

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

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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

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SECTION A. General description of small-scale project activity**A.1 Title of the small-scale project activity:****Title:** Wind Power Project by M/s Chhotabhai Jethabhai Patel & Co. (CJP) at Sinnar, Maharashtra**Version:** 03**Date:** 06/02/2010**A.2 Description of the small-scale project activity:**

Chhotabhai Jethabhai Patel & Co. (CJP hereafter) is a partnership firm & is part of well known CEEJAY Group, based in Nadiad, Gujarat, India.

Description of the project activity:

The project activity is a grid connected wind power generation. The project activity is based in Adwadi (Sinnar), Maharashtra, India. The project activity is having a total capacity of 1.5 MW. It consists of one wind turbine of capacity 1.5 MW. The project activity is connected to the NEWNE Grid of India.

The wind technology is supplied by Suzlon Energy Limited. The class of the wind turbine is S-82 which is technologically safe in its operation. This is attributed to Suzlon's efforts in Research & Development. The S-82 WTGs are suitable for deployment in a different climates ranging from hot, dry deserts to humid coasts, to near-freezing plains.

Purpose of the project activity:

The main purpose of this wind project activity is to generate electricity by using a renewable technology like wind electric generators and to feed it into the NEWNE Grid of India. The project is environment friendly as it does not emit any harmful gases or chemicals into the atmosphere, unlike a fossil fuel fired power plant where the environment is always exposed with disposal risks of harmful green house gases not limited to carbon dioxide, which do not only affect the environment but also the living beings.

The project will contribute to the sustainable development of the region during its entire operational life. The project is estimated to generate 3285 MWh of electricity per year and concurrently achieving emission reductions of 2976 tonnes of CO₂ during same period. This will help in decreasing the impact of global warming.

Mitigation of the greenhouse gas emission:

The project activity is a grid connected wind power generation. The electricity is being generated by utilizing the kinetic energy of the wind. This electricity is displacing the electricity generated by the fossil fuel fired power plant in the grid region; ultimately avoiding emission of CO₂ in to the atmosphere.

View of the project participant on the contribution of the project activity:

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The project participant has not only taken initiative to fight climate change by investing in GHG free clean electricity generation but also helping in contributing towards sustainable development of the region.

The project activity, during its entire operational life, will promote sustainable development of the local area of Sinnar in following respect:

Sustainable development:

Social well being:

The electricity generated from this wind power project is fed in to the NEWNE Grid. This will help in reducing the electricity deficit in the grid. The project will act as a good example among the local investors and will inspire them to come forward with such environmental friendly projects to generate electricity. It will increase the job opportunity in the local Sinnar region. The local economy will get a new life. The infrastructure in and around the project area will also improve due to project activity. This includes development of road network and other amenities.

As the project activity is located in a underdeveloped area, it will lead to alleviation of poverty by generating additional local employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people.

Environmental well being:

The energy generated from a wind power project is one of the cleanest power technologies available around us. As this project does not emit any harmful pollutants in atmosphere during the project operation, it is a environmental friendly project. The use of renewable energy source (wind energy) also helps in conservation of natural resources (like coal), thereby contributing to energy security of the country. Overall the project activity will be resulting into an environmental well being.

Thus it will not lead to a negative impact on resource sustainability and resource degradation due to activity. The project is bio-diversity friendly and has no impact on human health.

Technological well being:

The electricity generation technology used in this project activity is provided by Suzlon Energy Limited, which is a well known for its superior technology & safe products. The technology utilized in this project activity is S-82 class. Successful implementation and operation of this project will give necessary impetus in implementation of similar technology in the region.

Economical well being:

The project activity will be resulting into direct & indirect employment generation in local area during its entire operation. The project activity will generate income in this part of Sinnar where income sources are limited.

New avenues will keep on generating due to this project activity so that the poor people can be benefited from this.

A.3 <u>Project participants:</u>

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Name of Party involved (*) (host indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host Party)	M/s Chhotabhai Jethabhai Patel & Co. (CJP)	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.		

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.:

Maharashtra

A.4.1.3 City/Town/Community etc.:

Adwadi, Sinnar

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

The project activity is located at Adwadi village (Location No. AD-24/389), Sinnar Taluka, Nashik District, Maharashtra, India. The nearest railway station is Nashik Road, located at a distance of 35 km (approx) from WTG site and the nearest airport is Nashik located at a distance of 45 km (approx) from WTG site. The geographical co-ordinates of the project location is 73° 55' 22.2" E (longitude) and 19° 43' 22.8"N (latitude).

Capacity	Location No.	Location	Gut No.	Latitude	Longitude	Date of Commissioning
1 × 1.5 MW	AD- 24	Adwadi	389	N19 43 22.8	E73 55 22.2	30/03/2009

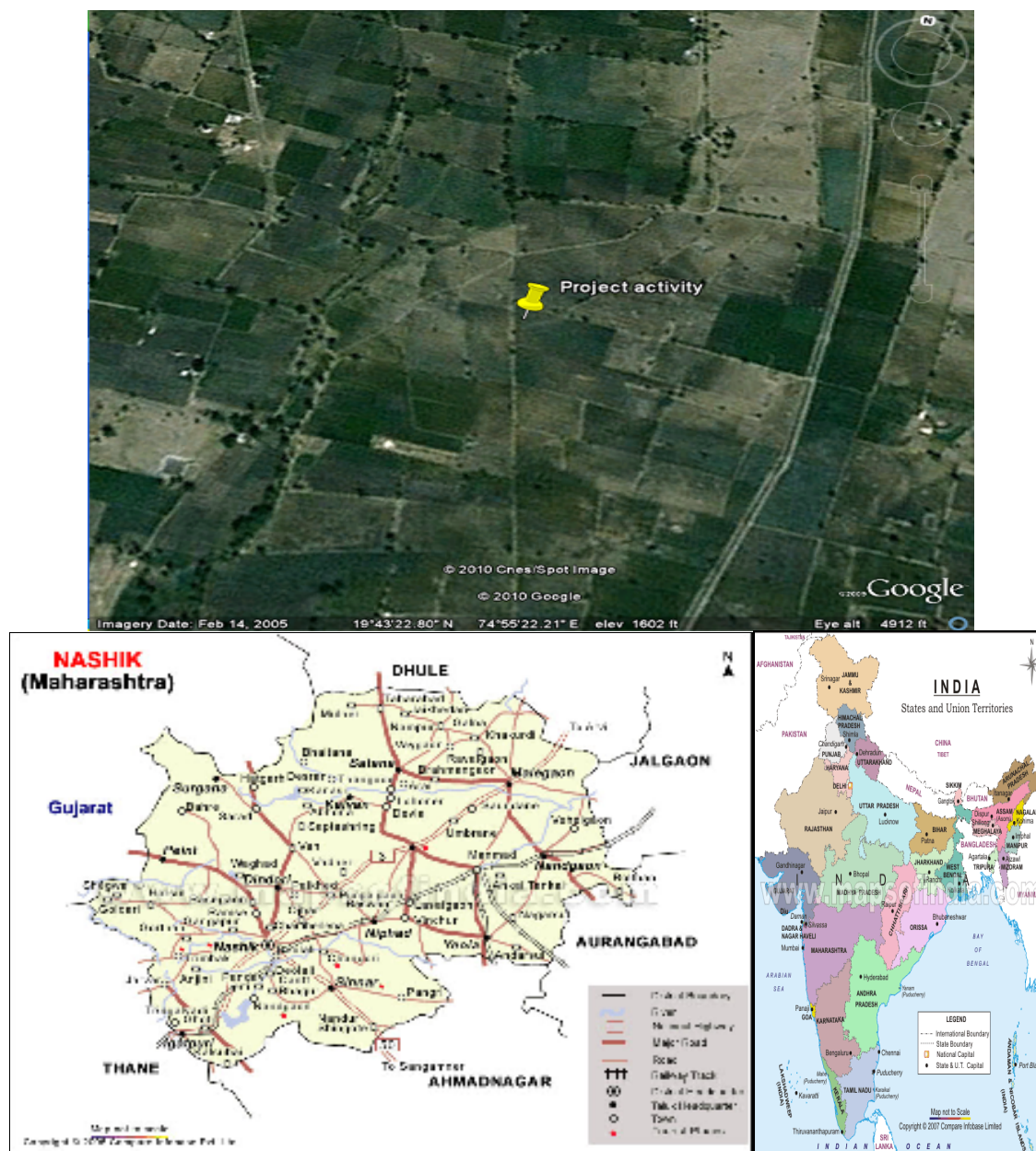


Figure 01: Project Location on Map

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

The project is a small scale CDM project activity. According to the Appendix B¹ of the simplified modalities and procedures (M & P) for small-scale CDM project activities, the project activity falls under the following type and category.

¹ <http://cdm.unfccc.int/Projects/pac/ssclistmeth.pdf>

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Project Type : Type I – Renewable Energy Projects
Project Category : I.D. – Grid connected renewable electricity generation
Reference² : 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 for project activity:

The wind power technology is considered as one of the most environmental friendly technologies available. The operation of the wind turbine does not emit any harmful GHGs or any other harmful gases like conventional power plants during their operation. The electricity generation is the result of the utilization of kinetic energy in wind to drive the wind turbine blades to generate electricity. Thus the operation of the wind power project is considered as environmentally safe.

Suzlon Energy Limited has driven a focused effort to make wind turbines more reliable, consistently delivering availability rates beating global standards, higher than 95% on an average. The S-82-1.5 MW wind turbine is specially designed to deliver high-performance in the low-to-medium wind regime prevalent across most of India.

The design incorporates Suzlon innovations starting from blades manufactured using state-of-the-art Vacuum Assisted Resin Infusion Molding technology, to a unique Micro Pitch system, advanced controls, and the highest hub-height in its class, all leading to a robust, reliable and efficient product which generates high-quality grid-friendly power with negligible harmonics.

The S-82 stands apart not just from the engineering point of view; the size and capacity of the turbine have been carefully selected to open up the wind energy market to smaller investors, businesses and industries.

Technical specification for Class: S-82³

Rotor	
Diameter	82 m
No. of rotor blade	3
Orientation	Upward/Horizontal axis
Rotation direction	Clockwise
Rotor blade material	GRP
Swept area	5281 m ²
Hub height	78.5 m
Regulation	Pitch regulated

Operational data	
Cut in wind speed	4 m/s
Rated wind speed	14 m/s
Cut off wind speed	20 m/s

² http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_PHPV5WESACMBTJ2YY54GAJYSIEI3HD

³ Technical Specifications for Class S-82, 1.5 MW sheet provided by Suzlon Energy Ltd.

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Gear box	
Type	Integrated 3 stage 1 planetary & 2 helical
Gear ratio	1:95.09
Manufacturer	Winergy/Hansen
Nominal load	1650 kW

Generator	
Type	Asynchronous 4 poles
Rotational speed	1511 RPM
Rated output	1500 kW
Rated voltage	690 V
Frequency	50 Hz
Insulation	Class "H"
Cooling system	Air cooled

Yaw drive	
Method of operation	Active electrical yaw motors
Bearing type	Polyamide slide bearing

Safety systems	
Break system	Spring applied hydraulically released brakes

Tower	
Type	Free standing, lattice tower, hot dip galvanized.
Construction	Bolted
Erection	With crane
Design	GL class III A

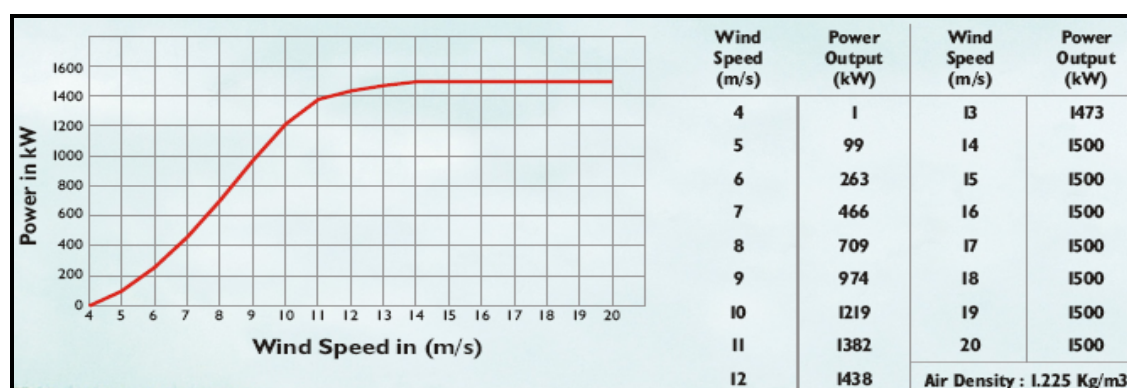
Power curve for 1.5 MW WTG⁴:

Figure 02: Power Curve

⁴ Source: Technical Specification Brochure – Suzlon Energy Limited

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

The chosen crediting period for the project activity is 10 years. It is estimated that the project activity would generate 29760 tonnes of CO₂ e during the crediting period. Annual estimates of emission reductions by the project activity during the above crediting period are furnished below.

Years	Estimation of annual emission reductions in tonnes of CO ₂ e
2010-11	2976
2011-12	2976
2012-13	2976
2013-14	2976
2014-15	2976
2015-16	2976
2016-17	2976
2017-18	2976
2018-19	2976
2019-20	2976
Total estimated reductions (tonnes of CO₂ e)	29760
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tCO₂ e)	2976

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

The project activity is not availing any public funding. Kindly refer Annex 2.

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

As per page 53 of Appendix C of the simplified modalities and procedures for small-scale CDM project activities (contained in Annex II to decision 21/CP.8, see document FCCC/CP/2002/7/Add.3)⁵ and Compendium of guidance on the de-bundling for SSC project activities (Annexure 27, EB-36)⁶,

Debundling is defined as the fragmentation of a large project activity into smaller parts. A small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities. The full project activity or any component of the full project activity shall follow the regular CDM modalities and procedures.

This wind power project activity is a separate project activity having installed capacity of 1.5 MW (1.5 MW × 1 No.) and is not a debundled component of any large scale project activity.

A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

⁵ <http://cdm.unfccc.int/Projects/pac/howto/SmallScalePA/sscdebund.pdf>

⁶ http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid17_v01.pdf

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- *By the same project participants;*
- *In the same project category and technology/measure; and*
- *Registered within the previous 2 years; and*
- *Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point*

This small-scale project activity can not be deemed to be a debundled component of a large project activity as there is no registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

- By the same project participant, CJP;
- In the same project category and technology/measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point

It therefore satisfies all conditions listed in Appendix C of the simplified M & P for the small-scale CDM project activities for guidance on how to determine whether the project activity is not a debundled component of a larger project activity. Thus, project proponent hereby confirm that the project activity is not a debundled component of another larger 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:

The approved baseline and monitoring methodology for small scale project activity, AMS- I.D.⁷ (Version- 13, EB- 36), has been applied to this wind power project activity. The title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity is as below –

Title of Methodology : Grid connected renewable electricity generation ---Version 13
Reference : AMS-I.D.

Tools referred to design Project baseline & additionality:

- Tool to calculate the emission factor for an electricity system (Version -02, EB- 50)⁸.
- Additionality tool for small scale project activities (Attachment A to Appendix B, Version 06: 30/09/ 2005)⁹.
- Approved consolidated baseline and monitoring methodology ACM0002, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (Version: 09, EB: 45)¹⁰
- “Tool for the demonstration and assessment of additionality” (Version: 05.2, EB: 39)¹¹

⁷ http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_PHPV5WESACMBTJ2YY54GAJYSIEI3HD

⁸ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf>

⁹ http://cdm.unfccc.int/Reference/Guidclari/ssc/methSSC_guid05.pdf

¹⁰ http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_71ZC14NVE4V5DHA3TUT3896PFLPVGG

¹¹ <http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf>

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

Approved small-scale baseline methodology, *AMS- I.D. (Version-13, EB- 36)*, is applicable for this project activity. As per section ‘Technology/measure’ of the approved small-scale baseline methodology —

Sr. No.	Applicability conditions	Justification
1.	<i>This category comprises renewable energy generation units, such as photovoltaics, 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.</i>	The project activity under consideration is a wind power generation activity & is connected to the NEWNE Grid. Project activity is displacing electricity from NEWNE grid that would be supplied by fossil fuel fired generating units in the grid region.
2.	<i>If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.</i>	The project activity only comprises of renewable component (i.e. Wind). The total capacity of the project activity is 1.5 MW (1.5 MW × 1 No.) which is less than the small-scale capacity limit of 15 MW.
3.	<i>Combined heat and power (co-generation) systems are not eligible under this category.</i>	Not applicable as it is a wind power generation.
4.	<i>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.</i>	Not applicable as it does not involves addition of renewable power generation facility.
5.	<i>Project activities that seek to retrofit or modify an existing facility for renewable energy generation are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.</i>	Not applicable it is a new power plant.

Thus the project activity is complying with requisite criteria for AMS- I.D. (Version-13, EB-36)

B.3 Description of the project boundary:

As per paragraph 6 of the of approved baseline methodology, *AMS- I.D. (Version-13, EB-36)* for small scale project activity, – ‘The project boundary encompasses the physical, geographical site of the renewable generation source’

The project boundary includes the electricity generation from 1.5MW Wind Turbine Generator implemented by the project activity at Adwadi Village, Sinnar Taluka, Nashik District, Maharashtra

and the transmission system till the evacuation point at the Khaprle substation. The project activity falls under North Eastern Western North-East (NEWNE) Regional Electricity Grid.

The spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the project power plant is connected to.

The schematic diagram of project boundary is as under:

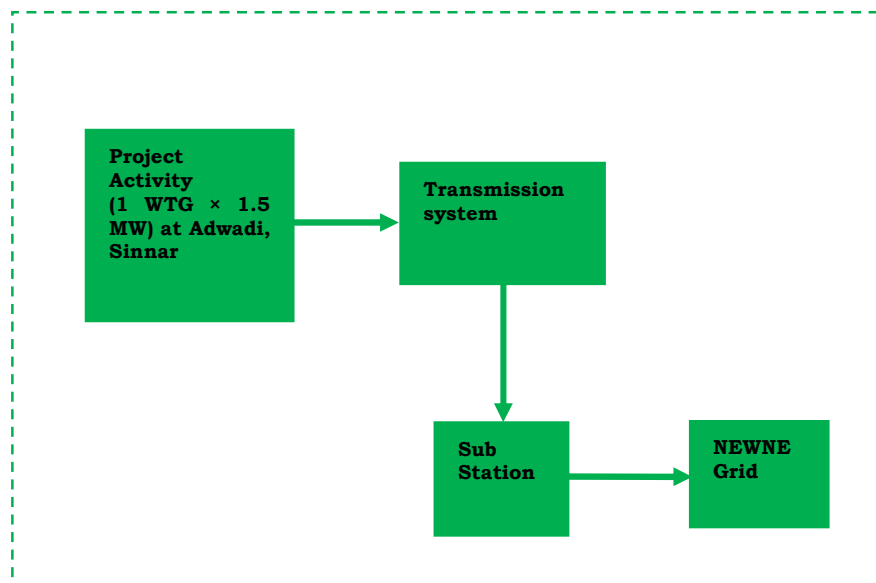


Figure 03: Project Boundary

B.4 Description of baseline and its development:

As per Paragraph 9 of methodology AMS I.D. Version 13, EB 36 the baseline emissions are calculated based on the net electricity delivered to the grid system (in MWh/year) by renewable generating unit multiplied by an emission factor for the displaced grid electricity (in tCO₂e /MWh).

The methodology provides following approaches for baseline calculations:

1. 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

2. The weighted average emissions (in kg CO₂e/kWh) of the current generation mix.

The project proponent has opted for approach ‘a’ i.e. combined margin emission factor with ex-ante approach where emission factor is fixed for the whole crediting period. The ex ante approach is considered conservative since the grid system in future is expected to become more carbon intensive as the projects planned to establish in the region is mostly from thermal power sector.

Following information is used for baseline development:

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1. Net electricity delivered to the Grid (EG_y , MWh) by the project activity per annum taken from the monthly JMR Reports and monthly invoices of sell to MSEDCL.
2. The grid emission factor (tCO_2/MWh) from CEA Database, Version 4.0 published by Central Electricity Authority (CEA), Government of India.

Sr. No.	Parameters	Unit	Value	Reference
1	$EF_{grid\ BM,y}$	tCO_2/MWh	0.59771	CEA Database, version 4.0 ¹²
2	$EF_{grid,OM,y}$	tCO_2/MWh	1.0090	CEA Database, version 4.0
3	$EF_{grid,CM,y}$	tCO_2/MWh	0.90618	Calculated as per equation 13 of Methodological tool “Tool to calculate the emission factor for an electricity system” (Version -02, EB- 50)

The calculation of the grid emission factor using the Combined Margin methodology has been detailed under Section B.6.1.

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 additional as per the options provided under ‘Attachment A to Appendix B’ of the simplified modalities and procedures for small-scale CDM project activity.

The project additionality as per the Attachment A to Appendix B is given below:

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

PP has chosen *Investment barrier* to prove project additionality.

(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;

Investment Analysis:

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).

¹²Baseline Carbon Dioxide Emission Database, CEA, Version: 04,
http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip

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

1. The most economically or financially attractive; or
2. Economically or financially feasible, without the revenue from the sale of certified emission reductions.

Applying sub-steps:

Sub-step 2a: Determine appropriate analysis method

(1) Determine whether to apply simple cost analysis, investment comparison analysis or benchmark analysis (Sub-step 2b). If the CDM project activity and the alternatives identified in Step 1 generate no financial or economic benefits other than CDM related income, then apply the simple cost analysis (Option I). Otherwise, use the investment comparison analysis (Option II) or the benchmark analysis (Option III).

The project activity is selling the generated electricity to MSEDCL & is getting revenue from MSEDCL other than CDM benefits. The Option I is not applicable under this situation. So, PP has opted for Option III out of remaining options i.e. Option II and III.

Sub-step 2b: Option III. Apply benchmark analysis

PP has selected Project IRR as relevant parameter for Investment analysis as the total return of project will be available to the PP.

As per Paragraph 6, the PP has identified option (b) which states that, the benchmark can be calculated from “*Estimates of the cost of financing and required return on capital (e.g. commercial lending rates and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds’ required return on comparable project*”.

The benchmark opted by PP under this is Prime Lending Rate (PLR) published by Reserve Bank of India for five major nationalised banks. PLR was in the range¹³ of 12.25% to 14% during April 2008 to October 2008 period. PP has chosen lower range of 12.25% as benchmark for the project on conservative basis.

Sub-step 2c. Calculation and comparison of financial indicators

The project under consideration is a 100% equity funded project, hence Project IRR will be equal to Equity IRR. The Project IRR for the project activity without CDM revenue is computed for a period of 20 years, lifetime of the 1.5 MW wind farm as below:

Investment analysis			
Nature of Concern	Partnership		
Location	Maharashtra		
Decision Date	November 19, 2008		
Particulars	Units	Values	Basis

¹³ http://rbidocs.rbi.org.in/rdocs/AnnualReport/PDFs/41APTB_09.pdf

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Capacity	kW	1500	Suzlon offer letter
Machines	No.	1	Suzlon offer letter
Total Capacity	kW	1500	Suzlon offer letter
Plant Load Factor (PLF)	%	25	Technical Evaluation Report Of Wind Turbine Generator At Adwadi, Nashik dated October 2008
Annual Generation	Lac, kWh	32.85	Calculated
Derating after 10 th year	%	5.00	MERC Guideline, page no. 33, Para 2.2.3
Tariff Rate	Rs. /kWh	3.5	MERC Guideline, page no. 66, Para 2.3.3 B
Escalation in Selling Rate up to 13 th year	Rs./kWh	0.15	MERC
CER Rate	Euro/tCO ₂	20	http://www.energymanagertraining.com/CDM/newsletter/2008/en-climate-cdm-highlights-61.pdf
Exchange Rate Euro	Rs.	62.50	http://www.xrates.com/cgi-bin/hlookup.cgi
Grid Emission factor	tCO ₂ /MWh	0.90618	CEA CO ₂ data base version 4.0
CO ₂ Emission Per Year	tCO ₂	2976	Calculated
O & M	Rs. Lacs	19.00	Suzlon offer letter
Escalation in O & M Exp.	%	5.00	Suzlon offer letter
Particulars	Units	Values	Basis
O & M Free For	Years	1.0	Suzlon offer letter
Insurance	Rs. Lacs	1.80	Suzlon offer letter
Cost of WTG	Rs. Lacs	1000	Suzlon offer letter
Promoters Contribution	Rs. Lacs	1000	-
Income Tax	%	33.99	Section 143, Income Tax Act 1961

As per sub-step 2c Para.10 (b), the proposed project activity has less favorable project IRR (8.99%) as compared to the benchmark (12.25%). Thus we can conclude that the proposed project activity can not be considered as financially attractive.

Parameters	Rate of Return
Minimum expected rate of return (benchmark)	12.25%
Rate of return without CDM benefits	8.99%
Rate of return with CDM benefits	12.26%

Thus, successful CDM registration of this project activity is imperative to make it financially attractive.

Sub-step 2d. Sensitivity analysis

The Guidance on the Assessment of Investment Analysis (*Version- 02, paragraph- 16*), 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 affects the viability of a wind power project as per above clause are mentioned below –

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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.
Project Cost	Project cost will have major impact over its return, hence sensitivity analysis has been carried out for this parameter.
Income from sale of electricity	This parameter depends on two factors; annual generation and tariff rate. Sensitivity analysis for annual generation was carried out by the PP. As far as tariff rate is concerned, PP is aware of the rate as it is mentioned in the Power Purchase Agreement by the MERC with the PP which is Rs. 3.50/kWh with an escalation of Rs. 0.15/kWh/yr up to 13 th year. So sensitivity analysis has been carried out for tariff from 14 th year.
Operation and Maintenance Expenses	Although, O & M does not add in to 20% of project cost, PP has carried out for O & M Expenses.

The project activity has been found sensitive to annual generation as below:

Sensitivity Analysis			
Generation / PLF varied by:	-10%	0%	+10%
Project IRR	7.23%	8.99%	10.59%
Cost of Project varied by:	-10%	0%	+10%
Project IRR	10.79%	8.99%	7.47%
Tariff from 14 th year varied by:	-10%	0%	+10%
Project IRR	8.73%	8.99%	9.23%
Operation and Maintenance	-10%	0%	+10%
Project IRR	9.28%	8.99%	8.68%

It can be seen from the above that with a 10% increase in generation for 20 consecutive years or decrease in cost of project by 10% or increase in tariff by 10% from 14th to 20th year and reduction in operation and maintenance expenses by 10%, the IRR of the project is not crossing the benchmark selected for the project.

The returns from the project are found to be clearly less attractive than the benchmark return without CDM; even then the promoters went ahead with the project expecting that proposed CDM benefits will increase the return. The returns from the project activity improve to 12.26% after including CDM benefit to the financials.

Thus from above discussed barrier, the project activity is not a *business as usual* case for the project proponent and the project activity would not have occurred due to the investment barrier. It thus fulfilling the additionality conditions as per *Attachment A to Appendix B* of the simplified modalities and procedures for small-scale CDM project activities.

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CDM Consideration:

As per the *Guidance on the Demonstration and Assessment of Prior Consideration of the CDM (Annexure 46, EB- 41, Section B- New project activities, Paragraph- 2)*¹⁴ –

‘The Board decided that for project activities with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and/or the UNFCCC secretariat in writing¹⁵ of the commencement of the project activity and of their intention to seek CDM status. Such notification must be made within six months of the project activity start date and shall contain the precise geographical location and a brief description of the proposed project activity. Such notification is not necessary if a PDD has been published for global stakeholder consultation or a new methodology proposed to the Executive Board before the project activity start date’

The start date of the project activity is November 26, 2008 (Purchase orders to Suzlon Energy Limited & Suzlon Infrastructure Services Limited). As the project start date is after August 02, 2008, the project activity considered as *New Project Activity*.

The PP has informed to the UNFCCC & Ministry of Environment & Forest (MoEF), New Delhi (DNA) about commencement of the project activity and of PP’s intention to seek CDM status for the same in writing on December 08, 2008.

Implementation timeline of CDM project activity:

Sr. No.	Activity/actions	Schedule/period of activity	Details
1	Investment Decision in Wind Power	August 09, 2008	Partners meeting at CJP Corporate house at Nadiad, Gujarat.
2	Offer by Suzlon for Sinnar	August 29, 2008	Suzlon offer CJP S-82 WTG at Sinnar, Maharashtra
3	Site visit by CJP & Suzlon for proposed WTG at Sinnar, Maharashtra	October 2008	CJP officials visited project site (AD-24) along with Suzlon officials
4	Assessment of wind energy potential for proposed project activity	October 2008	M/s Madhav Consultants conducted the assessment wind energy potential at AD-24 and submitted their report ¹⁶ to CJP.
5	Decision to invest at Sinnar, Maharashtra ¹⁷	November 19, 2008	Partners took decision to invest at Sinnar, Maharashtra based on the negotiation meeting on the offer given by Suzlon
6	Appointment of CDM consultant	November 21, 2008	CJP placed work order for consultancy services to MITCON Consultancy Services Ltd.
7	Purchase orders to Suzlon Energy Limited & Suzlon	November 26, 2008	CJP placed purchase order for 1 No. × 1.5 MW wind turbines to Suzlon Energy Limited

¹⁴ http://cdm.unfccc.int/EB/041/eb41_repan46.pdf

¹⁵ P.O. Box 260124 D-53153 Bonn Germany, cdmregistration@unfccc.int

¹⁶ Technical Evaluation Report Of Wind Turbine Generator At Adwadi, Nashik dated October 2008

¹⁷ Please refer Partners Meeting Note dated November 19, 2008

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	Infrastructure Services Limited ¹⁸		& Suzlon Infrastructure Services Limited
8	Intimation to UNFCCC ¹⁹ & MoEF, New Delhi (DNA)	December 08, 2008	CJP intimated the UNFCCC & MoEF, New Delhi (DNA) for their intentions to avail CDM benefits to the proposed project activity.
9	Stake holder consultation meeting	February 21, 2009	CJP conducted stake holder meeting at the project site in co-ordination with Suzlon Energy Limited.
10	Appointment of the DoE	March 14, 2009	CJP appointed RINA S.p.A.as their validator for the project activity.
11	Commissioning of project activity	March 30, 2009	The Project activity, AD-24, has been commissioned on 30/03/2009
12	Host Country Approval from DNA	June 29, 2009	CJP has been accorded HCA by NCDMA, New Delhi, Government of India.

B.6. Emission reductions:**B.6.1. Explanation of methodological choices:*****Baseline Emissions:***

Baseline methodology for project category I.D has been detailed in paragraphs 7-11 of the approved small scale methodology AMS I.D. (Version- 13, EB- 36) Paragraph 9 of the approved methodology applies to this project activity, which states that:

For all other systems, the baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner as:

1. 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

2. The weighted average emissions (in kg CO₂e/kWh) of the current generation mix.

The emission factor has been estimated using option (a) above by using the following steps of “*Tool to calculate the emission factor for an electricity system*” (Version -02, EB- 50):

Step 1: Identify the relevant electricity systems

Central Electricity Authority, Ministry of Power, Government of India (Host Country) has given the delineations of the project electricity system and the connected electricity system in India. As per

¹⁸ Project activity start date

¹⁹ http://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html?s=60

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CEA, the Indian power system is divided into two regional grids, viz. NEWNE Grid & Southern Grid.

Each grid covers several States as below:

NEWNE Grid				Southern Grid
Northern	Eastern	Western	North-Eastern	
Delhi	Jharkhand	Gujarat	Arunachal Pradesh	Andhra Pradesh
Haryana	Orissa	Daman & Diu	Assam	Karnataka
Himachal Pradesh	West Bengal	Dadra & Nagar Haveli	Manipur	Kerala
Jammu & Kashmir	Sikkim	Madhya Pradesh	Meghalaya	Tamil Nadu
Punjab	Andaman-Nicobar	Maharashtra	Mizoram	Pondicherry
Rajasthan	-	Goa	Nagaland	Lakshadweep
Utter Pradesh	-	-	Tripura	-

As the project activity is located in the State of Maharashtra NEWNE Grid is the identified relevant electricity system.

The build margin & operating margin emission factors for the project activity are also calculated by the Central Electricity Authority by using the “Tool to calculate the emission factor for an electricity system”²⁰.

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

Option I is applicable as the grid system in India is very enough stable and off grid generation is not significant.

Step 3: Select a method to determine the 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 OM, or
- (b) Simple adjusted OM, or
- (c) Dispatch data analysis OM, or
- (d) Average OM.

Out of the above options, the simple OM method (option a) is used in India. The Dispatch data analysis OM is not used as off-grid generation is not significant in India as per step 2 above. Other methods cannot currently be applied in India due to lack of necessary data.

As per emission factor tool, 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.

²⁰ CO₂ Baseline Database (Version: 4, September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip

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In India as per available data (most recent three years) with CEA, the low-cost/must-run resources constitute 18.50 % which is less than 50% of total grid generation.

Share of low cost / Must- run (% of net generation)			
Year	2005-06	2006-07	2007-08
NEWNE	18.0	18.5	19.0
South	27.0	28.3	27.1
India	20.1	20.9	21.0
Average of most recent 3 years (NEWNE)	18.50%		
Table reference- CO ₂ Baseline Database (Version: 4 , September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip			

The emissions factor has been calculated by using the *ex ante* option. If the *ex ante* option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

Step 4: Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units. OM values have been taken from CEA Database. The “Tool to calculate the emission factor for an electricity system” has been used in the CEA Baseline Database for the calculation of operating margin. The value of operating margin emission factor is 1.0090 tCO₂/MWh.

Simple Operating Margin (tCO ₂ /MWh) (incl. Imports)				Average OM
	2005-06	2006-07	2007-08	
NEWNE	1.02	1.01	1.00	1.0090
South	1.0056	0.99912	0.99062	0.99847
Table reference- CO ₂ Baseline Database (Version: 4 , September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip				

OM calculation has been done *ex-ante* and hence OM value will remain fixed and need not be monitored during the crediting period.

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

In accordance with the Grid Tool, the build margin is calculated in this database as the average emissions intensity of the 20 % most recent capacity additions in the grid based on net generation. Depending on the region, the build margin covers units commissioned in the last five to ten years.

20% of Net Generation (GWh)

Year	2005-06	2006-07	2007-08
NEWNE	87,575	93,072	99,224
South	27,666	30,441	31,463
India	115,241	123,513	130,687
Table reference- CO ₂ Baseline Database (Version: 4 , September 2008):			

http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip

Net Generation in Built Margin (GWh)

Year	2005-06	2006-07	2007-08
NEWNE	87, 764	93, 524	100, 707
South	28,228	30,442	31,613
India	115, 991	123,965	132,320
Table reference- CO ₂ Baseline Database (Version: 4 , September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip			

In line with the Grid Tool, if a station is registered as a CDM activity, it is excluded from the build margin but not from the operating margin²¹.

Step 6: Calculate the build margin emission factor

The build margin reflects the average CO₂ intensity of newly built power stations that will be (partially) replaced by a CDM project. In accordance with the Grid Tool, the build margin is calculated in this database as the average emissions intensity of the 20 % most recent capacity additions in the grid based on net generation. Depending on the region, the build margin covers units commissioned in the last five to ten years.

BM values have been taken from CEA Database. The “*Tool to calculate the emission factor for an electricity system*” has been used in the CEA Baseline Database for the calculation of build margin. The value of build margin emission factor is 0.59771 tCO₂/MWh.

Build Margin (tCO ₂ /MWh) (not adjusted for imports)			
	2005-06	2006-07	2007-08
NEWNE	0.67	0.63	0.59771
South	0.71	0.70	0.71
India	0.68	0.65	0.63
Table reference- CO ₂ Baseline Database (Version: 4 , September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip			

BM calculation has been done *ex-ante* and hence BM value will remain fixed and need not be monitored during the crediting period.

Step 7: Calculate the combined margin emissions factor

The combined margin is a weighted average of the simple operating margin and the build margin. By default, both margins have equal weights (50%). In particular, for intermittent and non-dispatchable generation types such as wind and solar photovoltaic, the Grid Tool allows to weigh the operating margin and build margin at 75% and 25%, respectively.

²¹ See EB-35 (Annex 12), pp.5 and 13.

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The combined margin emissions factor is calculated as follows:

$$EF_{\text{grid,CM},y} = EF_{\text{grid,OM},y} \times w_{\text{OM}} + EF_{\text{grid,BM},y} \times w_{\text{BM}}$$

Where:

- $EF_{\text{grid,BM},y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh)
 $EF_{\text{grid,OM},y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh)
 w_{OM} = Weighting of operating margin emissions factor (%)
 w_{BM} = Weighting of build margin emissions factor (%)

Thus the grid emission factor for NEWNE Grid is calculated as below:

$$\begin{aligned}
 EF_{\text{grid,CM},y} &= 0.75 \times EF_{\text{grid,OM},y} + 0.25 \times EF_{\text{grid,BM},y} \\
 &= 0.75 \times 1.0090 + 0.25 \times 0.59771 \\
 &= 0.90618 \text{ tCO}_2/\text{MWh}
 \end{aligned}$$

Further multiplication of electricity generated in MWh with grid emission coefficient will give the estimated value of baseline emission as given below.

$$\text{Baseline emission (tCO}_2\text{)} = \text{Grid emission coefficient (} EF_{\text{grid,CM},y} \text{, tCO}_2/\text{MWh}) \times \text{Net electricity delivered to the Grid (EG}_y \text{, MWh) by the project per annum}$$

$$\begin{aligned}
 BE_y &= 0.90618 \times 3285 \\
 &= 2976 \text{ tCO}_2
 \end{aligned}$$

Thus estimated baseline emission (BE_y) for the project activity shall be of 2976 tCO₂ per annum.

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

Data / Parameter:	$EF_{\text{grid,OM},y}$
Data unit:	tCO ₂ / MWh
Description:	CO ₂ Operating Margin emission factor for the NEWNE Grid (Three years average-2005-2006, 2006-2007, 2007-2008)
Source of data used:	CO ₂ Baseline Database (Version: 4 , September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip & CO ₂ Baseline Database, User Guide (Version- 4, September 2008) http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf
Value applied:	1.0090 tCO ₂ / MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	The Development of this CO ₂ Database has been done under Indo-German Bi-lateral Technical Cooperation between the Governments of India and Germany jointly implemented by GTZ together with partners Central Electricity Authority and the Bureau of Energy Efficiency under the Ministry of Power.
Any comment:	This database is an official publication of Government of India for the purpose of CDM baselines. It is based on most recent data available to the Central Electricity Authority and hence considered authentic. As the calculation of baseline emission has been done <i>ex ante</i> its value will remain fixed for the entire crediting period.

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Data / Parameter:	$EF_{grid, BM, y}$
Data unit:	tCO ₂ / MWh
Description:	CO ₂ Build Margin emission factor for the NEWNE Grid 2007-2008
Source of data used:	CO ₂ Baseline Database (Version: 4 , September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip & CO ₂ Baseline Database, User Guide (Version- 4, September 2008) http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf
Value applied:	0.59771 tCO ₂ / MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	The Development of this CO ₂ Database has been done under Indo-German Bi-lateral Technical Cooperation between the Governments of India and Germany jointly implemented by GTZ together with partners Central Electricity Authority and the Bureau of Energy Efficiency under the Ministry of Power.
Any comment:	This database is an official publication of Government of India for the purpose of CDM baselines. It is based on most recent data available to the Central Electricity Authority and hence considered authentic. As the calculation of baseline emission has been done <i>ex ante</i> its value will remain fixed for the entire crediting period

Data / Parameter:	$EF_{grid, CM, y}$
Data unit:	tCO ₂ / MWh
Description:	$EF_{grid, CM, y}$ is the grid emission coefficient calculated in a transparent and conservative manner as Combined Margin (CM) which is the combination of Operation Margin (OM) and Build Margin (BM) (OM & BM have been calculated <i>ex-ante</i>) Grid emission factor calculation: $EF_{grid, CM, y} = 0.75 \times EF_{grid, OM, y} + 0.25 \times EF_{grid, BM, y}$ $= 0.75 \times 1.0090 + 0.25 \times 0.59771$ $= 0.90618 \text{ tCO}_2/\text{MWh}$
Source of data used:	CO ₂ Baseline Database (Version: 4 , September 2008): http://www.cea.nic.in/planning/c%20and%20e/database_publishing_ver4.zip & CO ₂ Baseline Database, User Guide (Version- 4, September 2008) http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf
Value applied:	0.90618 tCO ₂ /MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	The Development of this CO₂ Database has been done under Indo-German Bi-lateral Technical Cooperation between the Governments of India and Germany jointly implemented by GTZ together with partners Central Electricity Authority and the Bureau of Energy Efficiency under the Ministry of Power. The $EF_{grid, CM, y}$ calculation is based on the guidelines in ACM0002 (Version- 09, EB- 45)
Any comment:	The calculation is done <i>ex ante</i> .

B.6.3 Ex-ante calculation of emission reductions:

Ex-ante calculation of Emission Reductions (ER_y):

The Net electricity delivered to the Grid (EG_y , MWh) by the project activity per annum can be calculated as below:

Sr. No.	Project Parameters	Details
1	Site	Adwadi, Sinnar
2	Grid	NEWNE
3	WTG capacity	1.5 MW
4	Total no. of turbines	01
5	Installed capacity of turbine	1.5 MW
6	Plant Load Factor	25%
7	Net electricity delivered to the Grid (Estimated) per annum	3285 MWh

Thus, the estimated Net electricity delivered to the Grid by the project activity will be 3285 MWh per annum.

The Baseline emissions for the project can be given as:

$$\begin{aligned}
 \text{Baseline emission (tCO}_2\text{)} &= \text{Grid emission coefficient (EF}_{\text{grid, CM, y}}, \text{ tCO}_2\text{/MWh)} \times \text{Net electricity delivered to the Grid (EG}_y\text{, MWh) by the project activity per annum} \\
 &= 0.90618 \times 3285 \\
 &= 2976 \text{ tCO}_2
 \end{aligned}$$

Thus, the total estimated baseline emission (BE_y) by the project activity is 2976 tonnes of carbon dioxide per annum.

Emission Reductions (ER_y):

The emission reductions (ER_y) are calculated as per equation 12 of ACM0002 (Version-09, EB- 45).

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	= Emission reductions in year y (t CO ₂ e/yr)
BE_y	= Baseline emissions in year y (t CO ₂ e/yr)
PE_y	= Project emissions in year y (t CO ₂ /yr)
LE_y	= Leakage emissions in year y (t CO ₂ /yr)

Project Emissions (PE_y):

As wind power generation is a renewable project activity, the project emissions for project activity are taken as zero tonnes of CO₂ (ACM0002, Version- 09, EB- 45). Moreover, during the construction work, the project activity has caused project emission due to vehicular movement. But this can be neglected as the emissions are very less & were temporary.

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Leakage Emissions (LE_y):

According to paragraph 12 of AMS-I.D. (Version-13, EB-36) 'If the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity, leakage is to be considered.'

The leakages are taken as zero tonnes of CO₂, as there is no transfer of energy generating equipments from another activity nor the existing equipments are transferred to another activity.

The total emission reductions by the project activity may be calculated as:

As for wind power project activity the leakages & project emissions are considered as zero, the emission reductions of the project activity are equal to the baseline emissions. Thus,

$$ER_y = BE_y = 2976 \text{ tCO}_2/\text{annum}$$

Thus estimated emission reductions (ER_y) for the project activity shall be of 2976 tCO₂ per annum.

B.6.4 Summary of the ex-ante estimation of emission reductions:
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Year	Estimation of project activity emissions (tCO ₂ e)	Estimation of baseline emissions (tCO ₂ e)	Estimation of leakage (tCO ₂ e)	Estimation of overall emission reductions (tCO ₂ e)
2010-11	0	2976	0	2976
2011-12	0	2976	0	2976
2012-13	0	2976	0	2976
2013-14	0	2976	0	2976
2014-15	0	2976	0	2976
2015-16	0	2976	0	2976
2016-17	0	2976	0	2976
2017-18	0	2976	0	2976
2018-19	0	2976	0	2976
2019-20	0	2976	0	2976
Total (tonnes of CO₂ e)	0	29760	0	29760

B.7 Application of a monitoring methodology and description of the monitoring plan:
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B.7.1 Data and parameters monitored:	
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Data / Parameter:	EG _y
Data unit:	MWh
Description:	EG_y is Net electricity delivered to the Grid (EG_y, MWh) by the project activity per annum It is given by the following formula: Net electricity delivered to the Grid by the project activity in a given

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	$\text{month} = \text{Export}^{22} - \text{Import}^{23}$ The sum of all these monthly net readings in a given year y will give EG_y .
Source of data to be used:	Monthly Joint Meter Readings Reports /Monthly invoice of sell
Value of data	3285
Description of measurement methods and procedures to be applied:	The project activity emission reductions is based on the Net electricity delivered to the Grid (EG_y, MWh) by the project activity per annum. The electricity from the project activity is evacuated to the sub-station through feeder. The electricity generated by the project activity is recorded by the Bulk meter at the sub-station. The 'Bulk meter', installed at the sub-station, contains a main meter and a check meter. These meters are sealed and are in the custody of MSEDCL. The state utility officials in the presence of representative/s of PP takes the Joint Meter Reading of these meters on a monthly basis as per PPA. The monthly JMRs for the project is prepared as per the PPA. The monthly JMRs have the parameters like import kWh, export kWh, Net export to the grid, reactive power etc. The monthly JMR Reports/ monthly invoices of sell is the basis for EG_y & consequently emission reduction by the project activity. <u>Metering</u>: Trivector meter <u>Accuracy class</u>: 0.2% <u>Data Type</u>: Electricity <u>Frequency</u>: Hourly measured <u>Recording</u>: Monthly Invoices/JMR Reports <u>Archiving policy</u>: Paper & Electronic <u>Energy meter calibration frequency</u>: Annual or as per the UNFCCC guidelines (at least once in three year, paragraph 12.c., EB 41 Report, Annex 20) <u>Responsibility</u>: Project Head is responsible for regular calibration of the meters.
QA/QC procedures to be applied:	The meters shall be approved, tested & sealed by the MSEDCL. The meters are in the custody of MSEDCL. The calibration of the meters will be carried out by MSEDCL annually/or at least once in three years, as per UNFCCC guidelines. 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 Power Purchase Agreement. The emission reductions is based on the monthly JMR reports which will be further cross checked with monthly invoices of sell.
Any comment:	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.

²² The Export is termed as *Import* by MSEDCL in JMR Reports and other documents like Power Purchase Agreement.

²³ The Import is termed as *Export* by MSEDCL in JMR Reports and other documents like Power Purchase Agreement.

B.7.2 Description of the monitoring plan:
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The monitoring of project activity is done as per approved small scale methodology AMS- I.D. (Version- 13, EB- 36). As per paragraph 13 of the approved methodology “*Monitoring shall consist of metering the electricity generated by the renewable technology*”.

Thus as per above paragraph, PP requires monitoring of Net electricity delivered to the Grid (EG_y , MWh) by the project activity per annum which is recorded in the monthly JMR Reports/ monthly invoices of sell, which will also be the basis of emission reduction calculation during entire crediting period.

Monitoring of the project activity:

The monitoring of the project activity is given 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 Suzlon Energy Limited 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. It uses a Woodward multi function relay that has three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current / voltage is converted into digital signal internally using A/D Converters at very high sampling rate. A software program reads these values and displays instantaneous parameters such as voltage, current, power factor, kVARh, and kWh. These instantaneous values are then time integrated and displayed / stored. 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 secondary recording of the electricity delivered to the grid is carried out jointly at the sub-station bulk meter.
- The joint measurement is carried out once in a month in presence of both parties (the developer’s representative and officials of MSEDCL) as per the Power Purchase Agreement (section 11.05, sub-point a).
- The meters shall be approved, tested & sealed by the MSEDCL. The meters are in the custody of MSEDCL. The calibration of the meters will be carried out by MSEDCL annually/or at least once in three years, as per UNFCCC guidelines (at least once in three year, paragraph 12.c., EB 41 Report, Annex 20).
- 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 Power Purchase Agreement.
- The monthly electricity data shall be collected & recorded in the form of JMR reports & invoices of sell by PP.
- The invoices of sell shall be cross-checked for accuracy with the monthly JMR reports.

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- PP receives monthly JMR reports for the monthly generations of the project activity. These monthly JMR reports are based on the apportioning logic applied by the State Utility Company, MSEDCL. The State Utility Company, MSEDCL is responsible for the apportioning of the electricity. The apportioning is not in the scope and control of PP or O & M Contractor. Apportioning is done and certified by MSEDCL. Please refer Power purchase Agreement (section 11.05, sub-point b & c). It is based on electricity generation data from CMS & recorded electricity data by the bulk meter at the substation.
- The monthly JMR reports for the project activity is the basis for the calculation of annual emission reductions achieved by the project activity.
- 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.

Suzlon Energy Limited is providing O & M services to the project promoter. The O & M management structure is as follows:

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 –

- Tower torquing
- Blade cleaning
- Nacelle torquing and cleaning
- Transformer oil filtration
- Control panel & LT panel maintenance
- Site and transformer yard maintenance

Security services:

This service includes watch and ward and security of the wind turbines and the equipment.

Management services:

- Data logging for power generation, grid availability, machine availability.
- Preparation and submission of monthly performance report in agreed format.
- Taking monthly meter reading jointly with utility of power generated at promoter's wind turbines 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:

- Visual inspection of the WTGs and all parts thereof.
- Technical assistance including checking of various technical, safety and operational parameters of the equipment, trouble shooting and relevant technical services

Emergency Preparedness Plan:

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Project activity is having well design Onsite Emergency Plan (OEP). As per Onsite Emergency Plan (OEP) the identified emergencies are:

1. Fire / explosion at office, guest house, canteen and WTG panel
2. Emergency at height Fall
3. Calamities
4. Communicable diseases
5. Food poisoning
6. Snake Bite
7. Road Accident
8. Electrical short circuit at panel / HT Yard
9. Oil Spillage

Out of above emergencies Fire / explosion at office, guest house, canteen may cause unintended emissions during the project operations. This emergency is handled by O & M contractor as below:

1. On receiving information quickly rush to the emergency spot with fire extinguisher & operate the fire extinguisher to bring the fire under control.
2. If the fire is out of control inform Site/ Section in charge to inform fire brigade for further control & help.

Moreover, sudden mechanical failure of WTG including metering equipments may also occur during project operation this will be tackled by the onsite O & M Team. The Central Monitoring Station (CMS) monitors the wind farm operations on continuous basis. After receiving the emergency/malfunction call from the Central Monitoring Station (CMS) the O & M team rush to the spot and cures the faults. The team is equipped with necessary skills & equipment to handle such situations. The fault in the metering system is determined by the State Utility/representative of PP (O & M contractor) during the regular inspection of the the system or during the periodic testing or monthly meter reading matching. The malfunctioning of the electrical and metering system is tackled by PP & the State Utility (MSEDCL) as per the Power Purchase Agreement. Please refer clause 9.06 (a), 10.1 (b & c). of the Power Purchase Agreement.

Training needs²⁴:

CJP has appointed Suzlon Energy Limited as the Operation & Maintenance contractor for this project activity. Suzlon Energy Limited is well known for its well managed wind project operations in wind power industry through out the world. It is an ISO certified company. The training activity to the employees is an integral part of the ISO system. It has trained its man power to carry out day to-day activity at the project site. It provides regular training to its employees. The training to the employees working at the project site involves following areas.

- Operation & maintenance
- Trouble shootings
- Preventive maintenance
- Safety techniques
- Onsite Emergency Plan (OEP)

²⁴ Please refer training document by Suzlon.

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The O & M contractor is well equipped with standard equipments to carry out necessary O & M operations.

Project Monitoring Team:

Sr. No.	Monitoring Team	Responsibility
1	Project Head (CJP)	• Overall performance monitoring • Project execution • Monthly review of project operations
2	Project Coordinator (CJP)	• Data Archival • Site visit for actual project monitoring Storage of data • Coordination with O & M Contractor for day to-day operations • Invoice preparation & follow ups • Coordination with Suzlon for regular calibration of meters • Reporting to Project Head • Online project monitoring • Feedback and corrective action wherever necessary • Follow up of project operation as per PPA.
3	O & M Contractor (Suzlon)	
3.1	Suzlon Mumbai Office	• Focal point between PP and O & M team at project site • Daily Generation Report to PP • Storage of data • Coordinating with PP/Consultant/Auditors during their site visit for validation/annual verification • Coordinating with MSEDCL for monthly JMR reports • Complying as per O & M Agreement with the PP • Requesting/coordinating MSEDCL for annual calibration behalf of PP
3.2	Sinnar Site Team	• Day-to-day operation and maintenance • Data monitoring & recording • Storage of data • Monthly Joint meter reading with MSEDCL • Maintenance of monitoring equipment and installations • Day-to-day records handling Monitoring, measurement and reporting, calibration of monitoring equipment • Handling of emergency situations, monitoring data adjustments & uncertainties, review of reports/data etc • Monitoring of project activity through facility at CMS, site visits

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 application of the baseline and monitoring methodology: 18/03/2009

Name of person/entity determining the baseline: M/s Chhotabhai Jethabhai Patel & Co. (CJP), Nadiad, Gujrat, India and their consultant and M/s MITCON Consultancy Services Ltd., Pune, India.

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Note: M/s Chhotabhai Jethabhai Patel & Co. (CJP), Nadiad, Gujarat, India is the project participant listed in Annex 1. M/s MITCON Consultancy Services Ltd., Pune, India is not the project participant in the project activity.

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:

The project starting date is 26/11/2008 (Purchase orders to Suzlon Energy Limited & Suzlon Infrastructure Services Limited)

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:

The project activity has chosen fixed crediting period.

C.2.1 Renewable crediting period

Not applicable.

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:

The project activity has chosen fixed crediting period.

C.2.2.1 Starting date:

The starting date of the crediting period shall be 01/06/2010 or date not earlier than the date of registration.

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:**

The guidelines on Environmental Impact Assessment have been published by Ministry of Environment and Forests (MoEF), Government of India (GoI) under Environmental Impact Assessment notification 14th September, 2006.²⁵

As per Ministry of Environment and Forests (MoEF), Government of India (GOI), *Any person who desires to undertake any new project or the expansion or modernisation of any existing industry or project listed in the [Schedule I](#) shall submit an application to the Secretary, Ministry of Environment and Forests, New Delhi.*

As the wind power generation projects are not listed in schedule I so it does not require Environmental Impact Assessment.

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 energy projects are considered environmentally safe and as per Host party- India no EIA is required.

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

The stake holder meeting for the project activity was conducted in Adwadi, Taluka: Sinnar, District: Nasik on 21st February 2009 by CJP. The meeting was coordinated by Suzlon Energy Limited. Mr. M. K. Bag represented Suzlon in the meeting. CJP was represented by Mr. D. T. Shah & Mr. Upadhyay. The stake holders were invited to meeting by invitation letters. The invitation letters were given to stake holders on 06/02/2009. Public notice was also given prior to meeting at primary school at Adwadi village.

²⁵ EIA Notification 2006, <http://envfor.nic.in/legis/eia/so1533.pdf>

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Photo 03: Stake holder signing on Attendance sheet

The stakeholders were also briefed about project activity including wind technology by Suzlon, installed capacity, expected generation, power evacuation and operation and maintenance arrangements, environmental benefits of the project, social and economic benefits including better roads and medical facilities etc.

The stakeholder meeting ended with vote of thanks from CJP and Suzlon.

E.2 Summary of the comments received:

During the meeting the representatives of CJP & Suzlon invited the stakeholders to offer their comments / feedback and ask if any of the members has any question related to the project.

The stakeholders took keen interest in the discussion and asked information about overall capacity of the wind park, benefits available in adjoining area and environmental effect of the project. They asked many questions particularly:

- (a) Job potential for local people*
- (b) Any adverse effect of ground earthing on underground water level*
- (c) Any adverse effect of wind power machine on rain*
- (d) Any adverse effect of wind power machine on wind direction/pattern*

The stakeholders were informed that the project has significant job potential for which the required persons would be from the adjoining areas only and not the outsiders. They were also informed that the project would have requirement both for skilled as well as unskilled work force and the residents of the area should take keen interest also for education of their children so that they can be offered skilled jobs also. As regards the effects of the project on ground water level, the representative of Suzlon presented a copy of report on 'Hydro geological and Geographical Investigation to Assess the Interface due to Bore wells for Earthing Purpose' by National Geographical Research Institute, Hyderabad in July 2008. This investigation report concluded that there is no adverse effect of such

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project on ground water level. It was also explained that because of use of advanced technology by Suzlon for manufacturing of wind turbine, the turbine automatically rotates towards wind direction and therefore, there is no way that turbine can change the wind direction/pattern. Similarly, it was also explained that there is no adverse effect of wind turbine installations on rain. In fact, wind energy projects are encouraged, not only by the Indian government but the world over, only because of its positive impact on climate.

The Feedback forms were distributed to each of the stakeholders. Suzlon representative explained in detail each item in the Form to the stakeholders before requesting them to give their feedback by filling up feedback form.

After due deliberation, all the stakeholders gave their feedback by filling up the feedback forms provided to them.

The stakeholders gave following feed back which is recorded in the feedback forms:

The wind power project:

- *Has no negative impact on the environment*
- *Will not emit pollutants or hazardous, toxic or noxious substances that could be harmful to human health*
- *Operation will not affect the local environment*
- *Will not produce any adverse noise levels*
- *Will not affect rain in the local area*
- *Does not cause any problem for radio/TV signals*
- *Do not affect crop health or cropping pattern?*
- *Will improves the living condition of the region in terms of infrastructure, basic amenities etc. due to its implementation*

The stakeholders support for the project activity can be evident from the feedback given by them duly filled in the feedback form.

E.3 Report on how due account was taken of any comments received:
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No negative comments were received on the project activity, so no additional measures are required by the PP.

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Annex 1**CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY**

Organization:	M/s Chhotabhai Jethabhai Patel & Co.
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Direct FAX:	NA
Direct tel:	NA
Personal E-Mail:	-

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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project activity is not availing any public funding.

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Annex 3

BASELINE INFORMATION

The baseline is explained under section B.6.

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Annex 4

MONITORING INFORMATION

The monitoring information is detailed under section B.7
