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

CONTENTS

Annexes

Revision history of this document

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

SECTION A. General description of small-scale project activity

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

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4.8 MW Manganese Ore (India) Limited Wind farm in Madhya Pradesh managed by Enercon
Version 3.0
10 April 2008

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

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Purpose of the project activity

The project activity is set up to produce clean power from the wind electric converters. The objective is development, design, engineering, procurement, construction, operation and maintenance of Manganese Ore India Limited (MOIL) Wind Farm of 4.8 MW wind power project ("Project") in the Indian state of Madhya Pradesh. The generated electricity will be wheeled using the state transmission system for captive consumption. The Project will lead to reduced greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants. The project activity puts to use barren land at Rajoda village in Dewas district in the state of Madhya Pradesh. The project will help in bridging the demand supply gap by using wind as a source of generating electrical energy.

Nature of Project

The project activity consists of 6 nos. machines of Enercon make 800 KW wind turbines, totaling to a capacity of 4.8 MW. The Project harnesses renewable resources in the region, thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. Enercon (India) Ltd ("Enercon" or "EIL") is the equipment supplier and the operations and maintenance contractor for the Project. The generated electricity will be supplied to MOIL for captive consumption. The Project is owned by Manganese Ore India Limited ("MOIL").

Contribution to Greenhouse gas emissions reduction

The project activity harnesses wind energy to generate electricity that displaces fossil fuel based electricity generation that would have otherwise been provided by the operation and expansion of the fossil fuel based power plants in the Western region electricity grid, thereby leading to reduction in emission of greenhouse gases associated with fossil fuel based electricity generation.

Contribution to sustainable development

The project activity contributes towards sustainable development of the country and the state of Madhya Pradesh by reducing the dependency on fossil fuel based electricity generation, which ultimately leads to reduction in greenhouse gas emissions. The project also fulfills several other sustainable development objectives as set out below:

- Contribution towards the policy objectives of Government of India and Government of Madhya Pradesh of incremental capacity from renewable sources;
- Contribution towards meeting the electricity deficit in Madhya Pradesh;

- CO_2 abatement and reduction of greenhouse gas emissions through development of renewable technology;
- Reducing the average emission intensity (SO_x, NO_x, PM, etc.), average effluent intensity and average solid waste intensity of power generation in the system;
- Conserving natural resources including land, forests, minerals, water and ecosystems; and
- Developing the local economy and create jobs and employment, particularly in rural areas, which is a priority concern for the Government of India;

A.3. Project participants:

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Please list project participants and Party(ies) involved and provide contact information in Annex 1. Information shall be indicated using the following tabular format.		
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)
Government of India (Host)	Private Entity: Enercon India Limited	No

MOIL has authorized Enercon India Limited to take the project through the CDM process.

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

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

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A.4.1.1. Host Party(ies):

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India.

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

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The project is located in the state of Madhya Pradesh that forms the part of Western regional electricity grid of India.

A.4.1.3. City/Town/Community etc:

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Rajoda Village/Dewas District/Madhya Pradesh State

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

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The project is located near Rajoda village in Dewas district in the state of Madhya Pradesh. The project extends between 22^0 54' to 22^0 55.5' North latitude and 76^0 4.5' to 76^0 5.5' East longitude. The location of the units is on the micrositing data to get optimum performance. The information allowing the unique identification of the project activity is given in the following table.

Project	Unique Identification Number	Metering point	Latitude	Longitude
4.8 MW Manganese Ore (India) Limited Wind Farm	MOIL- 01 to MOIL-06	Metering is carried out at 220/132/33 kV substation of Madhya Pradesh Power Transmission Company Limited (MPTRANSCO) situated at Dewas District.	22^0 54’ to 22^0 55.5’ North	76^0 4.5’ to 76^0 5.5’ East

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

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Project Type and Category:

The type and category of project activity as per Appendix B to the simplified modalities and procedures for small-scale CDM project activities is as under:

Project Type: I, Renewable energy project

Project Category: I D, Electricity generation for the system

Technology of the small scale project activity:

The Project involves 6 wind energy converters (WECs) of Enercon make (800 kW E-48) with internal electrical lines connecting the Project with local evacuation facility. The WECs generate 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%. The other salient features of the state-of-art-technology are:

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawl (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEC with voltage fluctuation of -20 to +20%.
- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking System.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts Generation of power at wind speed of 3 m/s.

Enercon (India) Ltd has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along

with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.
The technology used for the operation of the machine to generate electricity is free from emission of gases, which has adverse effect on the surrounding environment. The Environment Impact Assessment of the site as given in subsection D.1 and D.2 of Section D also state that there is no adverse impact on the environment.

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

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Years	Estimation of Annual emission reductions in tonnes of CO2e
1 June 2008- 31 Mar 2009	6,935
1 Apr 2009- 31 Mar 2010	8,354
1 Apr 2010- 31 Mar 2011	8,354
1 Apr 2011- 31 Mar 2012	8,354
1 Apr 2012- 31 Mar 2013	8,354
1 Apr 2013- 31 Mar 2014	8,354
1 Apr 2014- 31 Mar 2015	8,354
1 Apr 2015- 31 Mar 2016	8,354
1 Apr 2016- 31 Mar 2017	8,354
1 Apr 2017- 31 Mar 2018	8,354
1 Apr 2018- 31 May 2018	1,419
Total estimated reductions (tonnes of CO2e)	83,540
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	8,354

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

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There is no public financing involved in the Project.

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

In addition to the project activity, there is another 4.8 MW wind farm at the same location (Kala Pahad Hill Top on Nagda Hills in Rajoda village, Dewas district, Madhya Pradesh) being taken through the CDM process by the project proponent whose project boundary is within 1 km of the project boundary of the proposed small scale activity. However, the combined capacity of both the projects is 9.6 MW which is less than 15 MW, i.e. the threshold capacity for small scale projects as set in paragraph 6 (c) of the decision 17/CP.7. Further all the sites available on this hilltop for wind turbine installation have already been exhausted and no further installations are possible at the project location. The next available site for wind farm development is approx 10 kms away from the project location.

Therefore in accordance with the annex-7, appendix-C of the simplified modalities and procedures for the small-scale activity, the project activity qualifies to use simplified modalities and procedures for small-scale CDM project activities

SECTION B. Application of a baseline and monitoring methodology

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

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The indicative baseline and monitoring methodology for selected small-scale CDM project activity categories AMS I.D (version 13) has been used. The title of the methodology is "Grid connected renewable electricity generation".

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

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The project activity utilizes wind power for electricity generation, which falls into the category of renewable energy. Since the installed capacity of the project is 4.8 MW, less than the threshold capacity of 15MW, the project activity can be regarded as a small-scale CDM project activity as per paragraph 6(c) of decision 17/CP.7.UNFCCC. Therefore the project activity can be regarded as a small-scale CDM project activity.

Electricity generated by the project is used for captive consumption by MOIL's Mining Facility and Ferro Manganese Processing plant located at Balaghat District in Madhya Pradesh, which is also connected to the distribution system of Madhya Pradesh Poorv Kshetra Vidyut Vitran Company Limited (MPPoorvKVVCL). In the absence of the project activity the power requirements of the MOIL plant will have to be met by the distribution system of Madhya Pradesh Poorv Kshetra Vidyut Vitran Company Limited (MPPoorvKVVCL), which is part of the western regional electricity grid of India. The western grid comprises of a large number of power generating units, this satisfies the necessary criteria i.e. "displaces electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit" as per Appendix B of Simplified modalities and procedures for small-scale clean development mechanism project activities to be classified into category I.D.

The project activity is located on Kala Pahad hilltop on Nagda Hill near Rajoda village in Dewas district of Madhya Pradesh. All sites available on this hilltop for wind turbine installation have already been exhausted and no additional installations on this hilltop are possible. Therefore the capacity of the project activity cannot exceed the 15 MW limit in future.

In light of the above, the project is classified as type I.D. project activity.

B.3. Description of the project boundary:

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The project boundary, as stated in Appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project boundary is "The project boundary encompasses the physical, geographical site of the renewable generation source."

The project boundary is thus composed of the Wind Energy Converters, the metering equipment for each generator and substation, and the western regional electricity grid which is used to transmit the generated electricity. The western regional electricity grid includes the project site and all power plants connected physically to the electricity system.

Accordingly, the project boundary encompasses the physical extent of the Western regional electricity (Project Boundary) grid which includes the project site and all power plants connected physically to the electricity system.

B.4. Description of baseline and its development:

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Approach

The project category is renewable electricity generation for a grid system. The grid is also fed by both fossil fuel fired generating plants (using fossil fuels such as coal, natural gas, diesel, naphtha etc.) and non-fossil fuel based generating plants (such as hydro, nuclear, biomass and wind). Hence the applicable baseline, as per AMS I.D (version 13), is the kWh produced by the renewable generating unit multiplied by a grid emission factor (measured in kgCO2/kWh) calculated in a transparent and conservative manner as either of the following:

(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'

(b) The weighted average emissions (in kg CO_2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The project proponents have chosen option (a) i.e. the combined margin approach to calculate the emission coefficient for the grid. According to the tool, the baseline emission factor will be determined using the following steps:

STEP 1. Identifying the relevant electric power system

The Indian electricity system is divided into five regional grids, viz. Northern, Eastern, Western, Southern, and North-Eastern. Each grid covers several states. As the regional grids are interconnected, there is inter-state and inter-regional exchange. A small power exchange also takes place with neighbouring countries like Bhutan and Nepal.

Power generation and supply within the regional grid is managed by Regional Load Dispatch Centre (RLDC). The Regional Power Committees (RPCs) provide a common platform for discussion and solution to the regional problems relating to the grid. Each state in a regional grid meets its demand with its own generation facilities and also with allocation from power plants owned by the Central Sector such as NTPC and NHPC etc. Specific quotas are allocated to each state from the Central Sector power plants. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. The regional grid thus represents the largest electricity grid where power plants can be dispatched without significant constraints and thus, represents the "project electricity system" for the Project. As the Project is connected to the Western regional electricity grid, the Western grid is the "project electricity system".

STEP 2. Select an operating margin (OM) method

According to the tool, the calculation of the operating margin emission factor 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.

Any of the four methods can be used, however, 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 Share of Low Cost / Must-Run (% of Net Generation) in the generation profile of the different grids in India in the last five years is as follows:

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
North	25.9%	25.7%	26.1%	28.1%	26.8%	28.1%
East	10.8%	13.4%	7.5%	10.3%	10.5%	7.2%
South	28.1%	25.5%	18.3%	16.2%	21.6%	27.0%
West	8.2%	8.5%	8.2%	9.1%	8.8%	12.0%
North-East	42.2%	41.7%	45.8%	41.9%	55.5%	52.7%
India	19.2%	18.9%	16.3%	17.1%	18.0%	20.1%

Source: CO_2 Baseline Database for the Indian Power Sector – Central Electricity Authority

The above data 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 western regional grid is less than 50 % of the total generation. Hence the Simple OM method can be used to calculate the Operating Margin Emission factor.

The project proponents choose an ex ante option for calculation of the OM with 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, without requirement to monitor and recalculate the emissions factor during the crediting period.

STEP 3. 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. It may be calculated:

- Based on data on fuel consumption and net electricity generation of each power plant / unit (Option A), or
- Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit (Option B), or

- Based on data 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 C)

The Central Electricity Authority (CEA), Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO2 Baseline Database provides information about the Combined Margin Emission Factors of all the regional electricity grids in India. The Combined Margin in the CEA database is calculated ex ante using the guidelines provided by the UNFCCC in the "Tool to calculate the emission factor for an electricity system". We have, therefore, used the Combined Margin data published in the CEA database, for calculating the Baseline Emission Factor.

The CEA database uses the option B i.e. data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit, to calculate the OM of the different regional grids.
The simple OM emission factor is calculated based on the electricity generation of each power unit and an emission factor for each power unit, as follows:

$$\mathbf{EF_{grid,OMsimple,y} = \Sigma\ (EG_{m,y}\ x\ EF_{EL,m,y})\ /\ \Sigma EG_{m,y}}$$

Where:

$EF_{grid,OMsimple,y}$	= Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	= Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	= CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m	= All power units serving the grid in year y except low-cost / must-run power units
y	= Either the three most recent years for which data is available at the time of submission of the CDM PDD to the DOE for validation (ex ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

The emission factor of each power unit m has been determined using Option B

$$\mathbf{EF_{EL,m,y} = (\Sigma\ FC_{i,m,y}\ x\ NCV_{i,y}\ x\ EF_{CO2,I,y})\ /\ EG_{m,y}}$$

Where:

$EF_{EL,m,y}$	= CO_2 emission factor of power unit m in year y (tCO_2/MWh)
$FC_{i,m,y}$	= Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	= Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO2,I,y}$	= CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
$EG_{m,y}$	= Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
m	= All power units serving the grid in year y except low-cost / must-run power units
i	= All fossil fuel types combusted in power unit m in year y
y	= Either the three most recent years for which data is available at the time of submission of the CDM-PDD to the DOE for validation (ex ante option) or the applicable year during monitoring (ex post option), following the guidance on data vintage in step 2

STEP 4. Identify the cohort of power units to be included in the build margin (BM)

The sample group of power units m used to calculate the build margin consists of either:

(a) The set of five power units that have been built most recently, or
(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use the set of power units that comprises the larger annual generation.
Accordingly, the CEA database calculates the build margin as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation.
The build margin emission factor has been calculated 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. This option does not require monitoring the emission factor during the crediting period.

STEP 5. Calculate the build margin emission factor
The build margin emissions factor is the generation-weighted average emission factor of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$\mathbf{EF_{grid,BM,y} = (\Sigma\ EG_{m,y}\ x\ EF_{EL,m,}) / \Sigma\ EG_{m,y}}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ = CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m = Power units included in the build margin
y = Most recent historical year for which power generation data is available

The CO2 emission factor of each power unit m ($EF_{EL,m,y}$) is determined as per the procedures given in step 3 (a) for the simple OM, using options B using for *y* the most recent historical year for which power generation data is available, and using for *m* the power units included in the build margin.

STEP 6. Calculate the combined margin emissions factor

The emission factor *EFy* of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as $EF_{OM,y}$ and $EF_{BM,y}$, then the *EFy* is given by:

$$\mathbf{EF}y = w_{OM} * \mathbf{EF}_{grid,OM,y} + w_{BM} * \mathbf{EF}_{grid,BM,y}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM} = Weighting of operating margin emissions factor (0.75%)
w_{BM} = Weighting of build margin emissions factor (0.25%) (where $w_{OM} + w_{BM} = 1$).

Using the values for operating and build margin emission factor provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 901.05 tCO2e/GWh or 0.90105 tCO2e/MWh.

Details of Baseline data:

Data of Operating and Build Margin for the three financial years from 2004-05 to 2006-07 has been obtained from -

The CO2 Baseline Database for the Indian Power Sector
Ministry of Power: Central Electricity Authority (CEA)
Version 3
Dated: 15th December 2007
Key baseline information is reproduced in annexure 3.
The detailed excel sheet is available at:
http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

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:

Project Additionality:

The investment Barrier analysis set out below demonstrates in a conservative and transparent manner that the project activity is financially unattractive.

I. Investment Barrier:

For carrying out the investment analysis, we have used data and assumptions available from various MPERC orders and other publicly available information sources. The discussions relating to key parameters i.e. appropriate financial indicators and tariff is set out below. A detailed list of assumptions is also provided after these discussions.

Financial Indicator

The financial indicator identified for carrying out the investment barrier analysis is the return on equity or equity IRR. The return on equity or equity IRR is used as the appropriate financial indicator because in the Indian power sector, a 14% *post tax* return on equity is an established benchmark for projects in public or private sector based on cost-plus regulations (Source: Central Electricity Regulatory Commission, Terms and Conditions of Tariff, Regulations 2004 dated 26 March 2004) for utility scale power plants. Incentives (based on generation above the norm), foreign exchange variations and efficiency in operations are in addition to this benchmark of 14%.

For determining tariffs for wind power projects, the electricity regulatory commissions of the state of Madhya Pradesh, Maharashtra and Karnataka have considered the return on equity at 16%[1].

The **pre-tax return on equity** at 16%[2] has been considered by Madhya Pradesh Electricity Regulatory Commission (MPREC) for determining tariffs for wind power projects in the State.

[1] ROE for Madhya Pradesh, Maharastra and Karnataka - Source: RERC Order dated 29 September 2006

In addition, there are some essential differences between wind electricity projects (whether implemented with or without CDM revenues) and utility scale fossil fuel and hydro projects where the tariff is determined considering a post tax return on equity of 14%. These differences should be taken into account while setting the appropriate level of pre-tax equity IRR for wind projects in the state of Madhya Pradesh.

- The tariff structure for wind projects is a single-part tariff structure as compared to utility scale fossil fuel and hydro projects, which have two-part tariff structure. This implies that wind project activities carry a higher investment risk than the utility scale fossil fuel and hydro projects where the investment recovery is decoupled from the level of actual generation achieved by the project due to variations in off-take.

  Thus, in case of the wind power projects, issues such as transmission unavailability, back-down of generation or part-load operations, which are beyond the control of the investors are likely to affect the project activity more severely and therefore the project investors would require higher rate of return to compensate them for these additional risks.

- In case of utility scale fossil fuel and hydro projects, the tariff is determined by reference to a cost-plus approach whereby the projects recover their full investment cost each year if they are able to reach specified level of plant availability. In case wind projects, electricity generation is the sole determinant for tariff revenues. Wind electricity generation is again dependent on wind patterns, which is an exogenous factor. Therefore wind energy developers do not have any control over generation even if 100% machine availability is maintained. This increases the investment risks in the project activity compared to conventional power generation activities like fossil fuel fired and hydro power projects.

Based on the above considerations, **16% pre-tax equity IRR** is considered to be the appropriate pre-tax equity return for wind power projects in the state of Madhya Pradesh.

Tariff

HT consumers in Madhya Pradesh are required to pay a demand charge (fixed) which is based on their connected load and an energy charge (variable) linked to the amount of electricity consumed. In case of captive supply from wind power projects i.e. the project activity; the electricity generated is infirm and seasonal in nature and cannot be adjusted to the requirements of captive demand, therefore MOIL has to continue to rely on grid supply. The electricity supplied by the project activity provides relief only from the energy charge payable by MOIL; MOIL would continue to bear the demand charge as it was doing prior to the project activity. Evidence that there is no reduction in contract demand/demand charge prior to and after implementation of the project activity is available for the validator for verification.

Accordingly we have used the energy charge component of the applicable HT tariff for MOIL as the revenue line item for our investment analysis.

At the time of taking investment decision for the project, MOIL has considered baseline emission factor of 900 tCO2/GWh to calculate estimated value of emission reduction and expected CDM revenue from the project activity. Therefore, the baseline emission factor of 900 tCO2/GWh has been used for investment analysis to calculate pre tax equity IRR after considering CDM revenues.

Key assumptions for investment/financial analysis

Capacity of Machines in kW	800

[2] Pre-tax return on equity - Source: MPERC order passed on 11th June 2004 in the matter of procurement of wind energy (link: http://www.mperc.org/windenergy.pdf)

Number of Machines	6
Project Capacity in MW	4.80
Project Commissioning Date	30-June-06
Project Cost per MW (Rs. In Millions)	46.25

Operations	
Plant Load Factor	22.50%
Insurance Charges @ % of capital cost	0.18%
Operation & Maintenance Cost base year @ % of capital cost	1.00%
% of escalation per annum on O & M Charges	5.0%

Tariff	
HT Tariff for 33KV load in HV-3 category	4.15
Wheeling charge (% of Gross generation)	2%

Project Cost Land and Infrastructure, Generator & Electrical Equipments, Mechanical Equipments, Civil Works, Instrumentation & Control, Other Project Cost, Pre operative Expenses, etc.	Rs Million
Total Project Cost	222

Means of Finance		Rs Million
Own Source	100%	222
Term Loan	0%	0
Total Source		222
Terms of Loan		
Interest Rate	0.00%	
Tenure	-	Years
Moratorium	-	Months

Income Tax Depreciation Rate (Written Down Value basis)	
On Wind Energy Generators	80%
On other Assets	10%
Book Depreciation Rate (Straight Line Method basis)	
On all assets	4.50%
Book Depreciation up to (% of asset value)	90%

Income Tax	
Income Tax rate	30%

Minimum Alternate Tax	10%
Surcharge	10%
Cess	2%

Working capital	
Receivables (no of days)	45
O & m expenses (no of days)	30
Working capital interest rate	12%

CER Revenues	
CER Price in US$	-
Exchange rate Rs./US$*	40.00

* RBI reference rate as of 15 February 2007

Crediting period starts	1-June-08
Length of Crediting period	10

Baseline Emission Factor for Western Region (tCO2/GWh)	900

The pre-tax equity IRR for the project activity, without CDM revenue, is 14.10 %, which is lower than the benchmark rate of 16%. The pre-tax equity IRR improves to 15.63 % after CDM revenues are considered, therefore the CDM revenues can improve the commercial attractiveness of the project activity.

Conclusion:
From the above analysis it can be concluded that the proposed project is not financially an attractive business investment for the proponents. Alternatively, continuation of the baseline scenario; that of power consumption from the grid; would have been financially much more attractive an option and as a consequence would have led to higher GHG emissions. Thus, financial additionality of the project has been demonstrated using investment barrier.

II. Barriers due to prevailing practice

Wind energy potential in state of Madhya Pradesh
As of 31 March 2006, the gross potential for wind energy in the state of Madhya Pradesh was 5,500 MW. Installed capacity of wind farms in Madhya Pradesh as on the same date was 40.25 MW. This shows that installed capacity of wind in Madhya Pradesh is less than 1% of its gross potential, clearly wind based electricity generation is not a prevailing practice in Madhya Pradesh.
(Source: Indian Wind Power Association website, http://www.indianwindpower.com/potential.html)

Diffusion of wind energy in the electricity sector of Madhya Pradesh.
We analyze the extent to which wind energy projects have diffused in the electricity sector in Madhya Pradesh. In 2004 – 05, the total electricity available at bus bar in the state of Madhya Pradesh was 29,320.8 GWh[3] where as electricity generation in Madhya Pradesh from wind sources in 2004-05 was

[3] CEA General Review 2005-06 containing data for 2004-05

38.76 GWh[4]. This works out to about 0.13% of electricity available in the state of Madhya Pradesh. As can be seen, electricity generation from wind is not a common practice in Madhya Pradesh.

State	Grid Penetration[5]
Rajasthan	1.1%
Gujarat	0.7%
Madhya Pradesh	0.1%
Maharashtra	0.6%
Andhra Pradesh	0.3%
Karnataka	1.5%
Tamil Nadu	4.7%

Available information on grid penetration (as mentioned above) for wind power projects in Indian states indicate that Tamil Nadu is by far the leader having achieved close to 5% penetration, whereas the penetration level of wind farms in Madhya Pradesh is merely 0.1% which clearly demonstrates that wind power generation is not a common practice.

Clearly, the project activity faces significant Barriers as per Attachment A - Appendix B, Simplified modalities and procedures for small scale CDM project activities

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

The approach adopted for selecting the baseline scenario for the project is based on the existing actual emissions. The investors are currently drawing power from the grid. In the absence of the CDM project, the investors would have continued to draw electricity for meeting their power demands from the western grid.

Emission reductions are calculated as:

ERy = BEy – PEy – Ly

Where: *BEy* is the baseline emissions
PEy is project activity emissions and;
Ly is the amount of emissions leakage resulting from the project activity.

Baseline Emissions for the amount of electricity supplied by project activity, *BEy* is calculated as

BEy = EGy * EFy

[4] CEA General Review 2005-06 containing data for 2004-05

[5] Grid penetration = Electricity generation from wind projects as a percentage of the ex-bus energy available to the state. Source of data is CEA General Review 2005-06 containing data for 2004-05

Where: *EGy* is the actual amount of electricity displaced from the grid i.e. net electricity generated by the project after adjusted wheeling charge,
EFy is CO_2 emission factor of the grid

Project Emissions:

The project activity uses wind power to generate electricity and hence the emissions from the project activity are taken as nil.
PEy = 0

Leakage:

Since no equipment is transferred from another project activity or that any existing equipment is transferred to another activity, leakage as per AMS I.D is taken as zero.
Ly = 0

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

>>

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO2e/MWh
Description:	Operating Margin Emission Factor of Western Regional Electricity Grid
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied:	2004 – 05: 1.01294 2005 – 06: 1.00385 2006 – 07: 0.99362
Justification of the choice of data or description of measurement methods and procedures actually applied :	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with CDM methodologies: ACM0002 Version 07, and Tool to Calculate the emission Factor for an Electricity System (Version 01, EB 35 Annex 12)

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO2e/MWh
Description:	Build Margin Emission Factor of Western Regional Electricity Grid
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at

	www.cea.nic.in
Value applied:	2006 – 07 0.59379
Justification of the choice of data or description of measurement methods and procedures actually applied:	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with CDM methodologies: ACM0002 Version 07, and Tool to Calculate the emission Factor for an Electricity System (Version 01, EB 35 Annex 12)

Data / Parameter:	$EF_{CM,y}$
Data unit:	tCO2e/MWh
Description:	Combined Margin Emission Factor of Western Regional Electricity Grid
Source of data used:	Combined Margin Emission Factor ($EF_{CM,y}$) is calculated as the weighted average of Operating Margin Emission Factor ($EF_{OM,y}$) and Build Margin Emission Factor ($EF_{BM,y}$). The "CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied:	In case of wind power projects default weights of 0.75 for EF_{OM} and 0.25 for EF_{BM} are applicable as per ACM0002. Combined Margin Emission Factor ($EF_{CM,y}$) 0.90105 Refer Annex – 3 for comprehensive calculation of Combined Margin Emission Factor.
Justification of the choice of data or description of measurement methods and procedures actually applied:	Combined Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with CDM methodologies: ACM0002 Version 07, and Tool to Calculate the emission Factor for an Electricity System (Version 01, EB 35 Annex 12)

B.6.3 Ex-ante calculation of emission reductions:

>>

Ex-ante calculation of emission reductions is equal to ex-ante calculation of baseline emissions as project emissions (*PEy*) and leakage (*Ly*) are nil.

Baseline Emission Factor (Combined Margin) (*EFy*): - 901.05 tCO2e/GWh

Gross electricity generated by the Project Activity (Total Export): - TP_{Export} in kWh

Electricity Imported by the Project Activity (Total Import): - TP_{Import} in kWh

Net Electricity supplied to the grid by the Project Activity: - $TP_{Net} = TP_{Export} – TP_{Import}$ in kWh

Wheeling Charge of 2 % at Net Electricity: - $P_{wheeling}$ in kWh

Actual Electricity displaced by the Project Activity (EGy or TP_{Actual}): - TP_{Net} - $P_{wheeling}$ in kWh

Emission Reduction of the Project Activity (ERy): - EFy * EGy in tCO2e

Actual Electricity displaced by the Project Activity (EGy or TP_{Actual}):
TP_{Net} = 4.80 MW (Capacity) x 22.5% (PLF) x 8760 (hours) / 1000 = 9.4608 GWh
$P_{wheeling}$ = 2% * 9.4608 GWh = 0 .189216 GWh
EGy or TP_{Actual} = 9.4608 GWh - 0 .189216 GWh = 9.271584 GWh

Annual Baseline Emissions Reduction (ERy):
ERy = 901.05 tCO2e/GWh x 9.271584 GWh
= 8,354 tCO2e

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

>>

Year	Estimation of baseline emissions (tonnes of CO2e)	Estimation of project activity emissions (tonnes of CO2e)	Estimation of leakage (tonnes of CO2e)	Estimation of overall emission reductions (tonnes of CO2e)
1 June 2008- 31 Mar 2009	6,935	-	0	6,935
1 Apr 2009- 31 Mar 2010	8,354	-	0	8,354
1 Apr 2010- 31 Mar 2011	8,354	-	0	8,354
1 Apr 2011- 31 Mar 2012	8,354	-	0	8,354
1 Apr 2012- 31 Mar 2013	8,354	-	0	8,354
1 Apr 2013- 31 Mar 2014	8,354	-	0	8,354
1 Apr 2014- 31 Mar 2015	8,354	-	0	8,354
1 Apr 2015- 31 Mar 2016	8,354	-	0	8,354
1 Apr 2016- 31 Mar 2017	8,354	-	0	8,354
1 Apr 2017- 31 Mar 2018	8,354	-	0	8,354
1 Apr 2018- 31 May 2018	1,419			1,419
Total (tonnes of CO2e)	**83,540**	**-**	**0**	**83,540**

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

>>

B.7.1 Data and parameters monitored:

Data / Parameter:	**EGy**
Data unit:	MWh (Mega-watt hour)
Description:	The actual amount of electricity displaced from the grid i.e. net electricity generated by the project after adjusted wheeling charge.

Source of data to be used:	Electricity supplied to the grid as per credit note (certificate) for share of electricity generated by the project activity authorised by Madhya Pradesh Paschim Kshetra Vidyut Vitran Company Limited (MPPaschimKVVCL) and Madhya Pradesh Poorv Kshetra Vidyut Vitran Company Limited (MPPoorvKVVCL). MPPaschimKVVCL provides all details about kWh export, kWh import, Net Export kWh supplied to the grid, 2% Wheeling and Net Units after deduction of 2% wheeling to MPPoorvKVVCL every month for preparing credit note for the project activity.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Actual electricity displaced by the Project Activity (TP_{Actual} or EG): Net Electricity supplied to the grid (TP_{Net}) = 4.80 MW (Capacity) x 22.5% (PLF) x 8760 (hours) / 1000 GWh = 9.4608 GWh Wheeling Charge ($P_{wheeling}$) = 2% * 9.4608 GWh = 0 .189216 GWh TP_{Actual} = 9.4608 GWh - 0 .189216 GWh = 9.271584 GWh
Description of measurement methods and procedures to be applied:	Net electricity supplied to the grid will be measured by main meter (export and import). The procedures for metering and meter reading will be as per the provisions of the wheeling and banking arrangement between Madhya Pradesh Paschim KVV Company Ltd. Indore and Manganese Ore India Ltd (MOIL) for wind electric generation for captive use. The metering point is 220/132/33 kV (MPTRANSCO) substation located at Dewas district. Refer Annex – 4 for an illustration of the provisions for measurement methods.
QA/QC procedures to be applied:	QA/QC procedures will be implemented pursuant to the provision of wheeling and banking arrangement.
Any comment:	The monitoring data would be archived electronically and in hard copies till 2 years after the completion of the crediting period.

B.7.2 Description of the monitoring plan:

>>

Monitoring of emission reductions will be carried out following the guidance provided in the applicable methodology for the project activity i.e. AMS I.D (version 13), which requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex post* determination of grid emission factor has been chosen

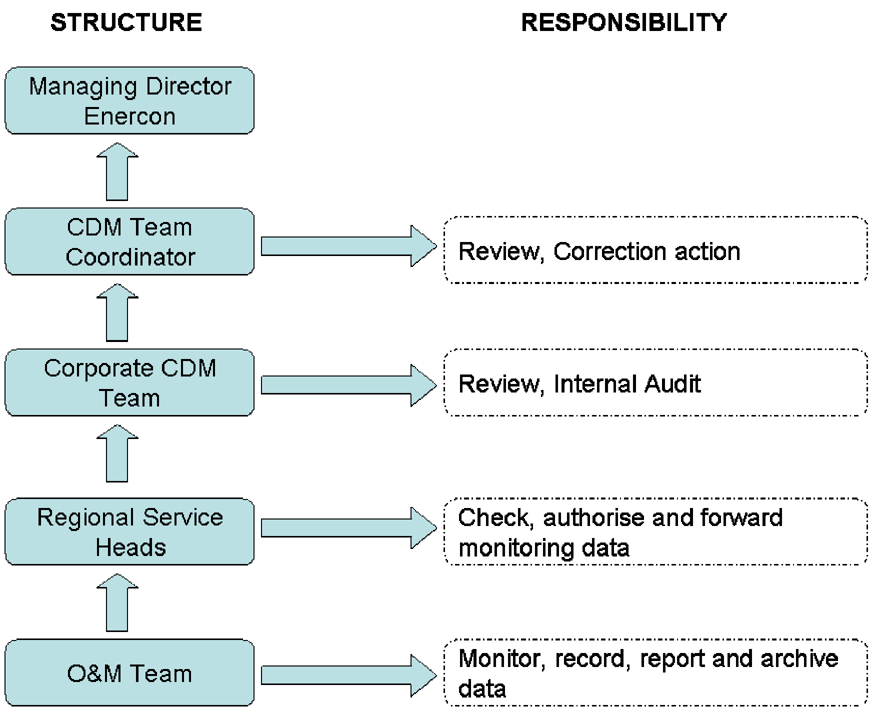
Since the baseline methodology is based on ex ante determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required. Further, wind based electricity generation is not associated with any kind of leakages. Hence, the sole parameter for monitoring is the electricity generated by the project and supplied to the grid after adjusted wheeling charge.

The Project is operated and managed by Enercon (India) Ltd. Enercon India limited is an ISO 9001:2000 certified Quality Management system from Germanischer Lloyd. Enercon India limited follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

The accuracy of monitoring parameter is ensured by adhering to the calibration and testing procedure. The project will adhere to all the mandatory regulatory and statutory requirements at the state as well as national level.

Training and maintenance requirements:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WECs), it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that Enercon's service staff is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The Enercon Training Academy provides need-based training to meet the training requirements of Enercon projects. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving.
The operational and management structure implemented by Enercon is as follows:



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: 10 April 2008
Name of responsible person/entity: Enercon India Limited (Project Participant) & their CDM Advisers

Contact Information: Refer to Annex 1

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:

>>
27 February 2006, being the date when MOIL released a letter of intent towards EIL for setting up this wind project.

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

>>
20 years

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

The project activity will use fixed crediting period.

C.2.1. Renewable crediting period

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

>>
Not Applicable

C.2.1.2. Length of the first crediting period:

>>
Not Applicable

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
1 June 2008 or the date of CDM registration whichever is later.

C.2.2.2. Length:

>>
10 years

SECTION D. Environmental impacts

>>

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

>>

Enercon appointed Care Sustainability, Navi Mumbai to conduct Rapid Environmental Impact Assessment Study in the part of Dewas district where the project activity of Enercon is located, to assess the impact of the project on the local environment

Environmental Impact Assessment (EIA) of this project is not an essential regulatory requirement, as it is not covered under the categories as described in EIA Notification of 1994 or the Amended Notification of 2006. However, Enercon conducted the EIA to study impacts on the environment resulting from the project activity.

The EIA study included identification, prediction and evaluation of potential impacts of the CDM activities on air, water, noise, land, biological and socioeconomic environment within the study area. The ambient air concentrations of Suspended Particulate Matter, Respirable Particulate Matter, Oxides of Nitrogen, Sulphur dioxide and Carbon Monoxide were monitored and were found under limits as specified by CPCB. The noise levels were observed through out the study period and were found to be in the permissible range. Water quality monitoring studies were carried out for determination of physico-chemical characteristics of bore wells. The ph level of water was found to be under the specified limits.

The study area represents part of Dewas district in Madhya Pradesh. The terrain comprises hilly areas which are sparingly populated, the hills are generally covered with shrubs and grass and trees are not found on the hilltops. Moreover the project area doesn't fall under any protected land for wildlife and it has no adverse ecological impacts on the surroundings, flora and fauna found in the vicinity of the project area. The wind-farms do not affect the path of migratory birds.

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:

>>

EIA demonstrated that there is no major impact on the environment due to the installation and operation of the windmills. The local ecology is not likely to get impacted by this type of project activity. The local population confirmed that there is no noise or dust nuisance due to windmills. The EIA also ruled out any adverse impacts due to the project activity.

SECTION E. Stakeholders' comments

>>

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

>>

For inviting the comments of all the stakeholder concerned with the project, an advertisement was published in the local daily newspaper "Raj-Express" on "4th-Oct-2006".

As per the schedule given in the local newspaper about the timing and location, a meeting was conducted on "19th-Oct-2006" at the site to know the views and concerns of the local stakeholders about the project. Villagers from villages in the vicinity of the wind farm gathered to give their comments and express their concerns.

The meeting commenced on scheduled time. Local stakeholders from nearby villages were present to attend the meeting. The villagers freely expressed their views about the development of wind farm in the area. No negative comment was received during the course of the meeting by any of the local stakeholder. The meeting ended on a positive note.

E.2. Summary of the comments received:

>>

The meeting was presided over by Shri Yashwant Thakur, Sarpanch Gram panchayat, Village Rajoda) who started of by saying that the wind turbines do not harm us in any way.

- The villagers felt that due to the construction of this wind farm, the local contractors can not use these mountains for excavations and thus there will be no problem of blasting and destroying the natural surroundings by them.
- Villagers themselves said that they know that wind generators do not have any adverse effect on the amount of rainfall in the area and this year it has rained more than their expectations
- Villagers were happy that the company does not stop them from grazing their animals even after the erection of Wind turbines in the area.
- Villagers expressed their gratitude towards company for building roads which the villagers now use to reach to their holy sites located on the mountains.
- People were happy to say that Enercon has employed people from nearby villages.

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

>>

No adverse comment about the project was received during the public stakeholder consultation meeting conducted at the site by Enercon India Ltd. The villagers were happy to know that the power produced from the wind energy project is clean and does not cause any environmental degradation.

The only question, which was discussed in detail during the meeting, was the effect of windmills on the rainfall pattern in the area. The villagers were conscious about this during the construction and operation of the project. The project personnel Mr. Ashish Shukla explained the villagers in detail about the working of the windmills. He said that the windmills extract the energy from the freely flowing wind and thus have no adverse impact on the environment or the rainfall. He said that this year the rainfall in the region was more than the average rainfall last year and if the windmills did affect the rainfall this would not have been the case. The chief guest of the meeting who by citing examples of the rainfall patterns in past few years said that there is no interconnection between the amount of rainfall and the windmills being installed in the area agreed upon this fact. The windmills do not affect the rainfall in this region or any other region. This is a scientifically proven fact that the windmills do not disturb the rainfall. The villagers were encouraged to put forward any further doubts they may have about this issue.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Enercon (India) Limited
Street/P.O.Box:	A-9, Veera Industrial Estate, Veera Desai Road, Andheri West
Building:	Enercon Tower
City:	Mumbai
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Telephone:	+91-22-66924848
FAX:	+91-22-67040473
E-Mail:	a.raghavan@enerconindia.net
URL:	
Represented by:	
Title:	Associate Vice President
Salutation:	Mr.
Last Name:	Raghavan
Middle Name:	V
First Name:	A
Department:	Corporate
Mobile:	+91-98200 45724
Direct FAX:	+91-22-5692 1175
Direct tel:	+91-22-6692 4848 extn. 7169
Personal E-Mail:	a.raghavan@enerconindia.net

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public financing involved in the project.

Annex 3

BASELINE INFORMATION

The Operating Margin data for the most recent three years and the Build Margin data for the Western Region Electricity Grid as published in the CEA database are as follows:

Simple Operating Margin

	Western Grid (tCO2e/GWh)
Simple Operating Margin - 2004-05	1012.94
Simple Operating Margin - 2005-06	1003.85
Simple Operating Margin - 2006-07	993.62
Average Operating Margin of last three years	1003.47

Build Margin

	Western Grid (tCO2e/GWh)
Build Margin- 2006-07	593.79

Combined Margin Calculations

	Weights	**Western Grid (tCO2e/GWh)**
Operating Margin	0.75	1003.47
Build Margin	0.25	593.79
Combined Margin		901.05

Detailed information on calculation of Operating Margin Emission Factor and Build Margin Emission Factor is available at www.cea.nic.in.

Annex 4

MONITORING INFORMATION

- **Metering:** Electricity supplied to the grid is metered by the two way export main meter installed by Madhya Pradesh Paschim Kshetra Vidyut Vitran Company Limited ("MPPaschimKVVCL") at the 33 kV side of 220/132/33 kV (MPTRANSCO) substation located at Dewas district. Another export/import meter is proposed to be installed and maintained by the distribution utility for recording the net energy fed into the distribution system. This meter will serve as check meter.

- **Metering Arrangement:** The project activity is connected to the common metering arrangement of main and check meter at the 220/132/33 (MPTRANSCO) substation located at Dewas District.

- **Metering Equipment:** Metering equipment is an electronic trivector meter of accuracy class 0.2 required for the Project. The meter is installed and owned by MPPaschimKVVCL. The metering equipment is maintained in accordance with electricity standards prevalent in Madhya Pradesh State.

- **Meter Readings:** The monthly meter reading is taken jointly and acknowledgement thereof is signed by the authorised representative of MPPaschimKVVCL and Enercon, being an operation and maintenance contractor for the project activity, on the last day of each calendar month. The joint meter reading contains the value of energy imported and exported and the net export to the grid during the recording period and certified by the Executive engineer of the MPPaschimKVVCL and by Enercon Officials. Then, the joint meter reading is submitted by MPPaschimKVVCL to MPPoorvKVVCL every month for preparing credit note for the project activity. The MPPoorvKVVCL prepare the credit note on the basis of the following parameters received from MPPaschimKVVCL:

kWh Export **(A)**	kWh Import **(B)**	Net kWh Export to the Grid **(X)=(A-B)**	2% Wheeling of Net Units in kWh **(Y)**	Net kWh after deduction of 2% wheeling **(Z)=(X-Y)**

  The project activity supplies electricity which is wheeled through the grid and is used for captive consumption. MOIL has to pay 2% of the net electricity supplied to the grid as wheeling charge for using the state transmission line. In view of the above, the net electricity after adjusted wheeling charge will be considered as the actual amount of electricity displaced from the grid by the project activity.

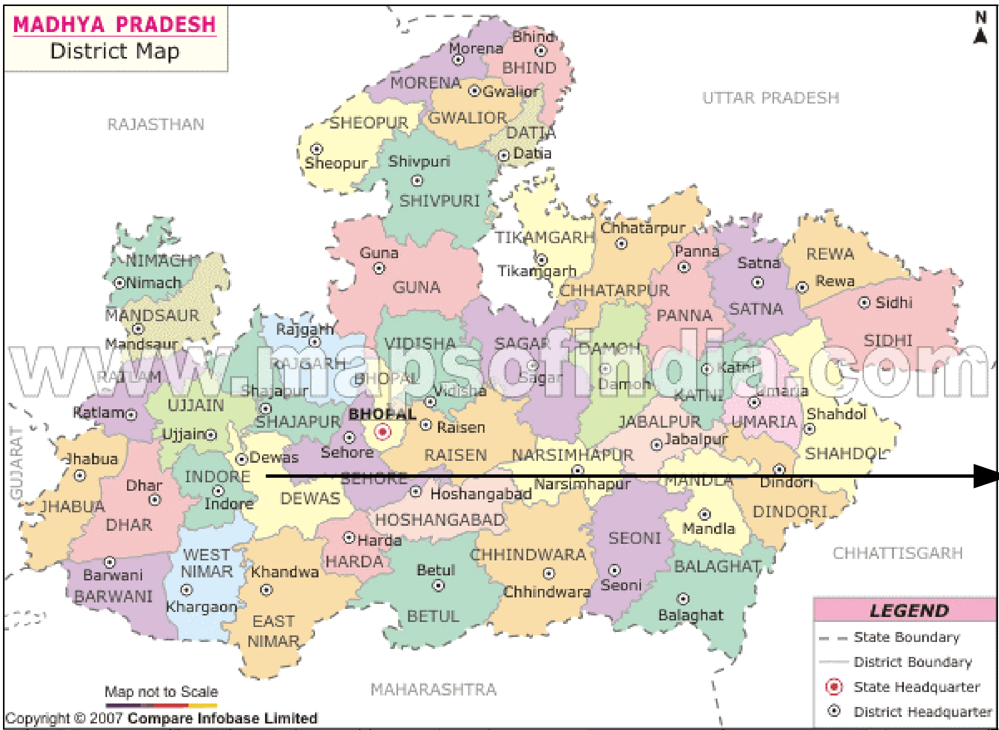
- Inspection of Energy Meters: The two-way export meter and all associated instruments, transformers installed at the Project are of 0.2 accuracy class. The meter is jointly inspected and sealed on behalf of the Parties (MPPasccimKVVCL and Enercon) and is not to be interfered with by either Party except in the presence of the other Party or its accredited representatives.

- **Meter Test Checking:** The meter is tested, checked for accuracy once in a year and also calibrated and adjusted once in a year in the presence of both the Parties. The meter shall be deemed to be working satisfactorily if the errors are within the permissible limit as allowed in the relevant IS specification applicable to high precision energy meters. The consumption registered by the main meter alone will hold good for the purpose of metering electricity supplied to the grid as long as errors in the main meter or check meter does not exceed permissible limits. In case in any month the errors in the main meter and check meter exceeds permissible limits, the meters will be tested and calibrated or replaced by correct meter and electrical energy will be recorded of that meter (Main or check) whose errors are found within limits.

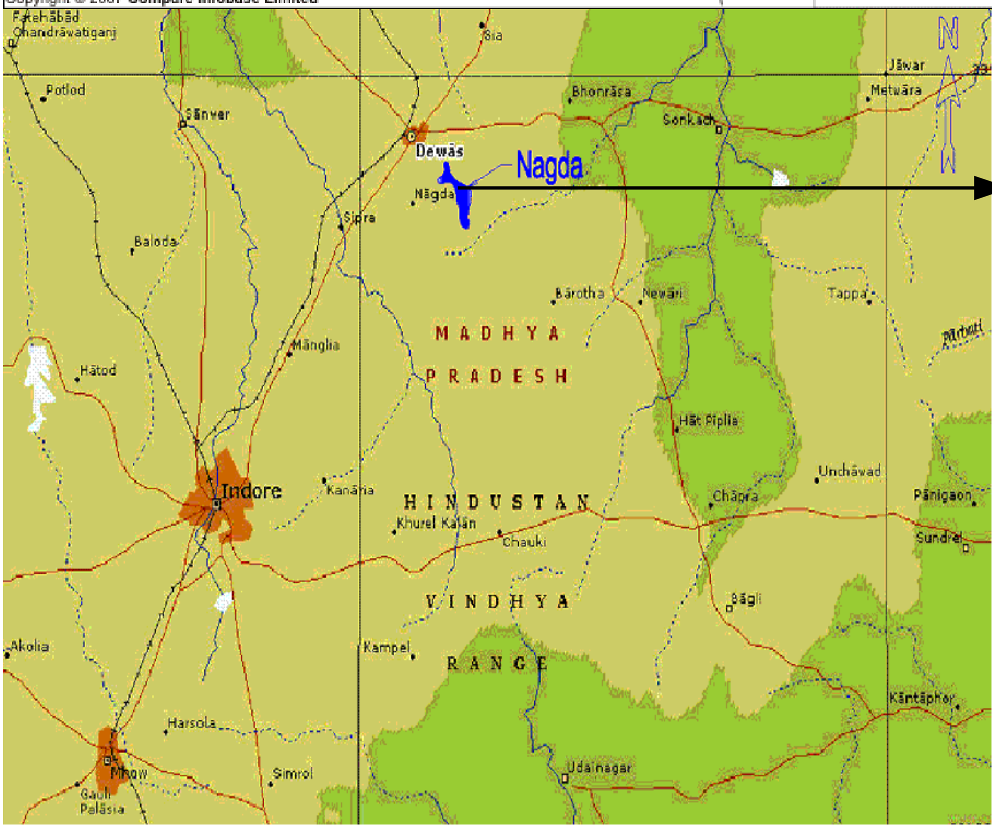
If during yearly test check or calibration,

- the main meter is found to have error beyond permissible limits of errors, but the check meter is found to have error within the permissible limit of errors, the electrical energy for the month shall be recorded and taken from the check meter. However main meter shall be calibrated and repaired immediately and the electrical energy thereafter shall be recorded and measured by recalibrated main meter.
- Both main and check meters are found to have errors beyond permissible limits, the main meter and check meter shall be immediately repaired and calibrated and a correction agreed to Parties will be applied to the monthly meter reading of the main meter to arrive at the correct electrical energy for recording purposes for the period of the Month up to the time of such test repairs and recalibration. The electrical energy for the period thereafter until the next monthly meter reading shall be recorded and measured as per the calibrated Main Meter.
- For the purpose of correction to be applied, the meter shall be tested as per the applicable standards. The error at the load and power factor nearest to the average monthly load served at the point during the testing shall be taken as per error to be applied for correction the sub-standard meter calibrated and sealed by authorised Meter Testing Laboratory shall be utilised.

APPENDIX 1 – LOCATION MAP



Map of Madhya Pradesh: Dewas District in which the project activity is located.



Location of the project activity: Nagda Hill near Rajoda Village of Dewas District in Madhya Pradesh State

Appendix 2 – Minutes of stakeholder consultation meeting

Public Consultation Meeting for Wind Power Projects as Clean Development Mechanism Projects at Site- Nagda Hills, Dewas District, Madhya Pradesh

Venue: Enercon India Ltd, Nagda Hills, Dewas District.

Date of Meeting: 19th October 2006

Members from the Villages

1. Sh Yashwant Singh Thakur
2. Sh Murari Lal

   And 15 participants from the village

Members from Enercon India Ltd., Dewas

1. Mr. Ashish Shukla (Proj. Coord)
2. Mr. Manish Vyas
3. Mr. Sunil Pandey
4. Mr. Aditya Awasthi
5. Mr. Ashish Shukla (Admin)

Members from Enercon India Ltd., Mumbai

1. Mr. Vivek Sen

Agenda of the Meeting:

1. Welcome Address and Introduction
2. Project Profile, CDM Environmental and Social Issues
3. Description about Wind Energy Conversion.
4. Suggestions and Opinions
5. Queries and Responses from the Stakeholders and Co. Authorities respectively.
6. Vote of Thanks

1. **Welcome Address:**

   In the Welcome Address the Mr. Ashish Shukla (Admin) ha briefed about the purpose of this Public Meeting, How Wind mills and wind energy are occupied major role in generating power there by rural population is benefited. Further he pointed out, how the benefits of employment opportunities, economical growth taken place in the areas. And also he has quoted examples of various social and religious activities taken up in the villages for ex. Construction of temple etc.

   Then Mr. Ashish Shukla (Admin) invited Mr. Yashwant Singh Thakur, Rajoda Village Panchayat leader to preside over the meeting and conduct the further proceedings.

2. Project Profile:

Mr. Ashish Shukla (Proj.. Coord): Mr. Ashish Shukla has described about the Wind Mills and how the wind Power is generated, Why it is called green energy and our project is emission free, pollution free when compared to thermal power. He reiterated that in thermal power, carbon would be emitted into the air, which causes air pollution. He said that the public would not have any bad impacts from the windmills. When asked by the villagers about the clouds running away causing due to the running of windmills and thereby causing deficiency in rainfall, Mr. Shukla has cleared the doubts of the stakeholder by convincing them about the height of the clouds and the height of the Wind Mill Erector. He also informed that the co-operation by the villagers required for the successful completion and service of Wind Mills.

3. President's Address:

A) Sh Yashwant Singh Thakur who has presided over the meeting has informed the villagers about how Wind Mills has helped our villagers and Farmers. He said whatever the electricity generated has to be distributed to the nearby locality as electricity cannot be stored. The wind mills are helpful in changing our economic and social life in and around Dewas Villages. He said that near village Rajoda government allot one hill to the contractor of stone crusher, it cases air & noise pollution due to bomb blast and it also destroys our natural sift of God so it is beneficial to install windmill rather than giving it to the contractor. He also pointed out on the news in one newspaper that windmill effect the rainfall and before the installation of windmill, villagers also thought the same but this year heavy rainfall removed all such doubts and there is no relation between these two from any angle. He also pledged that the cooperation from our villagers is there in future also and sought the same from Enercon. He also gave thanks to Enercon for building small temple of God Bhairav as local villagers worship from ancient times.

B) Sh Murari Lal has accepted that the temple work has been completed by Enercon only and praised about the social and religious activities by Enercon. He said that local villagers are getting employment during and after the project. The Windmill project also built a road up to their villages and fields. He told that there was no shortage of rainfall due to the windmills.

Questionnaire:

a) BY THE STAKEHOLDERS:

i) In the near time whether you restrict us and our cattle coming for grazing?
Ans. No, cattle are grazing in the hill area as usual

ii) Whether windmills affect our farming and ground water level?
Ans. No, there is no relation of farming with windmill nor it requires any water to rotate. The production of crops will increase if electricity is supplied at full voltage to the pump sets.

iii) What is the generation capacity of the Machine?
Ans. 800 kW per hour.

iii) Electricity generated from the windmill directly supplied to the villages?

Ans. No, it first goes to the MPSEB substation, Dewas and then it is further distributed.

b) BY THE COMPANY:

i) Is there any noise pollution by the running of Wind Mills

Ans. No, not heard but since it is in hilltops and away from the villages such nuisance is not there.

ii) Is there any problem of animals grazing in the hills?

Ans. No, cattle are grazing in the hill area as usual.

iii) How windmills helped in improvement of crops?

Ans. By the increase of voltage capacity and less load shedding it results an increase in the crop production.

iv) During construction or erection any damages or accidents occurred?

Ans. Absolutely not. The project work is taken up very smoothly and run with high safety standards.

Vote of Thanks: Mr. Ashish Shukla (Admin) thanked the village leaders and the villagers who have set aside their work and shown interest and eagerness to know about the Wind Mills. He also sought cooperation from all the corners for successful operation of windmills thereby achieving the national target of self sufficiency in power sector.

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