oil Filtration
e) Control Panel & LT Panel Maintenance
f) Site and Transformer Yard Maintenance

Security Services:

a) This service includes watch and ward and security of the wind farm and the equipment.

Management Services:

a) Data logging in for power generation, grid availability, machine availability.
b) Preparation and submission of monthly performance report in agreed format.
c) Taking monthly meter reading jointly with utility of power generated at Wind Farm and supplied to grid from the meter/s maintained by utility for the purpose and co-ordinate to obtain necessary power credit report/ certificate.

Technical Services:

a) Visual inspection of the WEGs and all parts thereof.
b) Technical assistance including checking of various technical, safety and operational parameters of the equipment, trouble shooting and relevant technical services.
c) Maintenance is done every quarter and annually and a checklist is maintained manually for the same.

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

Date of completion of Baseline and Monitoring methodology – 01/12/2009.

Name and other details of the responsible person are as follows –

Mr. V.P. Jagadale
Director
M/s Jsons Foundry Pvt. Ltd.
G-13, MIDC, Kupwada Block
Sangli – 416436

M/s Jsons Foundry Pvt. Ltd. is project participant; please refer Annex 1 of this document for contact details.

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:

13/05/2008 (based on purchase order issued to Enercon)

C.1.2 Expected operational lifetime of the project activity:

20 Years and 0 Months

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

C.2.1 Renewable crediting period

Not chosen.

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:

Opted.

C.2.2.1 Starting date:

01/11/2010 or the date of registration of project activity whichever is later

C.2.2.2 Length:

10 years and 0 months.

SECTION D. Environmental impacts

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

The project activity does not fall under the purview of Environmental Impact Assessment notification[23] of the Ministry of Environment and Forests (MoEF), Government of India (GOI).

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

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

Sub Bundle I

Project participant identified local communities, employee of Enercon and villagers, as the stakeholders having direct or indirect concern with this project. The meeting was conducted at Village- Jodha Bhopa, Taluka-Jaisalmer, Dist. – Jaisalmer, Rajasthan state. Accordingly, Project participant issued a public notice on 07/12/2009 in local news paper (Nafa Nuksan) to invite respective stakeholders requesting them to attend meeting or depute representatives at respective venues:

Meeting Details

Date	Venue	Time	Mode of communication
15/12/2009	Bhu Substation	12.00 pm	English & local language (Hindi)

The agenda of the meetings was fixed as follows:

- Welcome to stakeholders
- Description of the project
- Queries from the stakeholders and responses by Authority.
- Vote of thanks

Sub Bundle II

[23] http://envfor.nic.in/legis/eia/so1533.pdf

Project participant identified local communities, employee of Enercon and villagers, as the stakeholders having direct or indirect concern with this project. The meeting was conducted at Village- Chavaneshwar, Taluka-Koregaon, Dist. - Satara, Maharashtra state Accordingly, Project participant issued personal invitation letter on 20/04/2010 to invite respective stakeholders requesting them to attend meeting or depute representatives at respective venues:

Meeting Details

Date	Venue	Time	Mode of communication
05/05/2010	Satara	12.30 pm	English & local language (Marathi)

The agenda of the meetings was fixed as follows:

- Welcome to stakeholders
- Description of the project
- Queries from the stakeholders and responses by Authority.
- Vote of thanks

The stake holder's view was that, project participant in its own small way is contributing positively to local economy & development.

E.2 Summary of the comments received:

Stakeholders had no objections from installation of WEG instead they have appreciated wind power projects. The project helps them to generate additional revenue through lease to outsiders like contractors & their employees. They got the job opportunities for day -to - day maintenance and security of WEGs. They don't find any adverse impact on local environment due to wind turbines.

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

The stakeholders have given positive feedback and thus no measures are required to be taken.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	M/s Jsons Foundry Pvt. Ltd.
Street/P.O.Box:	G – 13, MIDC, Kupwada Block
Building:	--
City:	Sangli
State/Region:	Maharashtra
Postfix/ZIP:	416 436
Country:	India
Telephone:	+ 91-233-2644603 / 4
FAX:	+ 91- 233- 2644605
E-Mail:	--
URL:	--
Represented by:	
Title:	Director
Salutation:	Mr.
Last Name:	Jagadale
Middle Name:	P
First Name:	V
Department:	--
Mobile:	+ 91-9423566120
Direct FAX:	+ 91- 233- 2644605
Direct tel:	--
Personal E-Mail:	jagadale.vp@gmail.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

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

Annex 3

BASELINE INFORMATION

The baseline is explained under section B.6

Grid emission factor:

The grid emission factor is calculated by using database published by Central Electricity Authority, Government of India. The values of simple operation margin (OM) & build margin (BM) are directly referred from the following database.

Central Electricity Authority Database, version 05

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE	
VERSION	5.0
DATE	Nov-09
BASELINE METHODOLOGY	ACM0002 / Ver 10

EMISSION FACTORS

Simple Operating Margin (tCO2/MWh) (incl. Imports)			
	2006-07	2007-08	2008-09
NEWNE	1.01	1.00	1.01
South	1.00	0.99	0.97
India	1.01	1.01	1.01

Build Margin (tCO2/MWh) (not adjusted for Imports)			
	2006-07	2007-08	2008-09
NEWNE	0.63	0.60	0.68
South	0.70	0.71	0.82
India	0.65	0.63	0.71

Annex 4

MONITORING INFORMATION

The monitoring information is explain under section B.7

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