CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 02 - in effect as of: 1 July 2004)

CONTENTS

SECTION A. General description of project activity

A.1 Title of the project activity:

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Title: Bundled Wind power project in Jaisalmer (Rajasthan in India) managed by Enercon (India)Ltd.
Version: Version 6.0
Date:26/04/2012

A.2. Description of the project activity:

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The project activity involvesthe development and operation of grid-connected wind based electricity generation facilities with aggregate installed capacity of 54.0 MW, located within a wind park.

In April 2003, a new policy announced by the Rajasthan government provided for pooling, development and maintenance of grid sub-stations and transmission lines by the Rajasthan Rajya Vidyut Prasaran Nigam Ltd. (RRVPNL) for evacuation of power from wind farms. Based on this policy, the electricity generated from this wind park in Jaisalmer is supplied using internal electrical lines to a local sub-station of the RRVPNL at Badabagth using local transmission lines. The project activity has many sub-projects (individual wind farms owned by several entities) of smaller capacitiessharing common facilities within a wind park managed by Enercon (India) Ltd. (EIL); hence these sub-projects have been bundled in the project activity.

The capacity distribution of some of the sub-project has been changed as follows:-

1) In the registered PDD there is a typo error with respect to swap of capacities of two companies as follows:-

S. No.	Capacity as per the registered PDD			Capacity as per the Purchase orders		
	Sub-Project Owners	Number of WTGs	Capacity (MW)	Sub-Project Owners	Number of WTGs	Capacity (MW)
1	Texmo Group	5	3.0	Texmo Group	7	4.2
2	Venlon Polyester Film Ltd	7	4.2	Venlon Polyester Film Ltd	5	3.0

2) The ownership of following sub-project has been changed as follows:-

S.No.	Initial description as per registered PDD			Revised Configuration after change of ownership		
	Sub-Project Owners	Number of WTGs	Capacity (MW)	Sub-Project Owners	Number of WTGs	Capacity (MW)
1	Venlon Polyester Film Ltd	05	3.0	Enercon Wind	5	3.0

2	Texmo Industries-I*	03	1.8	Farm (Tungbhadra) Pvt. Ltd	3	1.8
3	Dinesh Pouches Limited	03	1.8		3	1.8
4	Texmo Industries-II*	01	0.6		1	0.6
5	Revathi Equipment Ltd.	04	2.4		4	2.4
6	R.K.Premises Pvt. Ltd.**	01	0.6		1	0.6
7	R. K. Marbles Pvt Ltd**	07	4.2		7	4.2
8	Supreme Buildestates Pvt. Ltd.**	01	0.6		1	0.6
9	Premier Buildestates Pvt. Ltd.**	01	0.6		1	0.6
10	Rennaissance Asset Management Co. Pvt. Ltd.	02	1.2		2	1.2
11	Texmo Precision Casting*	03	1.8		3	1.8
12	Shree Ram Transport Finance Co Ltd	07	4.2	NU POWER Renewable Ltd.	07	4.2

** These sub projects are the part of **Texmo Group**(Total capacity 4.2 MW) which includesfollowing WTGs as per the purchase orders:-*

S. No.	Name of Group Company	Name of Customers which are part of Group Company (as per the Purchase Orders)	No. of M/C	Capacity (MW)
1	*Texmo Group*	Texmo Industries Ltd.	03	1.8
2		Texmo Industries Ltd.	01	0.6
3		Texmo Precision Casting	03	1.8
		Total	**07**	**4.2**

*** These sub projects are the part of **R.K. Marbles Group** (Total capacity 6.0 MW, mentioned in registered PDD) which includesfollowing WTGs as per the purchase orders:-*

S. No.	Name of Group Company	Name of Customers which are part of Group Company (as per the Purchase Orders)	No. of M/C	Capacity (MW)
1	*R.K. Marbles Group*	R. K. Marbles Pvt Ltd	7	4.2
2		Supreme Buildestates Pvt. Ltd.	1	0.6
3		Premier Buildestates Pvt. Ltd.	1	0.6
4		R.K.Premises Pvt. Ltd.	1	0.6
		Total	**10**	**6.0**

3) From the total project capacity 58.2 MW (97 WTG) following WTGs were decommissioned:-

7 WTGs from total 6 sub-projects were decommissioned. The list of decommissioned WTGs is as follows:-

S.No.	Capacity before Decommissioning			No of WTGs Decommissioned	Revised Capacity of sub projects after part Decommissioning	
	Sub-Project Owners	Number of WTGs	Capacity (MW)		Number of WTGs	Capacity (MW)
1	Venlon Polyester Film Ltd	05	3.0	02	03	1.8
2	Texmo Industries-I	03	1.8	01	02	1.2
3	Dinesh Pouches Limited	03	1.8	01	02	1.2
4	Revathi Equipment Ltd.	04	2.4	01	03	1.8
5	R. K. Marbles Pvt Ltd	07	4.2	01	06	3.6
6	Dempo Industries Private Limited	01	0.6	01	0	0
	Total	23	13.8	07	16	9.6

Chronology of changes in project configuration as per JMR & Invoices is given in Appendix 5. Thus thefinal revised configuration of the project activitybased on the above changes in project configuration is as follows:-

S. No.	Sub-Project Owners	No. of M/C	Capacity (MW)
1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6
2	Compucom Software Ltd.	2	1.2
3	NU POWER Renewables Ltd.	7	4.2
4	BSL Limited*	4	2.4
5	LA-OPALA - RG Ltd*	1	0.6
6	Desai Brothers Ltd	5	3.0
7	Hindustan Platinum Pvt. Ltd.	2	1.2
8	Dinesh Pouches Ltd-I	3	1.8
9	Enercon Wind Farm (Tungbhadra) Pvt. Ltd	25	15
	Total	**90**	**54.0**

These sub projects are the part of **LNG group (Total capacity 3.0 MW, mentioned in registered PDD), which includesfollowing WTGs as per the purchase orders:-*

S. No.	Name of Group Company	Name of Customers which are part of Group Company (as per the Purchase Orders)	No. of M/C	Capacity (MW)
1	*LNG group*	BSL Limited	04	2.4
2		LA-OPALA - RG Ltd	01	0.6
		Total	**05**	**3.0**

The project activity generates and sells electricity to the RRVPNL under 20 year power purchase agreements (PPAs) under similar tariff. Enercon (India) Limited provides operation and maintenance services under contract to the sponsors for the entire 54.0 MW capacities. All the component wind farms have been commissioned, and supplies electricity to the RRVPNL in accordance with the preferential dispatching system.

The RRVPNL has decided not to invest in upgrading the existing 50 MVA sub-station and transmission lines that could have been used in this project, as a result, Enercon (India) Ltd. – (EIL) had to provide the investment in procuring and installing a 75 MVA sub-station and transmission lines for Enercon Jaisalmer project. In accordance with the official indicative expansion plan, options to meet increasing energy demand in Rajasthan are mostly thermal.

The proposed project will displace energy that is dispatched at the operating margin (largely thermal energy) and also delay the planned expansion of the RRVPNL generation capacity of its equivalent size.

The project activityinvolves development, design, engineering, procurement, finance, construction, operation and maintenance of wind energy based electricity generating stations that will provide electricity to the RRVPNL grid under the PPAs.

Apart from the generation of electrical power, the Project also contributes to the following:

- Sustainable development, through utilisation of renewable wind resources available in the region where the Project will operate;
- Reduction of Green House Gases, specifically CO_2;
- Rural and Infrastructural development in the areas around the Project;
- Capacity addition to the present installed capacity and increase in the energy availability at places of scarcity;
- Strengthening the countries rural electrification coverage;
- Generation of permanent and temporary employment and production of indirect employment in the area; and
- Project contribution for community development of the local rural area.

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Govt. of India (Host)	Enercon India Limited (EIL)	No
Govt. of Netherlands	IFC – Netherlands Carbon Facility (INCaF)	No

The project participant from non Annex I country (India) is EIL. The various project sponsors whose facilities form part this wind farm project have authorized EIL to act as an aggregator of sub-activities within the CDM project activity.

EIL shall be the lead and nodal entity for all communication with CDM-EB and Secretariat. The details of CER allocation at the point of issuance shall be furnished at the time of Project Design Document (PDD) registration.

The Netherlands represented by its Ministry of Housing, Spatial Planning and the Environment acting through the International Finance Corporation, in its capacity as a Trustee of the IFC-Netherlands Carbon Facility (INCaF) would be project participant from Parties in Annex I.

The contact information on project participants in the project activity is provided in Annex 1 in this PDD.

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

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A.4.1.1. Host Party(ies):

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The host party to the project activity is the Government of India (GoI).

A.4.1.2. State/ etc.:

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Rajasthan.

A.4.1.3. City/ etc:

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Jaisalmer (district).

A.4.1.4. Detail of physical location, including information allowing the unique identification of this project activity (maximum one page):

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The wind farm is located at Soda village, in Jaisalmer District of Rajasthan state in India. The project area is located in a wind zone of geographic location 26°54'N and 70°55'E. The project area extends between 26°40'N latitude and 69°36'E longitude to 26°42'N latitude and 69°38'E longitude. The sites are

located at a distance of 5 – 45 km from Jaisalmer, 300 km from Jodhpur by road. The nearest railway station is at Jaisalmer.A location map is attached as Appendix 3.

A.4.2. Category(ies) of project activity:

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The project activity is considered under CDM category zero-emissions **'grid-connected electricity generation from renewable sources'**that generates electricity in excess of 15 MW (limit for small scale project). Therefore as per the scope of the project activity enlisted in the 'list of sectoral scopes and related approved baseline and monitoring methodologies(version 02 Mar 05/07:23)', theproject activitymay principally be categorized in Scope Number 1, Sectoral Scope - Energy industries (renewable/ non-renewable sources).

A.4.3. Technology to be employed by the project activity:

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The facilities included in the project activity utilize a total of 90 numbers of 600kW rated turbines (Enercon make). The unique features of this wind turbine technology is attached as Appendix 4. These turbines are linked from individual facilities through internal electrical lines connecting the wind park to a local 33/132kV sub-station, and a 132kV Double Circuit line with the RRVPNL 220/132kV sub-station at Amarsagar using the local transmission lines.

The turbines generate 3-phase power at 400V, which is stepped up to 33KV. The substations and 33KV lines are maintained by the RRVPNL. The wind farms operate as base load units and can operate in the frequency range of 47.5 – 51.5Hz. The wind farms generate data every 30minutes on the unit of electricity generated and dispatched to the grid; such data is being monitored and tracked by EIL on a daily basis.

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 ensuring optimum efficiency at all times, having speed range of 18 to 33 RPM.
⇒ 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.

EIL 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. Moreover, Enercon India Limited has acquired capabilities to export synchronous generators and blades of the wind turbines, is recognized as an export house by the Government of India and has successfully exported wind turbines to Australia.

A.4.4.Brief explanation of how the anthropogenic emissions of anthropogenic greenhouse gas(GHGs) by sources are to be reduced by the proposed CDM project activity, including why the emission reductions would not occur in the absence of the proposed project activity, taking into account national and/or sectoral policies and circumstances:

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Rajasthan faces two interdependent energy problems for the coming decades. First, it has a significant deficit in electricity supply, with a current installed capacity of about 4,000MW. Second, its electricity sector relies overwhelmingly (64%) on thermal-based power generation (coal and gas), despite having under-developed renewable energy sources such as wind (constitutes only 1% of the regional grid power at present). As a result, the region's power grid is a major source of anthropogenic GHGs.In the past capacity additions have primarily been through the addition of coal based thermal power plants.

If the CDM project is approved, it will displace equivalent unit of electricity generated by thermal power plants**.** The CDM project activity, wind based project , represents a small capacity addition (<1.5% of grid installed capacity)[1] and hence will have a marginal effect on the operating generating units connected to the selected grid as well as on the capacity addition to the grid. Thus, it is demonstrated in Section B.3 that in the absence of the proposed CDM project activity, , the electricity authority would have permitted thermal/or other GHG intensive power generation options , which would result in the emission of a greater amount of greenhouse gases (GHG) emissions for generating same quantum of power from the proposed project activity.

The project itself is a zero emission power project as it is based on wind, a renewable natural resource. However, there had been some fugitive emission (in the form of carbon dioxide emissions due to movement of vehicles) during the construction phase of the project, but such emission has been considered negligible when compared with the total savings earned by the project throughout its lifetime and based on the scale of construction activities involved.

It is estimated that the project activity would achieve emission reduction of 996,240CO_{2equ} during its 10 years of crediting period.

A.4.4.1. Estimated amount of emission reductions over the chosen crediting period:

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The estimated emission reductions over the 10-year fixed crediting period is presented below:

Years	Annual estimation of emission reductions in tonnes of CO_2e
01 July 2004 to 30 June 2005	110147
01 July 2005 to 30 June 2006	110147
01 July 2006 to 30 June 2007	110147
01 July 2007 to 30 June 2008 *	108705
01 July 2008 to 30 June 2009	92849
01 July 2009 to 30 June 2010	92849

[1] The largest sub-project in the project activity (i.e., the Enercon wind farm project of installed capacity 24.6 MW) is less than 1% of the total grid capacity (3991.8 MW), whereas the total capacity under project activity (54 MW) is about 1.37% of the total grid capacity.

01 July 2010 to 30 June 2011	92849
01 July 2011 to 30 June 2012	92849
01 July 2012 to 30 June 2013	92849
01 July 2013 to 30 June 2014	92849
Total Estimated Reductions (tonnes of CO2e)	**996240**
Total number of crediting years	10 years
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	**99624**

* 07 WTGs were decommissioned on 02 June 2008 hence CER estimation has been done for 58 WTGs upto May 2008 and for later period for 54 WTGs

A.4.5. Public funding of the project activity:

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There is no Official Development Assistance (ODA) being used for the project. The total project cost works out to Rs. 2,873 million. The projects constituting the CDM project activity have secured a loan from Power Finance Corporation Ltd (PFC) to the extent of Rs. 984.40 million for the loan component of Enercon Wind Farms (Jaiselmer Neither of the loan component has any ODA component.

SECTION B. Application of a baseline methodology

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

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The approved baseline methodology **ACM0002**Version 04 Sectoral Scope: 1, "Consolidated baseline methodology forgrid-connected electricity generation from renewable sources", by CDM Meth Panel has been used to determine the baseline emissions and emission reductions due to the project activity. The title of this baseline methodology is "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

B.1.1. Justification of the choice of the methodology and why it is applicable to the project activity:

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Grid-connected electricity generation from renewable source (wind energy) has been considered as the project activity, for which the geographic and system boundaries for the relevant grid (Northern regional grid) can be clearly identified and information on the characteristics of the grid are also available.

The other conditions that favour the application of the selected approved methodology for this project are listed below:

- Sufficient publicly available information is available to document in a transparent and conservative manner the nature of the prohibitive barriers to the project activity, which can be used to demonstrate how its registration as a CDM project would enable it to overcome those barriers.
- sufficient information exists to demonstrate in a transparent and conservative manner that the type of activity undertaken in the Enercon Wind Farm project was not common practice in Rajasthan at the time of undertaking the project activity

- This wind energy project will displace electricity that would otherwise been provided by the operation and expansion in the Rajasthan state electricity grid which is a part of the northern regional grid. The extent of this grid can also be clearly identified.
- The northern region power sector is not dominated by generating sources with zero or low operating costs such as hydro, geothermal, wind, solar, nuclear, and low-cost biomass.

B.2. Description of how the methodology is applied in the context of the project activity:

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The baseline methodology approach 48(a) called "**existing actual or historical emissions, as applicable**" has been applied in the context of the project activity. The approach selected in the baseline methodology checks the additionality of the project activity and determines the baseline emission factor for selected baseline scenario. The details are discussed below.

1. Demonstrating the additionality of the project activity

This project activity will be defined as additional[2] if anthropogenic emissions of GHGs by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.

Within the scope of the adopted baseline methodology, additionality has been demonstrated by crossing certain barriers as per the following steps, which are organised below as per the CDM Meth Panel guidelines[3] as explained in the baseline methodology adopted for this project activity.

Step 0: Preliminary screening based on the starting date of the project activity

If project participants wish to have the crediting period starting prior to the registration of their project activity, they shall:

(a) Provide evidence that the starting date of the CDM project activity falls between 1 January 2000 and the date of the registration of a first CDM project activity, bearing in mind that only CDM project activities submitted for registration before 31 December 2005 may claim for a crediting period starting before the date of registration.

It is important to explain the process of wind farm project development in India in general and in the context of Rajasthan in particular. The process of development of wind power projects in India is very different from setting up conventional or other non-conventional power projects.

EIL obtained the rights to develop wind power projects from Government of Rajasthan under the Build-Own-Transfer basis under the prevailing policies of Government of Rajasthan. The rights to develop wind power projects included project approval, lease of project land, evacuation approval from the state electricity utility, approval of construction drawings from CEIG, etc. EIL then proceeded with site development activities including survey and selection of potential sites, site analysis, micro siting, wind measurement, etc.

Having identified the project site, EIL gained the possession of the land on a 30-year lease from the state government or the nodal agency and proceeded to develop the potential sites including surface preparation, approach roads, setting up of buildings including control rooms/office rooms, etc. Simultaneously along with the development of site, EIL started scouting for investors to invest in wind projects being developed by EIL. As investor orders were firmed up, it commenced the construction of evacuation system including substation, 33/ 66 kV overhead lines, protection equipment and other grid interface arrangements. In parallel, it approached the Rajasthan Rajya Vidyut Prasaran Nigam Limited (RRVPNL) for signing of the Power Purchase Agreements on behalf of the investors.

[2] As per 17/cp.7.

[3] As per "Tool for the demonstration and assessment of additionality (version 02)".

EIL is also the exclusive O&M contractor to the wind projects in the wind farms developed by it. The investors in the wind farm are private/public sector firms who are generally passive financial investors who own small capacities in a wind farm.

For the projects that are being aggregated under this PDD, the investors contracted with EIL in 2003 - 04 for setting up the wind farms. There is documentary evidence available for the validator.

(b) Provide evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity. This evidence shall be based on (preferably official, legal and/or other corporate) documentation that was available at, or prior to, the start of the project activity.

EIL initiated the wind farm development in Rajasthan by applying for 25 MW capacity in January 2001 under the 100 MW Government of Rajasthan wind power policy (see description below) and 83.6 MW capacity in March 2003 under the 250 MW Government of Rajasthan wind power policy (see description below). The proposed projects that are being aggregated are under the new Rajasthan wind power policy.

As soon as EIL obtained the rights to develop the 83.6 wind projects in Rajasthan under the new policy, it contemplated setting up the wind projects as CDM projects for its customers as well as for its own SPVs.

The Management Committee of EIL set out the CDM initiative in 2000 and since then has regularly monitored the progress of the CDM initiative. In late 2001, Government of Netherlands came out with the CERUPT Tender. EIL participated in CERUPT tender by offering 15 MW + 15 MW wind farm projects and was selected under the tender. EIL was not able to conclude the contract with CERUPT and the 15 MW + 15 MW projects were subsequently cancelled. However, this provided EIL with a considerable experience in the CDM process.EIL appraised its customers in Rajasthan about the potential CDM benefits. EIL considered CDM revenues as part of its investment decision in setting up Enercon Windfarm (Jaisalmer) Ltd, one of the sub-projects in this PDD. Further, the lender to Enercon Windfarm (Jaisalmer) Ltd considered CDM revenues while sanctioning the loan. These documents are available for the validator to review.

EIL had gained awareness regarding the clean development mechanism in 2000 through various seminars and conferences. It also began to apprise its customers of the emerging carbon opportunities. This provided a positive boost to EIL's plans to consider and go ahead with wind farm plans in general and the present project in particular.

EIL management had taken a decision to go ahead with the development of the wind farm in Rajasthan in 2002, after duly considering CDM benefits under the Kyoto Protocol. There is documentary evidence to such decision available for the validator.

EIL commenced discussions with INCaF on 17 June 2003 by sending a PIN for certain wind projects in Karnataka. Over the period of discussions with INCaF, the projects were reconfigured and EIL and INCaF signed a Letter of Intent on 30th December 2003 for the project activities in Rajasthan and Karnataka.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

1. Identify realistic and credible alternative(s) available to the project participants or similar project developers that provide outputs or services comparable with the proposed CDM project activity. These alternatives are to include:

- The proposed project activity not undertaken as a CDM project activity;
- All other plausible and credible alternatives to the project activity that deliver outputs and on services (e.g. electricity, heat or cement) with comparable quality, properties and application areas;
- If applicable, continuation of the current situation (no project activity or other alternatives undertaken).

Alternative(s) available to the project participants or similar project developers include:

(a) The proposed project activity not undertaken as a CDM project activity.

(b) Setting up of utility scale (100 – 200 MW) fossil fuel or hydro power projects that supply to the Rajasthan grid. This is a relevant Alternative because the project is a part of a utility scale wind farm development with a project implementation period of 3 – 4 years (comparable to project development time frame for similar sized coal-fired and hydro-power stations). The difference between the project activity and this Alternative from an implementation perspective is merely the incremental capacity additions over the project implementation period. Otherwise, the size of investment, the amount of project development and commissioning time, provision of services (electricity generation supplied to the state grid) for the entire wind farm is similar to that of this Alternative.

(c) Continuation of the current situation where no project activity or any of the above Alternatives are undertaken would not be applicable as Rajasthan had energy (MU) shortages of 2.10% and peak (MW) shortages of 1.5% in 2002-03 (Source: Northern Region Power Sector Profile, September 2005, Ministry of Power).

Sub-step 1b. Enforcement of applicable laws and regulations

2. The alternative(s) shall be in compliance with all applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution. This sub-step does not consider national and local policies that do not have legally-binding status.

3. If an alternative does not comply with all applicable legislation and regulations, then show that, based on an examination of current practice in the country or region in which the law or regulation applies, those applicable legal or regulatory requirements are systematically not enforced and that non-compliance with those requirements is widespread in the country. If this cannot be shown, then eliminate the alternative from further consideration.

4. If the proposed project activity is the only alternative amongst the ones considered by the project participants that is in compliance with all regulations with which there is general compliance, then the proposed CDM project activity is not additional.

There are no legal and regulatory requirements that prevent Alternatives from occurring.

Proceed to Step 2 (Investment analysis) or Step 3 (Barrier analysis). (Project participants may also select to complete both steps 2 and 3.)

Step 2. Investment analysis

As explained above, there are two levels of investment decisions that are involved in setting up wind projects in Rajasthan. At the first level, EIL has decided to proceed with the investments in wind farm over a 3 – 4 year period of setting up utility sized wind power project. At the second level, individual investors take decisions about participating in the wind farm by buying smaller capacities. The investment analysis presented here is applied on the wind capacity that is applicable for investment decisions at the second level, i.e., by reference to tariffs and returns to individual projects.

Sub-step 2a. Determine appropriate analysis method

Sub-step 2b. – Option I. Apply simple cost analysis

Sub-step 2b. – Option II. Apply investment comparison analysis

3. Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g., levelized cost of electricity production in $/kWh or levelized cost of delivered heat in $/GJ) most suitable for the project type and decision-making context.

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

4. Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g., levelised cost of electricity production in $/kWh or levelized cost of delivered heat in $/GJ) most suitable for the project type and decision context.

Option I is not applicable as the project activity sells electricity to the grid and obtains economic benefits in the form of electricity tariffs. EIL proposes to use **Option III – Benchmark analysis** and the financial indicator that is identified is the post-tax return on equity or the equity IRR. There are some essential differences between the project activity (whether implemented with or without CDM revenues) and the Alternatives identified in Sub-step 1(a) (utility scale fossil fuel and hydro projects).

The project activity tariff structure 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 project activity carries 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 offtake. Thus, 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 activity investors would require higher rate of return to compensate them for these risks.

The second difference arises from the fact that the tariff is specified *ex ante* for the project activity. In case of utility scale fossil fuel and hydro projects, these are usually by reference to cost-plus approach whereby the projects recover their full investment cost including a post-tax return on equity if they are able to reach specified level of plant availability. Whilst for the project activity, in the initial years, the return on equity (calculated as the net profit divided by the equity invested) is low (and even negative), the utility scale fossil fuel and hydro projects are ensured of equity returns from the first year of operation. This increases the investment risks in the project activity compared to the alternatives.

The post tax return on equity and equity IRR is used as a benchmark because in the Indian power sector, a 16% post tax return on equity has been 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 2001, Notification dated 26 March 2001). Incentives, foreign exchange variations and efficiency in operations (for fossil fuel fired generators) are additional to this benchmark of 16%. The expected return on equity for Central Power Sector utilities was estimated in the range of 16.5% - 21.5% (Source: Cost of Capital for Central Sector Utilities, Crisil Advisory Services, April 13 2000).

The regulated return on equity has been revised downwards to 14% return on equity by the Central Electricity Regulatory Commission (Source: Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2004 dated 26th March 2004).

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

5. Calculate the suitable financial indicator for the proposed CDM project activity and, in the case of Option II above, for the other alternatives. Include all relevant costs (including, for example, the investment cost, the operations and maintenance costs), and revenues (excluding CER revenues, but including subsidies/fiscal incentives. where applicable), and, as appropriate, non-market cost and benefits in the case of public investors.

6. Present the investment analysis in a transparent manner and provide all the relevant assumptions in the CDM-PDD, so that a reader can reproduce the analysis and obtain the same results. Clearly present critical techno-economic parameters and assumptions (such as capital costs, fuel prices, lifetimes, and discount rate or cost of capital). Justify and/or cite assumptions in a manner that can be validated by the DOE. In calculating the financial indicator, the project's risks can be included through the cash flow

pattern, subject to project-specific expectations and assumptions (e.g. insurance premiums can be used in the calculation to reflect specific risk equivalents).

7. Assumptions and input data for the investment analysis shall not differ across the project activity and its alternatives, unless differences can be well substantiated.

8. Present in the CDM-PDD submitted for validation a clear comparison of the financial indicator for the proposed CDM activity and:

(a) The alternatives, if Option II (investment comparison analysis) is used. If one of the other alternatives has the best indicator (e.g. highest IRR), then the CDM project activity can not be considered as the most financially attractive;

(b) The financial benchmark, if Option III (benchmark analysis) is used. If the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive.

The assumptions for financial analysis has been presented for the 24.6MW Enercon Windfarm (Jaisalmer) project, one of the sub-projects in the aggregated project activity as its assumptions in relation to financing can clearly be ascertained. Other sub-projects have been financed on the basis of internal accruals and therefore the return on equity calculation will be distorted.

Capacity of Machines in kW	600
Number of Machines	41
Project Capacity in MW	24.60
Plant Load Factor	23.78%
Insurance Charges	0.18%
Operation &Maintenance Rs '00,000 /WEC /PA	3.50
% of escalation per annum	7.5%
Revenue Parameters	
Base Tariff	3.39
Annual Escalation	2.0%
Project cost Rs '00,000	12,300
Income Tax Rate	35%
Surcharge on Tax	2.0%
Minimum Alternate Tax	7.5%
Tax Holiday on the Income	
100% Tax holiday under Section 80 IA	10 years
Debtors (no of days)	45
O & M Expenses (no of days)	30
Working capital interest rate	14%
Price of 1 CER	Euro 4.5
1 Euro	Rs 53

Means of Finance

Own Source (Rs. '00,000)	2209.00	18%
Loan Funds (Rs. '00,000)	10090.00	82%
Total Source (Rs. '00,000)	12300.00	
Terms of the Loan		

Lease from Power Finance Corporation	Terms	no.of years
Interest Rate	9.28%	
Moratorium		Nil
Repayment	100%	10
Second Repayment	0%	5

The post tax equity IRR without considering CDM revenues considering 20 years cash flows is 11.9%. The post tax equity IRR with CDM revenues is 13.9%.

Investment analysis for the Machines for which ownership has been changed:-

As per the guidance provided by UNFCCC via email dated 11 Feb 2011 in response to the prior documents submitted by PP , PP has incorporated the salvage value of decommissioned WTGs in IRR calculations and results of the same provided below .

The revised post tax equity IRR work out for the sub projects for which part decommissioning was done is as follows:-

S. No.	Sub-Project Owners	Number of WTGs	Capacity (MW)	Post tax equity IRR at base PLF @ 23.78% without CER revenues	
				Before Decommissioning	Post Decommissioning & after incorporating salvage value
1	Venlon Polyester Film Ltd	03	1.8	9.9%	9.0%
2	Texmo Industries-I	02	1.2	10.1%	9.0%
3	Dinesh Pouches Limited	02	1.2	10.4%	9.4%
4	Revathi Equipment Ltd.	03	1.8	10.4%	10.0%
5	R. K. Marbles Pvt Ltd	06	3.6	10.1%	9.8%
6	Dempo Industries Pvt. Ltd.	01	0.6	9.9%	10.2%

Further only machine of Dempo Industries Pvt. Ltd. was decommissioned by the project owner and there is no generation that could be attributed to project owner after decommissioning. As a result PP has carried out the investment analysis for the project activity only up to the period till the WTG was operational.

From the above sensitivity analysis it is clear that post tax equity IRR is still below than the benchmark and project is still additional.

Sensitivity analysis on PLF:-

In the registered PDD the sensitivity analysis has been conducted considering the key parameter, plant load factor. The plant load factor encompasses the variations in wind profiles, variations in offtake (including grid availability) and machine downtimes. In the registered PDD a sensitivity analysis has been done based on the range of ± 1.5 (absolute) plant load factor on base PLF of 23.78%. Similar sensitivity analysis on PLF forall the sub projects have been done as shown below:-

S. No.	Sub-Project Owners	Number of WTGs	Capacity (MW)	Post tax equity IRR without CER revenues(Post Decommissioning & after incorporating salvage value)	
				PLF at 22.28%	PLF at 25.28%
1	Venlon Polyester Film Ltd	03	1.8	7.9%	9.9%
2	Texmo Industries-I	02	1.2	8.0%	10.0%
3	Dinesh Pouches Limited	02	1.2	8.3%	10.3%
4	Revathi Equipment Ltd.	03	1.8	9.0%	11.0%
5	R. K. Marbles Pvt Ltd	06	3.6	8.8%	10.9%
6	Dempo Industries Pvt. Ltd.	01	0.6	9.4%	11.0%

Sub-step 2d. Sensitivity analysis (only applicable to options II and III):

9. Include a sensitivity analysis that shows whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions. The investment analysis provides a valid argument in favour of additionality only if it consistently supports (for a realistic range of assumptions) the conclusion that the project activity is unlikely to be the most financially attractive (as per step 2c para 8a) or is unlikely to be financially attractive (as per step 2c para 8b).

Sensitivity analysis has been conductedfor the 24.6 MW Enercon Windfarm (Jaisalmer) project considering the key parameter, plant load factor at 22.28% and at 25.83%. The plant load factor encompasses the variations in wind profiles, variations in offtake (including grid availability) and machine downtimes. A range of ± 1.5% (absolute) plant load factor has been considered for the sensitivity analysis.

The post equity IRR at the stated PLFs are as follows:

	PLF at 22.28%	PLF at 25.28%
Post tax equity IRR without CER revenues	9.2%	14.6%
Post tax equity IRR with CER revenues	11.0%	17.1%

Step 3. Barrier analysis

If this step is used, determine whether the proposed project activity faces barriers that:

(a) Prevent the implementation of this type of proposed project activity; and

(b) Do not prevent the implementation of at least one of the alternatives.

Use the following sub-steps:

Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity:

1. Establish that there are barriers that would prevent the implementation of the type of proposed project activity from being carried out if the project activity was not registered as a CDM activity.

The identified barriers are only sufficient grounds for demonstration of additionality if they would prevent potential project proponents from carrying out the proposed project activity if it was not expected to be registered as a CDM activity.

2. Provide transparent and documented evidence, and offer conservative interpretations of this documented evidence, as to how it demonstrates the existence and significance of the identified barriers. Anecdotal evidence can be included, but alone is not sufficient proof of barriers.

3. If the identified barriers also affect other alternatives, explain how they are affected less strongly than they affect the proposed CDM project activity. In other words, explain how the identified barriers are not preventing the implementation of at least one of the alternatives. Any alternative that would be prevented by the barriers identified in Sub-step 3a is not a viable alternative, and shall be eliminated from consideration. At least one viable alternative shall be identified.

As explained above, there are two levels of investment decisions that are involved in setting up wind projects in Rajasthan. At the first level, EIL has decided to proceed with the investments in wind farm over a 3 – 4 year period of setting up utility sized wind power project. At the second level, individual investors take decisions about participating in the wind farm by buying smaller capacities. The barrier presented here are the EIL faces and has faced in developing the entire wind farm.

Barrier due to changes in Government policy

Government of Rajasthan came out with a specific policy to encourage wind power projects. The Policy for Promoting Generation of Power through Wind issued vide Government Order No. F.20(3)Energy/98 dated 4.2.2000 (100 MW Government of Rajasthan wind power policy) provided for, inter alia, tariffs at MNES rates, availability of adequate transmission and evacuation facilities, etc.

Even before the build up capacity reached 100 MW as envisaged in the 2000 Policy, the State Government had cancelled the 2000 Policy and came out with a new policy in April 2003. There was a period of 6 to 8 months of uncertainty about the future of wind power sector in the State during the intervening period of 6 to 8 months in the State. Policy For Promotion Of Electricity Generation From Wind, 2003 issued vide Energy Deptt. letter No.F.20(3)Energy/98/Pt.III dated 30.4.2003 (250 MW Government of Rajasthan wind policy). The policy states that "*The level of tariff protection with guaranteed escalation and wheeling charges provided in the 2000 Policy, in accordance with MNES guidelines, is no longer affordable to RVPN as it imposes a heavy financial burden on it. Moreover, the identification of more potential sites, improvement in conversion efficiency, reduction in lending rates by the financial institutions, availability of large size machines on commercial scale and downtrend in capital costs, have all necessitated a review of the incentives and benefits in the existing Policies. A revised Policy is therefore proposed.*"

The 250 MW Government of Rajasthan wind policy reduced the tariff benefits substantially and introduced a developmental charge of Rs. 200,000 per MW to be deposited with RREC for developing pooling station. It provided that the state utilities will augment sub-station capacity at 132/33 or 33/11 KV or higher levels which never materialized as RVPN decided not to invest in upgrading the existing 50 MVA substations and transmission lines. As a result, EIL had to invest in installing a 75 MVA substation and transmission lines for the wind farms connected in the project activity. This resulted in additional expenditure of approximately Rs. 150 million.

The 250 MW Government of Rajasthan wind policy allows the state utility (RVPN) not to purchase power beyond 250 MW within this Policy, a barrier that has not been set in place for other types of power generation sources.

Barrier due to prevailing practice

At the time EIL commenced the developmental work in Rajasthan in 2002 – 03, wind in Rajasthan was not a common practice.

State	Grid penetration[4]
Andhra Pradesh	0.98%
Gujarat	1.88%
Karnataka	1.17%
Maharashtra	2.62%
Rajasthan	0.36%
Tamil Nadu	9.23%

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 over 9% penetration, whereas the penetration level of wind farms in Rajasthan was merely 0.36% which clearly demonstrates that wind power generation is not a common practice.

Barrier relating to economics of power project

The economics of wind power project, as they are based on single part tariff structure without any deemed generation benefits, depend on their ability to be able to generate at estimated levels without being backed down. This is unlike other utility scale fossil fired or hydro power projects where two part tariff structure is available which mitigates the investment risks from dispatch (actual generation).

The barrier due to low penetration manifested in lack of grid availability. When the project activity in the State of Rajasthan started, upgradation of evacuation facility of the State utility at Jaisalmer, was required to be carried out to evacuate the power and there hence a specific provision was put in the Power Purchase Agreement, to the effect that no compensation would be payable in case the utility was unable to evacuate the power due to the restricted evacuation facility. This was a major barrier and EIL as the project developer, and the upsides like CDM revenue were considered to evaluate the project. A larger level of penetration ensures adequate grid availability as in other states like Tamil Nadu.

The barrier due to low penetration brings forth developmental risks. At the time of project development, wind data availability was for 25 meters height which much less than the hub height of the turbine. The wind pattern of Rajasthan is unpredictable, which is proved so in the last two years of operation of the project. The capacity utilisation factors in Jaisalmer wind farm projects have seen tremendous reduction in the last two years of operation due to reduction in wind speed.

The wind pattern in Rajasthan is such that the maximum generation is achieved during the nights, when the load on the system is very low. The inadequate evacuation facility coupled with the maximum generation during off peak hours shall mean a considerable reduction in the revenue.

Sub-steps 3a – 3b are satisfied, proceed to Step 4

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity:

1. Provide an analysis of any other activities implemented previously or currently underway that are similar to the proposed project activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc. Other CDM project activities are not to be included in this analysis. Provide quantitative information where relevant.

[4] Grid penetration = installed wind capacity (in MW) as a percentage of the total installed capacity available to the state grid (including shares from Central Sector Power Utilities). Source of data is Ministry of Power Annual Report 2002-03. Data as on 31/01/2003.

Sub-step 4b. Discuss any similar options that are occurring:

2. If similar activities are widely observed and commonly carried out, it calls into question the claim that the proposed project activity is financially unattractive (as contended in Step 2) or faces barriers (as contended in Step 3). Therefore, if similar activities are identified above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially unattractive or subject to barriers. This can be done by comparing the proposed project activity to the other similar activities, and pointing out and explaining essential distinctions between them that explain why the similar activities enjoyed certain benefits that rendered it financially attractive (e.g., subsidies or other financial flows) or did not face the barriers to which the proposed project activity is subject.

3. Essential distinctions may include a serious change in circumstances under which the proposed CDM project activity will be implemented when compared to circumstances under which similar projects where carried out. For example, new barriers may have arisen, or promotional policies may have ended, leading to a situation in which the proposed CDM project activity would not be implemented without the incentive provided by the CDM. The change must be fundamental and verifiable.

Wind farm developers have developed and are currently developing projects in Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Tamil Nadu, etc. There are three factors which we consider appropriate in order to determine "comparable" environment:

- Government Policy and electricity regulatory framework: These vary significantly across the various states and therefore a wind farm investment in say Maharashtra or Karnataka can not be directly comparable to the one in Rajasthan.
- Physical factors: Tamil Nadu is generally accepted to have the most favourable wind regime with longer periods of wind availability and easily accessible project sites as compared to lower wind regime, extreme conditions and difficult terrain of Rajasthan.
- Wind farm penetration: The growth of wind farm development depends significantly on the existing infrastructure and transmission facilities availability. Therefore investment in wind farm in Tamil Nadu, in general, can be facilitated more easily than as compared to Rajasthan, where the wind farms were only recently developed.

On the basis of above, activities comparable to the project activity comprise wind energy generators developed by leading wind farm developers (who are also the leading wind turbine manufacturers like Enercon, Suzlon, etc.) set up in Rajasthan.

First wind installation in Rajasthan commenced in 1999 – 2000 (at 2 MW) which increased to 16.1 MW by 2001 – 02 and 60.7 MW by 2002 – 03 (Source: MNES Annual Reports).All these projects are under the 100 MW Government of Rajasthan wind power policy. The proposed54.0 MW projects are all under the 250 MW Government of Rajasthan wind power policy which has been discussed above.

Sub-steps 4a and 4b are satisfied.

Step 5. Impact of CDM registration

Explain how the approval and registration of the project activity as a CDM activity, and the attendant benefits and incentives derived from the project activity, will alleviate the economic and financial hurdles (Step 2) or other identified barriers (Step 3) and thus enable the project activity to be undertaken.

Registering the project activity as a CDM activity provides a significant amount of revenue, improving the project's cash flow and improve the equity IRR by 2%. The revenues from sale of the Certified Emission Reductions would enhance the viability of the project and would partially offset the risks associated with the possible changes in policy, wind regime, project implementation risks (time and cost overruns), etc. Further, CER revenues will be high quality cash flows coming from creditworthy parties

and denominated in foreign currency. The CDM revenues will attract new players to wind investments in Rajasthan, as they provide compensation for the regulatory and project risks implicit in the wind power projects.

2. Define the baseline scenario and calculate the baseline emission rate

2.1 Baseline Scenario

The baseline scenario is that the northern region electricity grid of India generates electricity by operation of existing grid connected power plants and by addition of new generation sources. The baseline emissions are calculated using approved baseline methodology ACM0002 recommended by the CDM Meth Panel. The baseline information is provided under **Annex 3**. The details of the calculations are provided under **section E**. The calculations for the Combined Margin carbon dioxide emission factor for the connected electricity system (NorthernGrid) is based on data collected from authenticate official sources, such as the Central Electricity Authority (CEA).

2.2 Choice of grid (electricity system):

There are 5 regional grids which manage the power distribution system in India. The management of generation and supply of power within the regional grids are undertaken by the load dispatch centers(LDC). Different states within the regional grids meet the demand from their own generation facilities plus generation by power plants owned by the central sector (i.e. NTPC and NHPC etc). Specific quota is allocated to different states from the central sector power plants. Depending on the demand and generation there are exports and imports of power with in different states in the regional grid. Thus there is trading of power between states in the grid. The imports and export of power between regional grids faces few physical restrictions for which inter regional grid power trading sometimes gets restricted. Since the CDM project would be supplying power to the regional grid it is also preferred to take the regional grid as project boundary than the state boundary. The choice of regional grid is in line with the definition of Project Boundary as per ACM 0002 as there is no guidance provided by the DNA of the host country on the delineation of grid boundaries and India is a large country with layered dispatch systems (e.g., state/regional).

Moreover, As per methodology ACM 0002, baseline calculations are to be based on fuel consumption value preferably taking the country specific figures, where available. The information published by CEA, the authorised source of information for India on fuel consumption, do not specifically mention the fossil fuel consumption (except coal) for the Central sector power plants in electricity grid. This makes it difficult to calculate state specific carbon dioxide emission factor. Hence Northern region electricity grid, to which the said project activity is connected has been selected as the baseline electricity system.

2.3 Baseline emission rate calculation

The first contribution to the baseline emission calculation is the project's impacts on the operating margin (affecting the operation of power plants on the grid). The impact on the operating margin accounts for the fact that the system operator will adjust the output of other existing plants on the system in response to the output of the project activity.

The second contribution is on the build margin (delaying or avoiding the construction of future power plants). This second contribution accounts for the fact that even a small project is likely to delay the commissioning of new generation sources, if not directly displace a specific other new generating source. In fact, this delay effect is a reasonable assumption where (a) there is a planned or unplanned

sequence of new facilities to be built, and (b) the timing of construction is affected by the need to balance supply and demand, either through maintaining the reserve margin above a threshold level. In fact, this delay effect can be expected to effect total emissions at the build margin to a degree that is comparable in magnitude to the effect on the project's effect on emissions at the operating margin.

The process for considering these two contributions to the baseline emissions and estimating the emission rate of the displaced electricity is as follows.

Step 1. Calculating the Operating Margin emission factor ($EF_{OM,y}$)

In order to understand the baseline scenario, the following information is provided below that provides information on the power generation portfolio in the Northern regional grid. The generation of electricity from different fuel sources, for past 5 years, as on 31 January 2004 (ref. CEA general review report[5]) is as follows: (all figures in GWh).

	Hydro	Wind	Nuclear	Steam	Diesel	Gas
2003-2004	38,279	15	7,380	103,232	0	18,758
2002-2003	30,335	25	8,800	100,362	0	17,262
2001-2002	29,129	19	8,158	96,882	24	17,634
2000-2001	29,020	6	6,669	92,417	0	16,863
1999-2000	31,531	1	5,322	87,096	0	15,438
Total	**158,293**	**65**	**36,329**	**479,988**	**24**	**85,955**
Percentage	**20.81**	**0.01**	**4.78**	**63.10**	**0.00**	**11.30**

It is clear that the grid profile is dominated by fossil fuel based power plants (74.4%) followed by hydro (20.8%).

The "Simple OM" method has been selected as per guidelines provided in ACM0002, since low-cost/must run resources (hydro, wind and nuclear) constitute only 25.6% (less than 50%)of average total grid generation the Southern grid, not including low-operating cost and must-run power plants.

The operating margin emission factoris calculated using the generation-weighted average emissions per electricity unit of all generating sources serving the system, with a 3-year average, based on the recent statistics available at the time of PDD submission. This option does not call for updation *ex post* every year, hence this part of the CO2 emission factor will not require monitoring.

Step 2. Calculate the Build Margin emission factor ($EF_{BM,y}$)

Since the project activity is opting for fixed crediting period, Option 1 of ACM 0002 was found more appropriate for calculation of the Build margin emission factor. As per methodology this is an *ex ante* option hence does not require monitoring.

The generation of 5 most recently built power plant in grid were found less than 20% of the present generation of the grid. Therefore, the generation from all those recently added power plants have been considered whose capacity additions comprise 20% of the regional grid's generation.

[5] Posted at CEA website : www.cea.nic.in

Step 3. Calculate a baseline emission factor EF_y

The baseline emission factor has been calculated as the weighted average of the Operating Margin emission factor **($EF_{OM,y}$)** and the Build Margin emission factor **($EF_{BM,y}$)** where equal weights have been provided as default.

No leakage has been considered in the calculation, as per recommendations of the ACM0002. Therefore, the emission reductions are actual baseline emission (BEy), since the project activity is based on wind resources and will not have any project emissions.

Step 4. Justify conservatism of baseline methodology in the case of the project

To be conservative in estimating emission reduction and baseline emission rate calculation, following measures has been taken:

- The selected methodology suggests exclusion of low cost must run power plants from the baseline grid when these resources constitute less than 50% of the total generation of the grid.
- For calculating baseline this project proposes to use a 50:50 default weighting of the build and operating margins, i.e. combine margin.
- Project output has been considered to remain constant and it has been proposed that no capacity addition to the same project within the same project site will be considered as part of CDM project.
- The data has been collected from the official sources and any sort of extrapolation has been explicitly avoided.
- To calculate the emissions of the existing power plants, the average net calorific values reported by CEA has been considered, which were lower compare to the default country specific net calorific values presented in the IPCC guidelines.

B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity:

>>

In the absence of the project activity, the GHG emissions to generate and supply the same amount of power as generated by the project activity, would be through use of existing power plants in the grid and/or addition of new plants in the grid.

The project activity, due to its nature (use of wind energy), would not result emissions that would otherwise have occurred in its absence.

B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity:

>>

The project boundary encompasses the physical, geographical site of the 54.0 MW project sited at the project location specified in Section A.4.1.4 above. It would include the wind turbine installations and pooling and the RRVPNL sub-stations.

B.5. Details of baseline information, including the date of completion of the baseline study and the name of person (s)/entity (ies) determining the baseline:

>>
Dr. P. Ram Babu of PricewaterhouseCoopers (P) Limited has assisted the project sponsor in determining the application of baseline methodology.

The baseline study has been revised on 15/12/2005.

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:

>>
10/07/2003

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

>>
20 years.

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

C.2.1. Renewable crediting period

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

>>

C.2.1.2. Length of the first crediting period:

>>

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
01/07/2004

C.2.2.2. Length:

>>
10 years.

SECTION D. Application of a monitoring methodology and plan

D.1. Name and reference of approved monitoring methodology applied to the project activity:

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Approved monitoring methodology ACM0002 / Version 04 Sectoral Scope: 1, "Consolidated monitoring methodology for grid-connected electricity generation from renewable sources", by CDM Meth Panel

D.2. Justification of the choice of the methodology and why it is applicable to the project activity:

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The monitoring methodology is used in conjunction with the adopted baseline methodology (ACM0002) that is applicable to electricity capacity additions from wind sources.

Since this project activity is not geothermal project, the methodology requires monitoring of the following:

- Electricity generation from the proposed project activity;
- Operating margin emission factor, if needed based on choice of methodology
- Build margin emission factor of the grid, if needed based on choice of methodology

For the project activity to establish its creditable emission reduction, it has to record the actual electricity generation, which would displace equivalent units of electricity at the operating and build margin of the Northern regional grid. Since the simple OM emission factor is calculated based on a 3 year average, based on the most recent statistics available at the time of PDD preparation, its updation based on ex post monitoring is not required. For BM calculation, option 1 (refer ACM 0002) has been chosen, which is calculated ex ante based on the most recent information, hence its monitoring is also not required. Thus, under the monitoring protocol for the project it is required to:

- Monitor and record the actual units of electricity supplied to the grid by the wind farms

Therefore, with the given requirements of the wind farms CDM project and the selected monitoring methodology, it is justified that the applied monitoring methodology (ACM0002) for grid-connected electricity generation from renewable sources is the correct choice for the monitoring plan of the CDM project activity.

D.2. 1. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario

D.2.1.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

Not applicable as the project is a zero-emissions grid-connected electricity generation from Wind energy – a renewable source.

D.2.1.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>
Not applicable.

D.2.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of GHGs within the project boundary and how such data will be collected and archived :

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
1.EG_y	Electricity quantity	Net electricity generation supplied to the grid by the	MWh	C	CM	monthly	100%	Electronic / paper	During the crediting period and two years after	The project activity is located in Sodabandhan and Temdarai. Project activity consists of two metering points, one main &onebackup metering point and each metering point have

		Projectactivity.								two meters. Main metering point is installedat Amarsagar[6] sub-station (33/132/220kV) which is managed by state utility (RRVPN) while backup metering point is installed at Temdarai sub-station (33/132 kV) which is managed by Enercon (India) Limited. At Temdarai Sub-station there are two backup meters (Back up meters B1 & B2) which records the electricity supplied to the grid by the project activity and non project activity WTGs at 132kV Level. From Temdarai sub-station electricity is transmitted to Amarsagar sub-station through two EHV lines (132kV each). At Amarsagar sub-station there are two main meters (main meters M1 and M2) at 132 kV Level which is connected at each 132kV EHV lines coming from Temdarai sub-station. Main meters records the electricity supplied to the grid by the project activity as well non project activity WTGs. Consequently, the main meter

[6]Connection point of the project activity to a particular sub station is decided by state utility and hence, the same might change in future. However the procedure for allocation of apportioning of electricity generation will remain same.

										readings reflect the aggregate electricity supplied by all these wind farms (project activity non project activity WTGs), The net electricity supplied by individual wind turbines is determined by following a process of allocating the total electricity (recorded at the main meters M1 and M2) to the individual turbines in proportion of the electricity generation recorded by the Panel meter (Local Control System (LCS)) at the individual wind turbines. Allocation plan for calculating net electricity generation supplied to the grid by project activity is given in Annex 4. Main and Backup meters measures the electricity (export & Import) on continuous basis and recorded by state utility on monthly basis. Panel meter (LCS controller) measures the Gross electricity export to the grid on continuous basis and daily/monthly data can be sourced/recorded from online SCADA system. Net electricity generation

										supplied to the grid is a calculated value and is used in calculation of emission reduction of the project activity. Refer Annex – 4 for an illustration of the provisions for measurement methods

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived ? (electronic/ paper)	For How long is archived data kept?	Comment
2. $E_{JMR,Export}$	Electricity quantity	Electricity exportedby project activity & non project activityWTGs, as recorded by the main meters at the Amarsagar (State utility substation).	MWh	M	-	Monthly	100%	Electronic / paper	During the crediting period and two years after	The Export reading is jointly noted from the main meters installed at the state utility substation. The monthly joint meter readings are taken by the representatives of state utility and Enercon (PP's representative) who also signs the JMR. Simultaneously, the monthly joint meter reading of backup meters available at Enercon (India) Limited sub-stations (Temdarai) is also taken by representatives of state utility and Enercon The data will be sourced

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
										from monthly JMRs recorded at utility sub-station. Refer Annex – 4 for an illustration of the provisions for measurement methods

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
3. $E_{JMR,Import}$	Electricity quantity	Electricity importedby project activity & non project activityWTGs, as recorded by the main meter at the state utility substation	MWh	M	-	Monthly	100%	Electronic/ paper	During the crediting period and two years after	The Import reading is jointly noted from the main meter installed at the state utility substation. The monthly joint meter readings are taken by the representatives of state utility and Enercon (PP's representative) who also signs the JMR.

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
										Simultaneously, the monthly joint meter reading of backup meters available at Enercon (India) Limited sub-stations (Temdarai) is also taken by representatives of state utility and Enercon The data will be sourced from monthly JMRs recorded at utility sub-station. Refer Annex – 4 for an illustration of the provisions for measurement methods

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
4. $EG_{Controller,i}$	Electricity quantity	Gross electricity export (gross electricity generation by WTG)by a WTG of project activity or non project activity, as measured at the controller (LCS meter) at project site. Where i, is the total number of WTGs connected to main meter including both	MWh	C	-	Continuous	100%	Electronic/ paper	During the crediting period and two years after	Gross electricity export by individual WTG is continuously monitored by SCADA system which is installed on site. This reading can also be seen in the electronic panel installed inside the WTG tower. Each WTG has exclusive LCS meter that records Gross electricity export from the WTG (project or non project). Based on the individual WTGs gross electricity export data sourced from SCADA system the total electricity export by the project activity and non-project activity is calculated (sum of all WTGs export data) by the Enercon's authorised personals.

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
		project activity & non project activity.								The data will be sourced from SCADA system which will be provided by Enercon (India) Limited. LCS meter measures the Gross electricity export by WTG and doesn't provide the reading of electricity import. The value is monitored continuously and recorded daily by the online monitoring station at the site. In addition to the daily generation report, monthly generation reports are also available at monitoring station. Refer Annex – 4 for an illustration of the provisions for measurement methods

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
5. $\sum EG_{Controller,i}$	Electricity quantity	Summation of Gross electricity export (Gross electricity generation by WTG)by all WTG of project activity and non project, as measured at the controller (LCS meter) at project site,	MWh	C	-	Continuous	100%	Electronic/ paper	During the crediting period and two years after	Each WTG has exclusive LCS meter that records Gross electricity export by the WTG (project or non project). The value is monitored continuously and recorded daily by the online monitoring station at the site. In addition to the daily generation report, monthly generation report is also available at monitoring station. The data will be sourced from online SCADA system which will be provided by Enercon (India) Limited. Refer Annex – 4 for an illustration of the provisions for measurement methods

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
6. $\sum EG_{Controller, N,M}$	Electricity quantity	Summation of Gross electricity export (Gross electricity generation by WTG) by all the WTGs (N number of WTGs) of sub-project (M) included in the project activity, as measured at the LCS where M is any sub project included in the project activityan	MWh	C	-	Continuous	100%	Electronic / paper	During the crediting period and two years after	Each WTG has exclusive LCS meter that records Gross electricity export by the WTG (project or non project). The value is monitored continuously and recorded daily by the online monitoring station at the site. In addition to the daily generation report, monthly generation report is also available at monitoring station. Based on the individual WTGs generation data sourced from SCADA system the total generation details of all the sub projects calculated (sum of all WTGs generation data) by the Enercon's authorised personals. The data will be sourced from SCADA system

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
		d N is the number of WTGs in a sub-project.								which will be provided by Enercon (India) Limited. Refer Annex – 4 for an illustration of the provisions for measurement methods

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
7. $EG_{Export,y,M}$	Electricity quantity	Electricity export to the grid by all WTGs of a sub-Project included in the project activity, where M is any sub project included the project activity.	MWh	C		monthly	100%	Electronic/ paper	During the crediting period and two years after	The value is calculated by the formulae mentioned in Annex 4, the value can be cross checked from invoices raised on the state utility. The value will be sourced from generation break-up sheets prepared by the developer (Enercon), which is based on the monthly JMR reading recorded at main meter installed at DISCOM sub-station and the LCS controller meter (panel meter) reading andbased on which customers raises the invoice to state utility. Refer Annex – 4 for an illustration of the provisions for measurement methods

ID number	Data Type	Data variable	Data unit	Measured (m), calculated (c), estimated (e),	For which Baseline method(s) must this element be included	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	For How long is archived data kept?	Comment
8. $\sum EG_{Export,y,M}$	Electricity quantity	Summation of Electricity export to the grid by all the sub-Projects included in the project activity.	MWh	C		monthly	100%	Electronic/ paper	During the crediting period and two years after	The value is calculated by the summation of $EG_{Export,y,M}$ for all the sub projects (M). Please refer annex 4 for detailed information. Refer Annex – 4 for an illustration of the provisions for measurement methods

D.2.1.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>

Provided under Section E.

D. 2.2. Option 2: Direct monitoring of emission reductions from the project activity(values should be consistent with those in section E).

Not required.

D.2.2.1. Data to be collected in order to monitor emissions from the project activity, and how this data will be archived:

Not applicable.

D.2.2.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

>>
Not applicable.

D.2.3. Treatment of leakage in the monitoring plan

D.2.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity

There is no leakage to this project.

D.2.3.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>
Not applicable.

D.2.4. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.)

>>
Provided under Section E.

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored

Data	Uncertainty level of data (High/Medium/Low)	Are QA/QC procedures planned for these data	Outline explanation how QA/QC procedures are planned
1. $E_{JMR,Export}$	Low	Yes	This data is used to calculate the net electricity exported to the grid by the project activity, the details of the QA/QC procedures are available in annex 4. The meters used to monitor the data are calibrated annually.

D.3. Quality control (QC) and quality assurance (QA) procedures are being undertaken for data monitored			
Data	**Uncertainty level of data (High/Medium/Low)**	**Are QA/QC procedures planned for these data**	**Outline explanation how QA/QC procedures are planned**
2. $E_{JMR,Import}$	Low	Yes	This data is used to calculate the net electricity exported to the grid by the project activity, the details of the QA/QC procedures are available in annex 4. The meters used to monitor the data are calibrated annually.

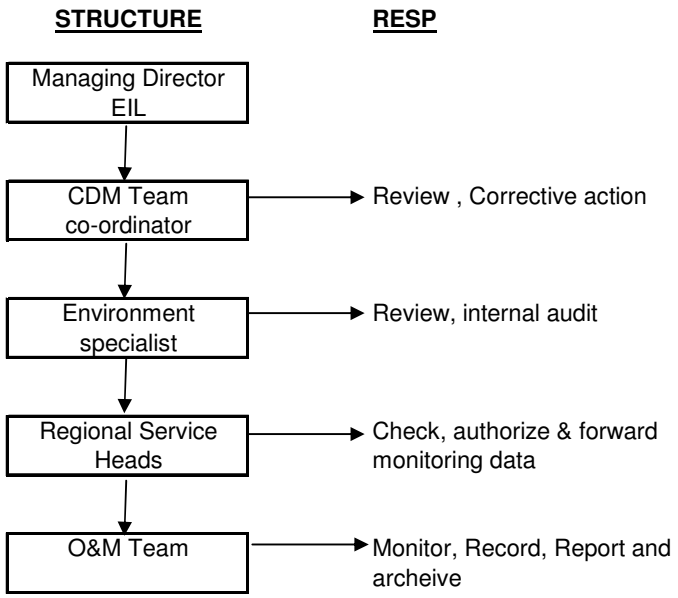
** Only the above parameters ($E_{JMR,Export}$&$E_{JMR,Import}$ are monitored directly. The balance parameters that are given in section D.2.1.3 are calculated using the parameters given above and hence represents low level of uncertainty.*

D.4 Please describe the operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity

>>

The project activity will be operated and managed by project proponent.

The operational and management structure implemented by EIL is as follows:



ORGANOGRAM OF THE CDM PROJECT MONITORING

D.5 Name of person/entity determining the monitoring methodology:

>>

Dr. P Ram Babu of PricewaterhouseCoopers (P) Limited has assisted the project sponsor in determining the application of monitoring methodology.

SECTION E. Estimation of GHG emissions by sources

E.1. Estimate of GHG emissions by sources:

>>

Using the ACM0002 methodology that is recommended by the CDM Meth Panel, the projected GHG emission reductions for the proposed CDM activity are determined.

The project activity is a wind based power generation project, hence there will be no GHG emissions of from the project activity. Therefore, no calculation is required here.

E.2. Estimated leakage:

>>

Leakage is defined as the net change of anthropogenic emissions by sources of GHGs that occur outside the project boundary, which can be measured and directly attributed to the CDM project activity.

No leakages were identified due to the project activity. Therefore, no calculation is required here.

E.3. The sum of E.1 and E.2 representing the project activity emissions:

>>

Zero.

E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline:

>>

The emission reductions ***ERy***by the project activity during a given year *y* is[1]

ERy = EGy * EFy …….(1)

where *EGy* is the electricity supplied to the grid, *EFy* is the CO_2emission factor of the grid as calculated below.

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

$$EFy = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

with respective weight factors $w_{OM}$and w_{BM}(where $w_{OM} + w_{BM} = 1$); by default, equal weightage$(w_{OM} = w_{BM} = 0.5)$ has been considered.

The Operating Margin emission factor*EF_OMy* is defined as the generation-weighted average emissions per electricity unit generated (tCO_2/GWh) for all sources serving the northern regional grid, excluding zero-or low-operating cost power plants (hydro, wind and nuclear), based on the average of the five most recent year data and using the following equation (for simple operating margin calculations):

[1]Throughout the document, the suffix *y* denotes that such parameter is a function of the year y, thus to be monitored at least annually.

$EF_{OM,y}$= [$\sum_{i,j}$*Fi,j,y*COEFi,j*] / [$\sum_j$*GENj,y*]……..*(3)*

where,*TEMy* and *TGENy* are the total GHG emissions and electricity generation supplied to the grid by the power plants connected to the grid excluding zero- or low-operating cost sources. The*Fi,y* and *COEFi,j*are the fuel consumption and associated carbon coefficient of the fossil fuel *i* consumed by power plant j in the grid. *GENj,y* is the electricity generation at the plant *j* connected to the grid excluding zero- or low-operating cost sources.

The CO_2 emission coefficient $COEF_{i,j}$is obtained as:

$COEF_{i,j}$ = $NCV_{i,j}$ * $EFCO_{2,i}$ * $OXID_i$……..*(4)*

where:

$NCV_{i,j}$is the net calorific value (energy content) per mass or volume unit of a fuel i,

$OXID_i$is the oxidation factor of the fuel (see page 1.29 in the 1996 Revised IPCC Guidelines for default values),

$EFCO_{2,i}$is the CO2 emission factor per unit of energy of the fuel i.

The Build Margin emission factor *EF_BMy*(tCO_2/GWh) is given as the generation-weighted average emission factor of the selected representative set of recent power plants represented by the 5 most recent plants or the most 20% of the generating units built (summation is over such plants specified by k):[2]

***EF_BMy* = [$\sum_i$ *Fi,y*COEFi*] / [$\sum_k$ *GENk,y*]**……..*(5)*

as the default method. The summation over *i* and *k* is for the fuels and electricity generation of the plants mentioned above.

Using the above formula, the baseline carbon emission factor (CM) is 908.52 t CO_2/year.

E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity:

>>The total emission reductions are 996,2400t$CO_2$for the entire crediting period of 10 years.

[2]The project participant is to demonstrate which is appropriate for the proposed project to the Operational Entity, otherwise, more conservative one is selected.

E.6. Table providing values obtained when applying formulae above:

>>

Year	Estimation of project activity emission reductions (tonnes of CO2e)	Estimation of baseline emission reductions (tonnes of CO2 e)	Estimation of leakage (tonnes of CO2e)	Estimation of emission reductions (tonnes of CO2 e)
01 July 2004 to 30 June 2005	0	110147	0	110147
01 July 2005 to 30 June 2006	0	110147	0	110147
01 July 2006 to 30 June 2007	0	110147	0	110147
01 July 2007 to 30 June 2008 *	0	108705	0	108705
01 July 2008 to 30 June 2009	0	92849	0	92849
01 July 2009 to 30 June 2010	0	92849	0	92849
01 July 2010 to 30 June 2011	0	92849	0	92849
01 July 2011 to 30 June 2012	0	92849	0	92849
01 July 2012 to 30 June 2013	0	92849	0	92849
01 July 2013 to 30 June 2014	0	92849	0	92849
Total (tonnes of CO2e)	0	**996240**	0	**996240**

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts:

>>

To conduct this Environment Impact Assessment (EIA) for the project activity, EIL appointed M/s CARE Sustainability, Navi Mumbai. The consultant conducted a Rapid EIA study and prepared report on the same "Environmental Impact Assessment for Wind Energy Farms at Jaisalmer, Rajasthan". However EIA of this project activity (power generation using wind energy) was not an essential requirement as per the Indian environmental regulations.

It should be noted here that though EIA is not a regulatory requirement in India for wind energy projects, still the project sponsors conducted the EIA to study if any irreversible and unacceptable impacts on the environment resulted and would result from the project activity.

The EIA study included identification, prediction and evaluation of potential impacts of the CDM activities (i.e. the generation of electricity through wind energy converters - WEC), its evacuation and transmission to the RRVPNL at Jaisalmer on terrestrial and aquatic environment within the study area.

Over all finding of the EIA demonstrate that there is no major impact on the environment due to the installation and operation of the windmills. The windfarm is located in the mist of the Indian 'Thar' Desert and does not come in the path of the migratory birds. There are no wild life or forest land near by. The desert ecology is not likely to get impacted by this type of project activity.The inhabitants of the nearest village from the windfarm boundary also confirmed that there are no dust or noise nuisance due to the windmills.

The EIA also ruled out any trans-boundary impacts due to the project activity.

The projects contribution to sustainable development is included in **Appendix 1**.

ENVIRONMENTAL ISSUES																		
Sr.no.	**Project activities**	**Land use**	**Terrain**	**Water**	**Drainage**	**Soil**	**Ambient Air Quality**	**Ambient noise levels**	**Vibration**	**Ecology**	**Natural habitats**	**Cultural property**	**Sensitive receptors**	**Traffic and transport**	**Health**	**Socio-economic**	**Aesthetics**	**Infrastructure**
PROJECT INITIATION PHASE																		
1	Mobilisation	T/M/-ve	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	Demolition and clearing	P/S/-ve	-	-	-	T/M/-ve	T/S/-ve	T/S/-ve	T/M/-ve	P/S/-ve	-	-	-	T/S/-ve	T/I/-ve	P/S/-ve	T/M/-ve	-
PROJECT CONSTRUCTION PHASE																		
3	Equipment mobilization	T/M/-ve	T/M/-ve	-	-	T/S/-ve	T/M/-ve	T/M/-ve	T/M/-ve	-	-	-	-	T/M/-ve	-	-	T/M/-ve	-
4	Setting up of temp labour camps	T/M/-ve	-	T/M/-ve	-	T/M/-ve	T/M/-ve	T/M/-ve	-	T/M/-ve	-	-	-	T/M/-ve	T/S/-ve	-	T/M/-ve	T/S/-ve
5	Utility services relocation (water)	-	-	T/M/-ve	-	T/M/-ve	-	-	-	-	-	-	-	T/S/-ve	-		T/M/-ve	-

ENVIRONMENTAL ISSUES																		
6	Material transport and storage	T/I/-ve	T/I/-ve	T/M/-ve	T/M/-ve	P/M/-ve	T/S/-ve	T/S/-ve	-	-	-	-	-	T/S/-ve	-		T/M/-ve	-
7	Foundation works	-	P/S/-ve	T/M/-ve	-	P/S/+ve	T/S/-ve	T/M/-ve	T/M/-ve	-	-	-	-	-	-	-	P/S/+ve	-
8	Earth work operation	P/S/-ve	P/S/-ve	T/M/-ve	-	T/M/-ve	T/S/-ve	T/S/-ve	-	-	-	-	-	T/M/-ve	-	-	T/M/-ve	-
9	Road cutting	P/S/-ve	P/S/-ve	-	P/S/+ve	-	T/S/-ve	T/S/-ve	-	-	-	-	-	T/M/-ve	-	-	T/M/-ve	-
10	Traffic movement	-	P/S/-ve	-	-	-	T/S/-ve	T/S/-ve	-	-	-	-	-	T/M/-ve	-	-	P/S/+ve	-
PROJECT OPERATION PHASE																		
11	Traffic movement	-	P/M/ve	-	-	-	P/S/-ve	P/S/-ve	-	-	-	-	-	P/M/-ve	-	-	P/S/+ve	-
12	Power generation	-	-	-	-	-	P/S/+ve	P/S/+ve	-	P/S/-ve	-	-	-	-	-	-	-	P/S/+ve
13	Local area development / project enhancement	P/S/+ve	P/S/+ve	-	-	-	P/S/+ve	P/S/+ve	-	P/S/+ve	P/S/+ve	P/S/+ve	P/S/+ve	P/S/+ve	-	-	P/S/+ve	-

Environmental Management Plan for the Wind farms at Jaisalmer – Pre-construction Stage

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Ecological Impacts	Shrubs and trees felling within the road alignment, wind farm area, which are to be removed before commencement of construction, shall be identified and approved. Prior permission from forest department/concerned authorities shall be obtained.	Before start of construction of relevant section.	Enercon	Forest Department

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Natural Habitats – Desert National Park	All activities, construction vehicle movements and other miscellaneous activities must be restricted within project area Temporary disposal of demolition debris/excavated material, felled trees or locating labour camps and stockyards beyond the project construction area must be avoided near protected areas.	Entire pre-construction and construction phase.	Contractor-Enercon	Enercon
Local traffic Management	Temporary traffic arrangement during construction within construction area has to be planned. This plan shall be periodically reviewed with respect to site conditions. During site clearance activity, the demolition debris shall be preferably removed during non-peak hours and with deployment of more vehicles for the purpose.	During site clearance and construction	Contractor	Enercon
Traffic Control and Safety	The contractor shall take all necessary measures for the safety of traffic during demolition and site clearing activities shall provide, erect and maintain such barricades, including signs, markings, flags, light and flagmen as may be required by the Supervising agency for the information and Protection of traffic.	During pre-construction and construction	Contractor	Enercon
Safety of pedestrians In Habitat zones at all villages	Special consideration shall be given to the local traffic management to the safety of pedestrians especially at roads near villages while travelling to the sites through villages	Before construction and during construction	Contractor	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Impact on land-use outside project site	Construction related activities should be preferably restricted within project area	During entire site clearance and construction phases	Contractor	Enercon

Environmental Management Plan for the Wind farms at Jaisalmer – Construction Stage

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Plying vehicles on *Kuccha* roads	The unpaved road if used by the contractor, shall be sprinkled with water at least once in a day to control the fugitive dust emissions – at least near habitations and vegetative cover (considering non-availability of water).	Construction phase	Contractor	Enercon
Material spill	All vehicles delivering material to the site shall be covered to avoid material spillage.	Entire Construction phase	Contractor	Enercon
Watering to control of dust as site	During erections of WEC construction site to be watered periodically to minimize fugitive dust generation while laying foundations.	During entire construction phase	Contractor	Enercon
Roads used for transport	Contractor shall ensure that the transport vehicles used to carry materials and dispose debris does not create hazardous conditions for general traffic.	During entire construction phase	Contractor	Enercon
Barricading site	The construction site should be barricaded at all time in a day with adequate marking, flags, reflectors etc., for the safety of general traffic	During construction phase	Contractor	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
	movement and pedestrians.			
Earthwork	All earthwork and construction material should be stored in such a manner to minimize generation of dust and spillage on roads.	During entire construction phase	Contractor	Enercon
Idling of vehicles	Idling of delivery trucks or other equipment should not be permitted during periods of unloading or when they are not in active use. This practice must be ensured especially near habitations	During construction phase	Contractor	Enercon
Drilling operations	All possible and practical measures to control noise emission during drilling operations shall be employed. Enercon may direct to take adequate control measures depending on site conditions.	During construction phase	Contractor	Enercon
Construction equipment emissions	Exhaust and noise emissions of construction equipment ‘s shall adhere to emission norms as lay out by MoEF/CPCB.	During construction	Contractor	Enercon
Noise from construction related plants and equipments	All construction equipment’s shall be fitted with exhaust silencers. Damaged silencers to be promptly replaced by contractor.	During construction	Contractor	Enercon
Noise impact due to operation of DG sets	DG sets, if used, shall adhere to noise standards of MoEF.	During construction	Contractor	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Noise control measures	The noise levels shall adhere to local laws. Restricted blasting –work hours and intermittent blasting could be few mitigation measures that can be adopted.	Before start of construction of relevant section		Enercon
Noise levels near residential areas and sensitive receptors	Construction activity induced noise levels shall be mitigated between The contractor can employ mitigation measures such as restricted and/or intermittent activity	During entire construction of relevant sections	Contractor	Enercon
Exposure to loud noise	Workers exposed to loud noise (as per factory act requirements) shall wear earplugs/earmuffs.	During construction	Contractor	Enercon
Storage of construction materials	Construction material containing fine particles shall be stored in an enclosure such that sediment-laden water does not drain into nearby water drains	During construction	Contractor	Enercon
Blockage and change in drainage pattern	If the channel /drains get blocked due to negligence, contractor should ensure that they are cleaned especially during monsoon season. Once the work is completed in all respects, the contractor shall, as a mark of good gesture, clean up the drains along the project road to the extent possible.	During construction	Contractor	Enercon
Soil erosion	On road embankments, slopes shall be stabilized. The work shall consist of measures as per design, or as directed by the Enercon to control soil erosion, sedimentation and water pollution.	During construction	Contractor	Enercon
Work during monsoon near water bodies	Construction work at sections close to water bodies shall be avoided during	During construction	Contractor	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
	monsoon or completed before monsoon.			
Areas susceptible to erosion	In areas susceptible topsoil erosion, especially at various steep gradient locations should be preferably carried out before rainy season or temporary/ permanent erosion protection work as may feasible shall be provided.	During construction	Contractor	Enercon
Inspection of site	Daily inspection at construction site should be carried out to ensure removal of construction debris.	During construction	Contractor	Enercon
Earth work debris disposal	As soon as construction is over the surplus earth should be utilized to fill up low-lying areas or the area	During construction	Contractor	Enercon
Debris disposal	Debris generated due to dismantling of existing pavement/structures shall be suitably reused in proposed construction. Un-utilizable debris shall be suitably disposed at the site Good disposal practices recommended by various agencies/authorities shall be followed.	During construction	Contractor	Enercon
Soil contamination by construction waste and fuels	Oil and fuel spills from construction equipment shall be minimized by good O &M practice. Soils contaminated by such spills shall be disposed as per MOEF requirements.	During construction	Contractor	Enercon
Sourcing quarry materials	Sand, aggregates and other quarry material shall be sourced from licensed quarries.	During construction	Contractor	Enercon
Compensatory plantation	Compensatory plantation	During construction	Enercon	Enercon/forest

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
	(over debris disposal location) shall be done in line with concerned authority regulations and guidelines. Transplant the trees which are required to be moved due to construction of foundations/ buildings, new roads or widening of existing roads			department
Aesthetics and landscape	Adequate landscaping of the median, embankment slopes and other open space available within construction site area shall be carried out The area can be utilized for growing dwarf varieties of plants.	During fag end of construction phase or within 6 months after operation starts and before monsoon	Contractor	Enercon
Providing labour camps and facilities	The contractor shall abide by the contract conditions and directions with respect to siting of labour camps, providing sanitation facilities and labour welfare issues etc.	During construction	Contractor	Enercon
Occupational health and safety	The contractors is required to comply with all the precautions as required for the safety of workmen as per the international labour organization (ILO) Convention no.62 as far as those are applicable to the contract.	During construction	Contractor	Enercon
Provision of safety accessories / appliances to each work	The contractor shall supply all necessary safety appliances such as safety goggles, helmets, safety belts, earplugs, masks etc. to the worker and staff.	During construction	Contractor	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Safety precautions	Adequate precautions shall be taken to prevent danger from electrical equipment .all machines / equipment used shall confirm to the relevant Indian standards (IS) codes	During construction	Contractor	Enercon
Availability of first aid kit at construction site	A readily available first aid unit including an adequate supply of sterilized dressing material and appliances shall be provided as per the requirements under the factory act.	During construction	Contractor	Enercon
Workers health and hygiene	All anti-malarial measures shall be compiled with	During construction	Contractor	Enercon

Environmental Management Plan for the Wind farms at Jaisalmer –Operation Stage

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Air quality impact	Ambient air concentrations of various pollutants shall be monitored as per the pollution-monitoring plan.	Starting immediately after the completion of construction	Pre approved monitoring lab	Enercon
	Vehicle emission norms of the day shall be enforced.	Routinely after operation phase	Pre approved monitoring lab	Enercon
	Providing masks and protection for workers at maintenance site of WEC	Routinely after operation phase	Enercon	Enercon
Noise pollution	Monitoring of the noise levels at sensitive receptors as per monitoring plan.	Starting immediately after the completion of construction	Pre approved monitoring lab	Enercon
	Noise will become a major problem if congestion or bottleneck situation exists in the road. Such locations causing hindrances to traffic flow shall be rectified. Adequate “no honking” sign boards at sensitive locations shall be installed.	Routinely after operation phase	Pre approved monitoring lab	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	**Supervision**
	Attenuation at receptor level at maintenance sites by use of ear muffs	Routinely during operation	Enercon	Enercon
	Humming sound of wind power	Regular maintenance of the WEC	Enercon	Enercon
Land pollution	Proper and contained disposal of enamel and paint drums, waste water from sites, other waste at sites	Routinely during operation	Enercon	Enercon
Traffic and safety	Traffic control measures including speed limits to be enforced strictly. Traffic volume and speed to be monitored to record benefits achieved from the project.	Through operation stage	Enercon	Enercon
Survival rate of plantation	Adequate care of the compensatory plantation should be taken up so as to comply the survival rates recommended in the relevant policies of the tree authority.	Upto 3 years after project becomes operational	Enercon	Forest department
Aesthetics and landscape	The landscaping provided shall be guarded from animals with adequate monitoring to ensure their growth.	Upto 3 years after project becomes operational	Enercon	Enercon
Impact on visual resources	Provision of setbacks for facilities to minimize impacts to visually sensitive areas, such as scenic corridors and recreation areas	Throughout operation stage	Enercon	Enercon
	Minimization of new road construction	Throughout operation stage	Enercon	Enercon
	Placing transmission lines underground or low lying areas	Throughout operation stage	Enercon	Enercon
	Painting wind turbines, blades, towers and structures a neutral, non-reflective colour, so that they blend with the surroundings	Throughout operation stage	Enercon	Enercon
	Use of subdued lighting for project facilities, while providing lighting only as needed for safety purposes	Throughout operation stage	Enercon	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Public health and safety	Provision of adequate traffic signals, signpost/road crossing etc.	During operation stage	Enercon	Enercon
	Minimum safety setbacks of 150 meters or three times the turbine height, whichever is greater, should be established from any property line, public roadway, transmission facility or rail road.	During operation stage	Enercon	Enercon
	In designing a site plan for project facilities, the requirements of aviation authorities should be complied to avoid electromagnetic interference and other incompatible land uses.	During operation stage	Enercon	Enercon
	Providing rotational speed controls should ensure the safe operation of wind turbine rotors. Unauthorized personnel should be prevented from accessing towers and other hazardous or restricted areas.	During operation stage	Enercon	Enercon
	An operation and public emergency response program must be developed for fires and major accidents including emergency equipment and trained personnel.	During operation stage	Enercon	Enercon
Road embankment and cut section stability	Road embankment and cut section should be checked for erosion and rutting. Any sign of instability should warrant adequate response immediately and well before succeeding monsoon season.	Throughout operation stage	Enercon	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
Accident hazards	The entire proposed road corridor should be monitored for any accidents. Project road management agency shall maintain a database based on data collected from traffic police. They shall analyze the database and rectify if any physical correction/alteration in the geometry of the road needed.	Throughout operation stage	Enercon	Enercon
	Personnel involved in the construction and operation of the project must be trained on the hazards, safety procedures and emergency response plan associated with their tasks in accordance with World Bank Environment, Health and Safety Guidelines: General Criteria.	Throughout operation stage	Enercon	Enercon
	Project authorities must provide training for monitoring and mitigating the effects of the project on environmental and socio-cultural resources.	Throughout operation stage	Enercon	Enercon
	Exposure to air pollutants and higher noise levels than those are permissible, poor illumination, increased levels of dust, heat and humidity at work place lead to occupational health disorder and diseases. It is therefore necessary to provide safe and clean working environment for the control/ prevention of such health hazards.	Throughout operation stage	Enercon	Enercon

Environmental Issue	Mitigation Measures	Time Frame	Responsibilities	
			Implementation	Supervision
	Occupational hazards involved in windmill power plant are related to injury, fall from high places and electrical shocks. Perfect ventilation system shall facilitate escape of gases to the atmosphere inside the tower.	Throughout operation stage	Enercon	Enercon
	All working conditions in the industry and guidelines for safety against the occupational hazards are governed by the Factories Act 1948 and other legislative enactment. All necessary guidelines laid down by the Factory Inspector for safety against occupational hazards should be followed by the management of ENERCON	Throughout operation stage	Enercon	Enercon
	Normal sanitary, bathing and cleaning facilities should be provided within the plant. The necessary first aid, medical and health facilities should be provided to the workers	Throughout operation stage	Enercon	Enercon
	Personal protective equipment (safety kits) such as safety shoes, helmets, safety goggles, etc. should be provided to workers employed in hazard prone areas.	Throughout operation stage	Enercon	Enercon
	Follow the E-40 Safety Instruction Manual	Throughout operation stage	Enercon	Enercon

Environmental Monitoring Plan for the Windfarms at Jaisalmer – Post Project Monitoring

Component	Project stage	Parameters	Standard	Location	Frequency	Duration	Institutional responsibility	
							Implementation	Supervision
Air quality	Construction	SPM,PM_{10},	NAAQS of CPCB	At every habitation enroute	Once every season- summer, winter, post monsoon	24 hr/day for 2 consecutive working days per week for 2 weeks	Pre-approved monitoring agency	ENERCON
Air quality	Operation	SPM, PM_{10},	NAAQS of CPCB	At every habitation enroute	Once every season- summer, winter, post monsoon for 1 year after operation starts	24 hr/day for 2 consecutive working days per week for 2 weeks	Pre-approved monitoring agency	ENERCON
Noise level	Construction	L_{eq} day, L_{eq} night, L10, L50, L90 dB(A)	CPCB noise standards	At every habitation enroute	Once every season- summer, winter, post monsoon during construction period	Continuous 24 hour reading with a frequency of 10 minutes for 2 non consecutive days per week for 2 weeks	Pre-approved monitoring agency	ENERCON
Noise level	Operation	L_{eq} day, L_{eq} night, L10, L50, L90 dB(A)	CPCB noise standards	At every habitation enroute	Once every season- summer, winter, post monsoon for 1 year after operation starts	Continuous 24 hour reading with a frequency of 10 minutes for 2 non consecutive days per week for 2 weeks	Pre-approved monitoring agency	ENERCON
Water quality	Construction	Ph, BOD, TSS, TDS, DO, turbidity and O &G	Inland SW &relevant stds. For heavy metals in	At every habitation enroute	Once every following season- summer, winter and post monsoon	Every season	Pre-approved monitoring agency	ENERCON

Component	Project stage	Parameters	Standard	Location	Frequency	Duration	Institutional responsibility	
							Implementation	Supervision
			ground water					
Water quality	Construction	Ph, BOD, TSS, TDS, DO, turbidity and O &G	Inland SW &relevant stds. For heavy metals in ground water		Once every following season-summer, winter and post monsoon.	Every season	Pre-approved monitoring agency	ENERCON
Soil quality	Construction	Heavy metals and oil and grease	Contaminant threshold level given by USEPA		At the start and end of construction activity at the relevant section	One time sample	Pre-approved monitoring agency	ENERCON
Soil quality	Operation	Heavy metals and oil and grease	Contaminant threshold level		-In the event of an accident -Once during post monsoon season	-One time sample -Annually for 3 years	Pre-approved monitoring agency	ENERCON
Ecology	Pre-construction	Monitoring of tree felling	As laid out in project detail design		During tree felling	--	Pre-approved monitoring agency	ENERCON
	Operation	Survival rate of road side plantation and other compensate plantation	Survival rate as per the concerned policy guidelines		Annually	For 3 years after operation starts	Pre-approved monitoring agency	ENERCON
Traffic volume	Operation	Traffic volume, characteristic and speed	As per relevant		3 day hourly counts	Annually for 3 years	Pre-approved monitoring agency	ENERCON

F.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:

>>

The environmental impacts of the project are not considered significant by the host party. The EIA for this project is not required as per existing regulations in the host country, i.e., India.

The project proponent has planned mitigation and monitoring measures (detailed in previous section) to address all environmental issues.

SECTION G. Stakeholders' comments

>>

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

>>

The stakeholders identified for the project are as under:

- Elected body of representatives administering the local area (village *Panchayat*)
- Rajasthan Rajya Vidyut Prasaran Nigam Ltd. (RRVPNL)
- RajasthanState Electricity Board (RSEB)
- Rajasthan Electricity Regulatory Commission (RERC)
- Indian Renewable Energy Development Agency (IREDA)
- Ministry of Environment & Forest
- Rajasthan Pollution Control Board (OPCB)
- Ministry of Non Conventional Energy Sources (MNES)
- Non-Governmental Organisations (NGOs)
- Consultants
- Equipment Suppliers

Various stakeholders from the above mentioned groups were consulted at various phases of the project from inception to implementation. However the stakeholders raised no concerns as this power project is based on renewable wind resource, harnessed within the region. More over, this project activity also brings various environmental and social developments within the region.

A local stakeholder meeting was held on 21 June 2004 at Enercon (India) Limited, 11, J. N. Vyas Colony, Jaisalmer, attended by the following representatives:

- Mr. Jai Singh, RTS, Tasildar, Jaisalmer Tehsil.

- Enercon (India) Limited:
  1. Mr. V. K. Sharma, Manager – Liaison, Jaipur
  2. Mr. R. L. Trivedi, Engineer –Services, Enercon Office, Jaisalmer

- CARE Sustainability
  1. Dr. (Mrs.) Suju George, Managing Director
  2. Srinivas Rao, Head, Environmental Services

The agenda of the meeting was fixed as follows:
Welcome
Description of the project details
Queries and responses from the proponent and the stakeholders
Vote of thanks

Mr. R. L. Trivedi, Engineer – Services, appraised and gave description of the project to the stakeholders, and communicated the benefits of Enercon Wind Farm Projects at Jaisalmer

Enercon installed its 1st project of 2.76 MW at Barabagh near Jaisalmer in 2001 & then at Temdarai- I started installation from March-2003. At present 90 MW installation has been done by Enercon which will be 95 MW at the end of June-04. The sites are located near Hansua, Gorera, Sodabadhan, Moda & Korwan.
The salient benefits communicated have been as follows:

- The best use of land is made through the project which otherwise was barren. Improved supply of electricity to the grid, and employment opportunities to local people. He explained function of windmill to the people and advantages of the windmill. Actual consumption of JaisalmerCity is 20 MW. The total power generated from Jaisalmer is 235 MW out of which wind energy comprises of 200 MW while generation from Ramgarh Gas Thermal power plant is 35 MW. Self reliance on using renewable energy sources is observed in Jaisalmer.

- In addition several other support services augmented by Enercon to local people in terms of transportation, mid –day meals to school children, renovation of Temdarai temple etc. as its social community initiatives.

- Mr. Srinivas Rao, CARE Sustainability briefed the environmental benefits of wind power generation as compared to that of thermal power generation based on coal. Similarly, a briefing on GHG and its role in global warming / increasing temperatures on the earth was given. The benefits in terms of pollution free environment and safeguard to human health were also communicated to the stakeholders while comparing coal based generation to wind based generation. Summary on Kyoto Protocol and CDM were made available.

The proceedings of the stake-holder consultation process are included in **Appendix 2**.

G.2. Summary of the comments received:

>>Majority of the comments from the stakeholder were actually queries by nature which were clarified to their satisfaction on the spot. Stakeholders wanted to know how the project benefits them, how it affects the water availability, change in migratory pattern of birds or fauna and grazing of local cattle. They also wanted to know occurrence of any incident or accident during construction and erection.
Stakeholders suggested to provide medical facility to the village and confirmed they have not observed any noise disturbances so far, due to the project activity.

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

>>
When enquired by the stakeholders on the different issues, Enercon representatives clarified the following:
Benefits of the locality:

- Employment opportunity to the educated villagers
- Economic opportunities in terms of small shops and as construction workers
- Increase in connectivity to the nearest town with improvement in transportation system
- Improvement in water availability from project site

Effect on environment:

- The project has improved the accessibility of cattle to areas for grazing and drinking water
- The project does not fall under migratory patterns of the birds, hence not expected to affect them
- Water availability has improved

Accident during construction and erection:

- Enercon has taken all safety precautions during construction and erection which prevented any incident of accident. Even blastings were done under control supervision and ground blasting were preferred in majority of the time.

Enercon has decided to extend the first aid facility available at their wind mill site to the villagers and also help them to commute to the city in case of medical emergencies.

Annex 1

Contact Information On Participants In The Project Activity

PRIMARY PROJECT SPONSOR

Organization:	Enercon (India) Limited
Street/P.O.Box:	Kolsite House, Plot No. 31, Shah Industrial Estate, Veera Desai Road, Andheri (West)
Building:	
City:	Mumbai
State/Region:	Maharashtra
Postfix/ZIP:	400 053
Country:	India
Telephone:	+91-22- 5673 0085
FAX:	+91-22-5673 0092
E-Mail:	ymehra@enerconindia.net
URL:	
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Mehra
Middle Name:	
First Name:	Yogesh
Department:	CEO
Mobile:	
Direct Fax:	+91-22-5673 0092
Direct Tel:	+91-22- 5673 0085
Personal E-Mail:	ymehra@enerconindia.net

PARTY FROM ANNEX I

Organization:	The Netherlands represented by its Ministry of Housing, Spatial Planning and the Environment acting through the International Finance Corporation, in its capacity as a Trustee of the IFC-Netherlands Carbon Facility (INCaF).
Street/P.O.Box:	2121 Pennsylvania Ave NW
Building:	
City:	Washington
State/Region:	DC
Postfix/ZIP:	20433
Country:	USA
Telephone:	202 473 4194
FAX:	202 974 4404
E-Mail:	carbonfinance@ifc.org, mparaan@ifc.org
URL:	www.ifc.org/carbonfinance
Represented by:	
Title:	Program Manager
Salutation:	Mr.

Last Name:	Widge
Middle Name:	
First Name:	Vikram
Department:	Carbon Finance, Environmental Finance Group, Environment and Social Development Department
Mobile:	
Direct FAX:	202-974-4404
Direct tel:	202 473 1368
Personal E-Mail:	carbonfinance@ifc.org

Annex 2

Information Regarding Public Funding

There is no ODA being used to fund the project activity.

Annex 3
BASELINE INFORMATION

SIMPLE OM CALCULATION:

Simple OM of year2003-04

Fuel	Units	Consumpt	Density (kg/Lt)	10^3 MT	Emission factor ($tCO_2/10^3$ tonnes)* NG =TCO_2/M Cu.m)	Gross Emissions (tCO2)	Gross Electricty generation	Auxiliary consumption	Net supply to grid
Steam stations		*		*			*	**	GWh
Coal	000 MT	70085	1	70085	1506	105523383	102385.08	8.9	93272.81
Furnace Oil	KL	43377	0.93	40.34061	3324	134079		8.9	0
Light Oil	KL	254855	0.827	210.7651	3131	659961		8.9	0
LSHS/HHS/HSD	KL	2377	0.827	1.965779	3163	6217		8.9	0
GAS	KL	0				0		8.9	0
Lignite	000 MT	0	1	0	1136	0		8.9	0
Gas Stations									0
Natural Gas	M Cu M	3808	1	3808	1931	7354599	18757.67	2.29	18328.12
HSD	KL	240593	0.827	198.9704	3127	622174		2.29	0
Naphtha	KL	188981	0.72	136.0663	3268	444627		2.29	0
Diesel Stations						0			0
LSHS	KL	0	0.827	0	3163	0	0	0	0
Diesel	KL	0	0.827	0	3127	0		0	0
Total						**114745041**			**111600.9**

Simple OM **1028.173 tCO2/GWh**

Simple OM of year 2002-03

Fuel	Units	Consumption	Density (kg/Lt)	10^3 MT	Emission factor ($tCO_2/10^3$ tonnes)* NG =TCO_2/M Cu.m)	Gross Emissions (tCO2)	Gross Electricty generation	Auxiliary consumption	Net ele Gen
Steam stations		*		*			*	**	GWh
Coal	000 MT	68594	1	68594	1644	112768184	100362	8.74	91590.54
Furnace Oil	KL	57666	0.93	54	3439	184455		8.74	0
Light Oil	KL	60211	0.827	50	3199	159280		8.74	0
LSHS/HHS/HSD	KL	32761	0.827	27	3231	87531		8.74	0
Gas	KL	0	1					8.74	0
Lignite	000 MT	0	1	0	1115	0		8.74	0
Gas Stations									0
Natural Gas	M Cu M	3953	1	3953	1931	7634645	17262	1.91	16932.69
HSD	KL	401257	0.827	332	2996	994254		1.91	0
Naphtha	KL	0	0.72	0	3268	0		1.91	0
Diesel Stations									0
LSHS	KL	0	0.827	0	3231	0	0	0	0
Diesel	KL	0	0.827	0	3127	0		0	0
Total						**121828349**			**108523.2**

Simple OM **1122.602 tCO2/GWh**

Simple OM of year 2001-02

Fuel	Units	Consumpt	Density (kg/Lt)	10^3 MT	Emission factor ($tCO_2/10^3$ tonnes)* NG =TCO_2/M Cu.m)	Gross Emissions (tCO2)	Gross Electricty generation	Auxiliary consumption	Net supply to grid
Steam stations		*		*			*	**	GWh
Coal	000 MT	66487	1	66487	1644	109304287	96115	8.951	87511.75
Furnace Oil	KL	140195	0.93	130	3439	448439		8.951	0
Light Oil	KL	43332	0.827	36	3199	114629		8.951	0
LSHS/HHS/HSD	KL	53328	0.827	44	3231	142482		8.951	0
Gas	KL	0			0	0		8.951	0
Lignite	000 MT	0	1	0	1115	0		8.951	0
Gas stations									0
Natural Gas	M Cu M	3879	1	3879	1931	7491725	17634	2.292	17229.61
HSD	KL	845	0.827	1	2996	2094		2.292	0
Naphtha	KL	0	0.72	0	3268	0		2.292	0
Diesel Stations						0			0
LSHS	KL	0	0.827	0	3231	0	0	2.4	0
Diesel	KL	5337	0.827	4	2996	13225	24	2.4	23.67776
Total						**117516881**			**104765**

Data source:

* Table 6.1, CEA general Review

** Table 5.5, CEA general review

Simple OM **1121.718 tCO2/GWh**

Source of CEA data : www.cea.nic.in

Emission factor (CO2 emission co-efficient)

2003-2004

Type of FUEL	Net Calorific Value (TJ/ 10^3 tonnes or TJ/Mcum)	Carbon Emission Factor (t C/ TJ)	Fraction of Carbon Oxidised - Oxidation Factor	Emission Coefficient (tCO_2/ 10^3 tonnes or tCO2/Mcum)
Steam Stations	**	*	***	
Coal	15.99	26.2	0.980	1505.6
Furnace diesel	43.39	21.1	0.990	3323.7
Light Oil	43.13	20.0	0.990	3131.3
LSHS/HHS/ oil/HSD	43.13	20.2	0.990	3162.6
Gas				
Lignite	11.46	27.6	0.980	1136.4
Gas Stations				
Natural Gas (TJ/Mcum)	34.60	15.3	0.995	1931.4
HSD	42.64	20.2	0.990	3127.0
Naphtha	45.01	20.0	0.990	3267.7
Diesel Stations				
LSHS	43.13	20.2	0.990	3162.7
Diesel Oil	42.65	20.2	0.990	3127.1

2002-2003

Type of FUEL	Net Calorific Value (TJ/ 10^3 tonnes or TJ/Mcum)	Carbon Emission Factor (t C/ TJ)	Fraction of Carbon Oxidised - Oxidation Factor	Emission Coefficient (tCO_2/ 10^3 tonnes or tCO2/Mcum)
Steam Stations	**	*	***	
Coal	17.46	26.2	0.980	1644.0
Furnace diesel	44.91	21.1	0.990	3439.4
Light Oil	44.06	20.0	0.990	3198.7
LSHS/HHS/ oil/HSD	44.06	20.2	0.990	3230.7
Gas				
Lignite	11.25	27.6	0.980	1115.3
Gas Stations				
Natural Gas (TJ/Mcum)	34.60	15.3	0.995	1931.4
HSD	40.86	20.2	0.990	2996.2
Naphtha	45.01	20.0	0.990	3267.7
Diesel Stations				
LSHS	44.06	20.2	0.990	3230.9
Diesel Oil	40.86	20.2	0.990	2996.3

2001-2002

Type of FUEL	Net Calorific Value (TJ/ 10^3 tonnes or TJ/Mcum)	Carbon Emission Factor (t C/ TJ)	Fraction of Carbon Oxidised - Oxidation Factor	Emission Coefficient (tCO_2/ 10^3 tonnes or tCO2/Mcum)
Steam Stations	**	*	***	
Coal	20.28	26.2	0.980	1909.7
Furnace diesel	43.95	21.1	0.990	3366.0
Light Oil	43.78	20.0	0.990	3178.4
LSHS/HHS/ oil/HSD	43.78	20.2	0.990	3210.2
Gas				
Lignite	10.99	27.6	0.980	1089.9
Gas Stations				
Natural Gas (TJ/Mcum)	34.60	15.3	0.995	1931.4
HSD	43.09	20.2	0.990	3159.8
Naphtha	45.01	20.0	0.990	3267.7
Diesel Stations				
LSHS	43.78	20.2	0.990	3210.3
Diesel Oil	43.09	20.2	0.990	3160.0

Data sources	
**Calorific values	
Coal, HSD, LSHS, FO,Lignite	Table 6.3, Central Electricity Authority general review of corresponding years
Naphtha	Default values obtained from Table 1-3 of Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook
Natural gas	www.ocean.washington.edu/ courses/envir202/energy-numbers.pdf www.evworld.com/library/energy_numbers.pdf
* Carbon emission factor	Default values obtained from Table 1-4 of Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook
*** Oxidation factor	Default values obtained from Table 1-6 of Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Workbook

BM CALCULATION:

Hydro	Cen/Pvt/State	State	Date of addition	Installed capacity	Gross Gen	Net supply to grid	Emission factor (2003-04)	Total tCO2 emission/year
				MW	GWh	GWh	tCO2/GWh	
Hydro								
NJ HEP (6,5,4,3,2,1)	state	HP	20/09/03,23/11/03,22/01/03,1	1500	5422	5403		0
Chemara HEP II (1,2,3)	NHPC	HP	04/11/03,05/12/03,26/02/04	300	1084	1081		0
Baspa -II(1,2)	Pvt	HP	24/01/03,08/02/03	200	723	720		0
Dolowal HEP (1)	Pvt	Punjab	28/01/03,02/02/03,06/02/03	4.2	15	15		0
Malana(1,2)		HP	5/07/01,9/07/01	86	311	310		0
Upper SindhII(1,2)		JK	11/09/01,29/03/02	70	253	252		0
Sewa-III(1,2,3)		JK	18/03/02,18/03/02,19/03/02	9	33	32		0
Hanvi (2,1)	state	HP	30/07/00,07/12/00	22.5	81	81		0
Gumma (1,2)	state	HP	31/08/00	3	11	11		0
Chenani III (1,2,3)	state	JK	31/07/00	7.5	27	27		0
Ranjait Sagar (1,2,3,4)	State	Punjab	12/08/00,20/08/00,16/09/00,1	600	2169	2161		0
Upper Sind -II (1)		JK	5/1/2000	35	127	126		0
Sobla (1,2)		UP	13/11/98	6	22	22		
Steam								
Suratgarh-III (5)	RRVUNL	Rajasthan	30/06/03	250	1809	1648	1140	2062049
Kota TPS-IV (6)	RRVUNL	Rajasthan	30/07/03	195	1411	1285	1140	1608398
Suratgarh TPS(3,4)	RRVUNL	Rajasthan	29/10/2001,25/03/02	500	3618	3296	1140	4124098
Panipat TPS St IV (6)	HPGCL(state)	Haryana	31/03/01	210	1378	1255	1140	1570652
Suratgarh (2)	RRVUNL	Rajsthan	28-03-00	250	1809	1648	1140	2062049
Rajasthan APS (3)©	state	Rajsthan	10/3/2000	220	1592	1450	1140	1814603
Unchahar TPP©	central	UP	22/10/99	210	1602	1460	1140	1826486
GHTP Bhatinda (2)	state	Punjab	16-10-98	210	1405	1280	1140	1602107
Suratgarh TPS	RRVUNL	Rajashthan	10/5/1998	250	1809	1648	1140	2062049
Unchahar (3)	central	UP	27-01-99	210	1602	1460	1140	1826486
GHTP Bhatinda (1)	state	Punjab	29-12-97	210	1405	1280	1140	1602107
Tanda TPS(2)	central	UP	20-02-98	110	839	765	1140	956731
Wind								0
Private		Rajasthan	31/03/04	162.4	356	356		0
wind (state)		Rajasthan	1/6/2001	2.15	5	5		0
wind (pvt)		Rajasthan	1/6/2001	9.7	21	21		0
Jaisalmer	RSPC	Rajasthan	1/6/2000	2.25	5	5		0
Gas								0
Pragati CCGT(2,3)	state	Delhi	09/11/02,31/01/03	225.8	910	889	459	418073
Ramgarh CCGT Stg II GT-2	RRVUNL	Rajasthan	07/08/02,24/08/02	75.3	545	532	459	250349
Pragati CCGT (1)	Pr PCL	Delhi	15/03/02	104.6	421	412	459	193669
Faridabad CCGT (1,2)©	state	Haryana	28/06/99,18/10/99	286	1877	1834	459	862220
Faridabad CCGT	state	Haryana	31/07/00	144	945	923	459	434125
Nuclear								
Rajasthan Atomic PP (4)	Central	Rajasthan	23/12/00	220	1253	1114		0
Total					**36893**	**34806**		**25276251**

Total Gross Electrical Ene Gen for NR grid (2003-2004) = 167663
Total Gross Ele Gen from the power plant which is added to the ele system 36893 21.78% of the total system

BM= 726.210 tCO2/GWh

* Source:table2.7, CEA, General Review 2005,2002-2003,2001-2002,2000-2001,1999-2000,1998-1999,1997-19
** Source:tTable 6.6, CEA General Review 2003-2004
** Source:table2.4,3.4,6.6, CEA, General Review 2005

Combined Margin Calculations

Simple OM	
2001-2002	1121.72 tCO2/GWh
2002-2003	1122.60 tCO2/GWh
2003-2004	1028.17 tCO2/GWh
Average	1090.83 tCO2/GWh

Simple OM	$EF_{OM,y}$	1090.83 tCO2/GWh
BM	$EF_{BM,y}$	726.21 tCO2/GWh
CM	EF_{y}	908.52 tCO2/GWh

BASELINE EMISSION & EMISSION REDUCTION

Year	Baseline Emission factor	Electricity to grid	Emission Reductions
	t CO2/GWh	GWh	t CO2
01 July 2004 to 30 June 2005	908.52	121.238	110,147
01 July 2005 to 30 June 2006	908.52	121.238	110,147
01 July 2006 to 30 June 2007	908.52	121.238	110,147
01 July 2007 to 30 June 2008 *	908.52	119.651	108,705
01 July 2008 to 30 June 2009	908.52	102.198	92,849
01 July 2009 to 30 June 2010	908.52	102.198	92,849
01 July 2010 to 30 June 2011	908.52	102.198	92,849
01 July 2011 to 30 June 2012	908.52	102.198	92,849
01 July 2012 to 30 June 2013	908.52	102.198	92,849
01 July 2013 to 30 June 2014	908.52	102.198	92,849
		Total Net Emission Reductions	996,240
		Total Crediting Period	
		Average Net Emission Reductions per year	99,624

* 07 WTGs were decommissioned on 02 June 2008 hence CER estimation has been done for 58 WTGs up to May 2008 and for later period for 54 WTGs

Annex 4

Monitoring Plan

Metering and Monitoring Plan details

The general conditions set out for metering, recording, meter readings, meter inspections, Test & Checking and communication shall be applicable as per the PPA (Power purchase agreement) with the State electricity board.

The Project is operated and managed by Enercon (India) Ltd. The general conditions of monitoring are described below

- Project activity consists of two metering points, main & backup metering points. Main metering point is located at Amarsagar sub-station (33/132/220kV) which is managed by state utility (RRVPN) while backup metering point is located at Temdarai sub-station (33/132 kV) which is managed by Enercon (India) Limited.

- At Temdarai Sub-station there are two backup meters (Back up meters B1 & B2) which records the electricity supplied to the grid by the project activity and non project activity WTGs at 132kV Level. From Temdarai sub-station electricity is transmitted to Amarsagar sub-station through two EHV transmission lines (132kV each).

- At Amarsagar sub-station there are two main meters (main meters M1 and M2) at 132 kV Level which is connected at each 132kV EHV lines coming from Temdarai sub-station. Main meters records the electricity supplied to the grid by the project activity as well non project activity WTGs.

- The electricity supplied to the grid will be metered at the main meters at132 kV level at the RRVPN substation at Amarsagar. Representatives of RRVPN/respective Discom and Enercon will take Joint Meter reading at the main meter at Amarsagard sub-stationand sign the meter readings. Simultaneously, the Joint Meter Reading at the 132 kV level of the backup metering system at Temdarai substation (Enercon Sub-station) will also be taken by representatives of RRVPN/respective Discom and Enercon. Main meter reading recorded at Amarsagar sub-station will be used in ER calculation

- Joint meter reading records the values of export &import based on which the net export by all the WTGs (Project as well as non-project) connected to billing metering points at the DISCOM sub-station (Amarsagar) is calculated.

- Based on the monthly JMR reading and the LCS controller reading of Project as well as non-project WTGs, Enercon prepares the breakup sheet which indicates the energy Exported, Imported & net electricity supplied by the individual project owner/investor. This breakup sheet is then submitted to Discom authority as well as the individual investors.

- Based on this breakup sheet the PP raises an invoice and submits to the Discom.

- The Discom authority conducts a thorough review based on the JMR readings, breakup sheets and the invoice raised by individual investors. The audits are conducted by senior official based at the circle office of individual Discom and only after the authorisation of submitted documents/ records by the superintending engineer of the respective Discom, are the payments released to the individual investor.

- Net electricity supplied to the grid is a calculated value and is used in calculation of emission reduction of the project activity.

- The meters will jointly inspected/tested once in a year as per the terms of the PPA. Joint inspection and testing will also be carried out as and when difference in monthly meter readings exceeds the sum of maximum error as per accuracy class of main and back up meters.

Measurement & Recording of electricity:

-Main and Backup meters measures the electricity (export & Import) on continuous basis and recorded by state utility on monthly basis.

-Panel meter (LCS controller) measures the Gross electricity export by WTG on continuous basis and daily/monthly data can be sourced/recorded from online SCADA system.

Metering Equipment and Metering Arrangement Information

- The meter used are Trivector and the manufacturer is the Secure Meter. The meters are two-way meter and measure the electricity import and export and give the net electricity.

- As per the Power Purchase Agreement entered into with the electricity distribution utility, there will be a set of main meter and backup meter in each feeder. Main and backup meters would be two-way export import meters that measure both export and import of electricity and provide net electricity exported to the grid.

- In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated by authorised representative of state utility.

- If main meter goes defective and the backup meter is working within the permissible limits of error, the consumption recorded by the backup meter will be referred.

- The main and the backup metering systems will be sealed in presence of representatives of Enercon and RRVPN/respective Discom.

- The LCS meter readings recorded at the WTGs are used for allocation of the net electricity exported to the grid from the project activity. The LCS meter readings are archived electronically on hourly basis. Joint meter reading at the Amarsagar substation (State utility sub station) and at the Temdarai substation(Enercon sub station) is noted each month. Therefore cumulative LCS meter reading for each month is used for purpose of allocation of net electricity supplied to the grid from the project activity.

- The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WTGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. The operations and maintenance staff will calibrate or replace the meter immediately.

The procedure for allocation of the net electricity exported (EG_y) to the grid is as follows:-

Calculation of Net Electricity Supplied to the grid by project activity:

The project activity is located in Sodabandhan and Temdarai. The WEC's are connected to Amarsagar substation. In addition to the project activity, the wind farms of non project activity are also connected to

the Amarsagar substation. Electricity delivered by all these wind farms is metered at a common metering point. The common metering point comprises two main meters i.e. Main meter 1 and Main meter 2 that are installed at 132 kV metering point at the Amarsagar substation. Consequently, the main meter readings reflect the aggregate electricity supplied by all these wind farms, including the project activity and non project activitiy. The net electricity supplied by individual wind turbines is determined by following a process of allocating the total electricity (recorded at the main meters M1 and M2) to the individual turbines in proportion of the electricity generation recorded by the (Local Control System) LCS meters at the individual wind turbines. LCS meter records the electricity exported by the WTG to the grid which is used for apportioning procedure.

The net electricity supplied to the grid will be calculated on monthly basis at the State utility (State utility) substations (Amarsagar) wherein the billing meter is connected. The monthly joint meter readings are taken by the representatives of state utility and Enercon (PP's representative) who also signs the JMR. Simultaneously, the monthly joint meter reading of backup meters available at Enercon (India) Limited sub-stations (Temdarai) is also taken by representatives of state utility and Enercon. The copy of JMR at backup meters is available with Enercon.

Since the project activity WTGs are connected through common metering system along with non project activity WTGs of other customers at the main meter, apportioning of net electricity export & import as recorded in JMR is being done to calculate the electricity export & import by individual customers WTGs.Apportioning[7] is being done based on the Gross electricity export by WTG asrecorded at LCS meter installed in individual WTGs.

Based on the monthly JMR reading, which is signed by representative of state utility and PP's representative (Enercon); Enercon prepares the monthly breakup[8] generation sheets which indicate the export, import &net electricity supplied by individual customers to the grid. An apportioning procedure is used by PP's representative to arrive at net electricity supplied to the grid by individual investors.

As per the PPA the monthly break up generation sheet is submitted to both, state utility as well as individual investors. PP raises the invoice based on the monthly breakup sheet corresponding to the net electricity generation value indicated in the monthly breakup sheet. Based on the JMR reading along with monthly breakup sheet prepared by Enercon and the invoice raised by investors, DISOM conduct the audit to cross check the net electricity values and in case all the values are found to be correct, state utility release the payment against the invoice raised by individual investors.

The values of the net electricity supplied to grid by project activity can be cross checked with invoices raised by the PP on state utility.

Allocation plan for calculating net electricity generation supplied to the grid for project activity is as follows:-

[7]Since LCS meter records the gross electricity export (gross generation by WTG) by WTG only and doesn't record the electricity import, hence in order to the calculate the net electricity generation supplied to grid by all WTGs of project activity (EGy), PP will conservatively deduct the total Electricity imported by project activity & non project activity WTGs, as recorded by the main meter at the state utility substation ($E_{JMR,Import}$) from the Summation of Electricity export to the grid by all the sub-Projects included in the project activity ($\sum \mathbf{EG_{Export,y,M}}$) instead of apportioning of Import data; detailed calculation is given in following paragraphs

[8]As per section 4.2 (iv) of PPA 'Measurement of Energy and Metering':- The developer will intimate/furnish the details of break-up of the energy supplied at Common Delivery Point. Based on such break-up, the power supplied by individual Power Producer shall be considered for the purpose of payment. Further the details of break-up of energy as intimated by Developer shall be final and binding on the Power Producer(s) using the common injection system and Metering equipment. .

The monthly JMR reading contains theelectricity export, import & net electricity supplied by all the WTGs of project activity as well as non project activity connected to the metering system at state utility substation. Hence in order to arrive at the electricity export, import &net electricity supplied by WTGs of the project activitybased on Gross electricity export by WTG as recorded at LCS meter,following procedure is used by O&M contractor (Enercon):-.

Electricity exported by all WTGs of project activity is apportioned on the basis of summation of Gross electricity export[9] by all WTGs of project activity, as measured at the controller (LCS meter) at project site and the electricity export recorded at the main meter mentioned in the JMR. The formula used for computing electricity export to the grid by any sub-project M, included in project activity is as follows:-

Electricity Export to the grid by the sub-projectM included in the project activity,

$$\mathbf{EG_{Export,y,M}} = \frac{\mathbf{EG_{JMR,Export}} * \sum \mathbf{EG_{Controller,N,M}}}{\sum EG_{Controller,i}} \quad \text{.....(1)}$$

[10]

As LCS meter measures the Gross electricity export by WTGs and doesn't provide individual reading of Export & Import. Therefore apportioning of export as well as import for the purpose of billing (invoicing) for all WTG of the sub-projects included in project activity is also apportioned on the basis of summation of gross electricity export by all the WTGs of project activity, as measured at the controller (LCS meter) at project site and the electricity import recorded at the main meter mentioned in the JMR.This is a standard procedure that is followed in the state of Rajasthan and is accepted by the state DISCOM for payment of tariff invoices and payment.

Though in order to being conservative while calculating the net electricity generation supplied to grid by all WTGs of project activity (EG_y), PP will conservatively deduct the total Electricity imported by project activity & non project activity WTGs, as recorded by the main meter at the state utility substation ($E_{JMR,Import}$) from the summation of electricity export to the grid by all the sub-Projects included in the project activity ($\sum \mathbf{EG_{Export,y,M}}$) instead of apportioning of Import data; detailed calculation is given in following paragraphs.

This is a conservative approach to estimate net electricity supplied to the grid as import data recorded at the substation including WTGs included in the project activity and WTGs not included in the project activity ($E_{JMR,Import}$) is deducted from the summation of electricity export to the grid by all the sub-Projects included in the project activity ($\sum \mathbf{EG_{Export,y,M}}$).

Therefore net electricity generation supplied to grid by all WTGs of the project activity is calculated as:

$$\mathbf{EG_y} = \sum \mathbf{EG_{Export,y,M}} - E_{JMR,Import}$$

Thus calculated value of EG_ywill be used to calculate total emission reduction from project activity.

[9] LCS meter installed in individual WTGs control panel measures the gross electricity export by WTG and therefore $\sum EG_{Controller,\ i}$is used by developer to calculate electricity export by individual developer (project activity & non project activity WTGs)..

[10]The report detailing the value of $\sum EG_{Controlleri}$ can be provided to the verifying DOE on request.

Wherein,

$\sum EG_{Controller, N,M}$	=	Summation of net electricity generation by all WTGs (N number of WTGs) of sub project M, included in the project activity, as measured at the controller (LCS meter) at project site; where N is number of WTGs in the sub project M included in the project activity
$EG_{Controller,i}$	=	Summation of net electricity generation by an WTG (project or non projectactivity connected at main meter), as measured at the controller (LCS meter) at project site. where i is number of WTGs including project activity and non project activity.
$\sum EG_{Controller,i}$	=	Summation of net electricity generation by all WTGs of project activity as well as non project activity connected at main meter, as measured at the controller (LCS meter) at project site; where i is number of WTGs includingproject activity and non project activity.
$EG_{JMR,Export}$	=	Electricity export by project and non project activity as recorded at respective billing meters located at state utility sub-station. This can be checked from JMR certificates.
$EG_{JMR,Import}$	=	Electricity import by project and non project activity asrecorded at respective billing meters located at state utility sub-station. This can be checked from JMR certificates.

Appendix 1

Project's contribution to Sustainable Development

The wind power project contributes to the sustainable development of the region and country, through a profitable operation of the units and thereby creation of sustainable shareholder, economic, social and environmental value.

The strategic objectives identified by the project to achieve the stated goals include increased share of renewable energy in the Indian Context more specifically through a focus on wind energy, increased rural incomes, reduced vulnerability and empowerment of the vulnerable sections of society. More specifically, the project shall contribute to the sustainable development of the region and country by addressing the following broad issues:

1.0 Policy and Development

a) The wind power project is situated in a backward area having wasteland and hilly terrain. The project can create employment opportunities in these areas during operation and maintenance of the Wind Turbine Generators. Creation of employment opportunities in rural areas has long been recognized as a major concern for sustainable development and to stem the mass exodus from rural to urban areas. This concern, has formed the cornerstone of most of Government of India's rural development programmes. To that extent, the activity directly addresses a core national concern.

b) The wind power project is in keeping with the policies of MNES and Government of Rajasthan. It contributes towards the achievement of the stated target of Government of Rajasthan, to raise the share of renewable energy.

c) In light of the likely shortfall of the 9^{th} plan targets the state is likely to have an energy deficit at the end of the plan period. The project, though in a small measure, shall contribute to mitigation of the deficit.

d) The proposed wind power project, shall contribute to reduction in T&D losses and makeup of electricity deficit, thereby it shall contribute to improved service delivery as regards consumers of power in the state.

2.0 Environment

a) The bridging of supply shortfall shall be by the use of a non-polluting and renewable resource. The fact that wind power has nearly no climate change implication is of particular importance.

b) Wind energy contributes to reduction in specific emissions (emissions of pollutant/unit of energy generated) of pollutants for the country as a whole.

c) Wind Energy uses a renewable resource, thus contributes to resource conservation.

d) Wind Power projects address the increasingly insurmountable problem of solid waste disposal encountered by most of the other sources of power, as they generate nearly no solid waste.

e) Large coal based power plants have a water consumption rate of 130.8 m3/day/MW installed capacity. This diverts an increasingly scarce resource to energy generation and the consequent pollution, which is avoided in wind energy generation.

f) Noise pollution is often associated with Wind Turbine Generators. This is not the case with the Wind Turbine Generators installed under this project predominantly on account of the fact that these are gearless WECs.

g) There is considerable wind resource in Rajasthan that has not been harnessed. This Project acts as a catalyst towards sustainable wind energy development in the state of Rajasthan.

h) The wind farm is located in a region, which is not on any notified migratory route of migratory birds.

i) In light of the fact that the land requirement for installation of WECs is very small, no significant impact on the existing resource use pattern is expected.

j) In addition to (i) above, the promoters intend to, to the extent feasible, promote availability of firewood and fodder grass to the local community.

k) The approach roads shall also enhance access to previously inaccessible areas, which facilitates better management of the resources in such areas as also improved fire fighting capability in instances of uncontrolled fires.

l) An Initial Environmental Assessment has been undertaken prior to validation of the project, and it showed no significant impacts either pre or during project construction and operation. The results are mentioned below.

The initial construction works at the project site involves land clearance, cutting, filling and levelling causing loss of ground vegetation. Since, no major trees exist in the project site except few bushes and shrubs, hence no loss of forest / tree is anticipated. There will be no conflict regarding the encroachment on nature reserve, as the project area is located out of the Desert National Park, which is located at south of the Jaisalmer site. No impact on wildlife habitat and bird movement is anticipated. There are no rare and endangered species reported in the project area. No impact on Bio-diversity is expected because of plant implementation.

In a power generation activity with coal as a base fuel, emissions of primary pollutants are not ruled out. Even in such a case impact on the health of flora and fauna is envisaged to a certain extent. The ecological impacts are potentially due to the release of such emissions to the atmosphere and their impacts on vegetation, terrestrial flora and fauna.

However, in a case like this, the impact on the ecological systems is avoided, as no air emissions would be generated in this activity.

3.0 Socio-economic

The project area does not have any housing structures/dwelling units hence Rehabilitation and Resettlement has never been an issue. The impact of the project on services and amenities has been felt or will be felt if expanded. The project has provided and will continue to provide job opportunities by way of casual labour, skilled labour and office staff not only in the construction and operation of the wind power plant but also in the increased services and amenities that will come up in its wake. The impact on the health and culture of local residents is not anticipated as employees will be recruited from the residents of the surrounding area and the construction period of the project is planned to be short.

The development in the study area will definitely bring change in the land-use pattern. The areas presently under vegetal cover can be diverted for Industrial and other usages. The area of 500 acres has already been acquired for commissioning of the plants. The site does not involve any sensitive archaeological monuments as per the Archaeological Survey of India. No Historical and CulturalMonuments have been effected due to project location. The green belt surrounding the farms will improve the aesthetics of the area.

The operation of the ENERCON Wind Farms has seen several changes in the socio-economic and cultural environment. The contribution of Enercon and its customers towards provisions of employment and livelihood opportunities has improved the quality of life of the people in the surrounding habitations. The proposed power generation activity would add to this, through its contribution of providing social and economic benefits in terms of employment opportunities during operations and maintenance of the plant, and secondly, by providing cleaner environment and better environment health conditions to the people in the neighbouring villages.

The generation of electricity from such clean process would contribute towards meeting the states deficit in electricity requirements.

4.0 Technological Development

a) WECs proposed to be used are specifically designed for the wind regimes prevalent in India.

b) The WECs proposed to be used in the power project have a microprocessor controlled rotor pitching facility which aligns and adjusts the rotor blade's pitch precisely (continuous any angle pitching) depending on wind speed to maximize conversion of wind energy. Most of the conventional WECs used in the country only provide for pitching in or pitching out of the rotor blades (only extreme positions and no intermediate positions are possible), thus the PLF of such WECs is much lower than the WECs used herein.

c) The micro-processor controlled pitching facility provides the added advantage of WEC braking by pitching out the blades whereas in conventional WECs hydraulic braking is required. Hydraulic braking results in higher wear and tear as compared to rotor pitch based braking.

d) The WECs are operated by softwares, which reduce the response time as regards pitch angle adjustment as also hub direction alignment with wind direction. This improves the PLF of the WECs.

e) The Conventional wind power project in the country use the 5D distance (where D is the coverage diameter) between machines and 7D distance between rows as a thumb rule for micro siting of WECs in a wind farm.

Appendix 2

	Public Consultation Meeting for Wind Energy Projects at Clean Development Mechanism Project of Enercon (India) Limited. **Jaisalmer, District Rajasthan, India** **MINUTES OF THE MEETING**	
	Venue: Enercon (India) Limited, 11, J. N. Vyas Colony, Jaisalmer	Date: 21 June 2004
	The people participated are the following:	
	Representatives:	
	Mr. Jai Singh, RTS, Tasildar, Jaisalmer Tehsil <u>Enercon (India) Limited:</u> Mr. V. K. Sharma, Manager – Liaison, Jaipur Mr. R. L. Trivedi, Engineer –Services, Enercon Office, Jaisalmer CARE Sustainability Dr. (Mrs.) Suju George, Managing Director Srinivas Rao, Head, Environmental Services	
	The list of the other participants with their signatures is attached Mr. V. K. Sharma, Manager – Liaison, ENERCON invited Mr. Jai Singh, RTS, Tehsildar to Chair the meeting. The agenda of the meeting is fixed as follows: Welcome Description of the project details Queries and responses from the proponent and the stakeholders Vote of thanks Mr. R. L. Trivedi, Engineer – Services, appraised and gave description of the project to the stakeholders, and communicated the benefits of Enercon Wind Farm Projects at Jaisalmer Enercon installed its 1st project of 2.76 MW at Barabagh near Jaisalmer in 2001 and then at Temdarai- I started installation from March-2003. At present 90 MW installation has been done by Enercon which will be 95 MW at the end of June-04. The sites are located near Hansua, Gorera, Sodabadhan, Moda & Korwan. The salient benefits communicated have been as follows: The best use of land is made through the project which otherwise was barren. Improved	

	supply of electricity to the grid, and employment opportunities to local people. He explained function of windmill to the people and advantages of the windmill. Actual consumption of JaisalmerCity is 20 MW. The total power generated from Jaisalmer is 235 MW out of which wind energy comprises of 200 MW while generation from Ramgarh Gas Thermal power plant is 35 MW. Self reliance on using renewable energy sources is observed in Jaisalmer. In addition several other support services augmented by Enercon to local people in terms of transportation, mid –day meals to school children, renovation of Temdarai temple etc. as its social community initiatives.

	Mr. Srinivas Rao, CARE Sustainability briefed the environmental benefits of wind power generation as compared to that of thermal power generation based on coal. Similarly, a briefing on GHG and its role in global warming / increasing temperatures on the earth was given. The benefits in terms of pollution free environment and safeguard to human health were also communicated to the stakeholders while comparing coal based generation to wind based generation. Summary on Kyoto Protocol and CDM were made available.	
	The concerns, suggestions, opinions of the stakeholders have been specially invited. The participants expressed the queries as given below. The representatives from ENERCON clarified them as given below.	
	Queries	**Responses**
1.	What are the benefits of the wind power projects the stakeholders have observed?	The educated people of the villages have got employment opportunities. Other people have employment for at least 24 man days during a month, since the project has come up. Due to drought and no rains the people had lost occupation; the project has given jobs and economic opportunities in terms of small shops and as construction workers. The improved transportation has increased their accessibility to the near by town.
2.	Has the project affected the grazing of local cattle?	It has improved the accessibility of cattle to areas for grazing and drinking water.
3.	Has the project affected any migratory patterns of birds or fauna?	The project does not fall under migratory patterns of the birds. The major birds migrating in the region, but away from project site are *" Gatta", Tilor,* and *Solan*, which usually take their path away from the project site.
4.	Has the project affected the water availability? How far are the tube wells located from the site?	The project has improved the availability of water, which can also be accessed from project site. The tube wells are located at a distance of 3 Km from project site which the people daily access.

5.	During construction and erection has any incident of accident or damage occurred?	As to date no incidence of accident has occurred. Even blasting is done under control and supervision with enough warning. Majorly ground blasting is practiced.
6.	Suggestions	Provision of medical facility would help the village population, even medical store and mobile clinic can aid the local people.
7.	Have you observed any noise disturbances from the project during construction and operation of the project has occurred by the local people?	No noise disturbances have been so far.

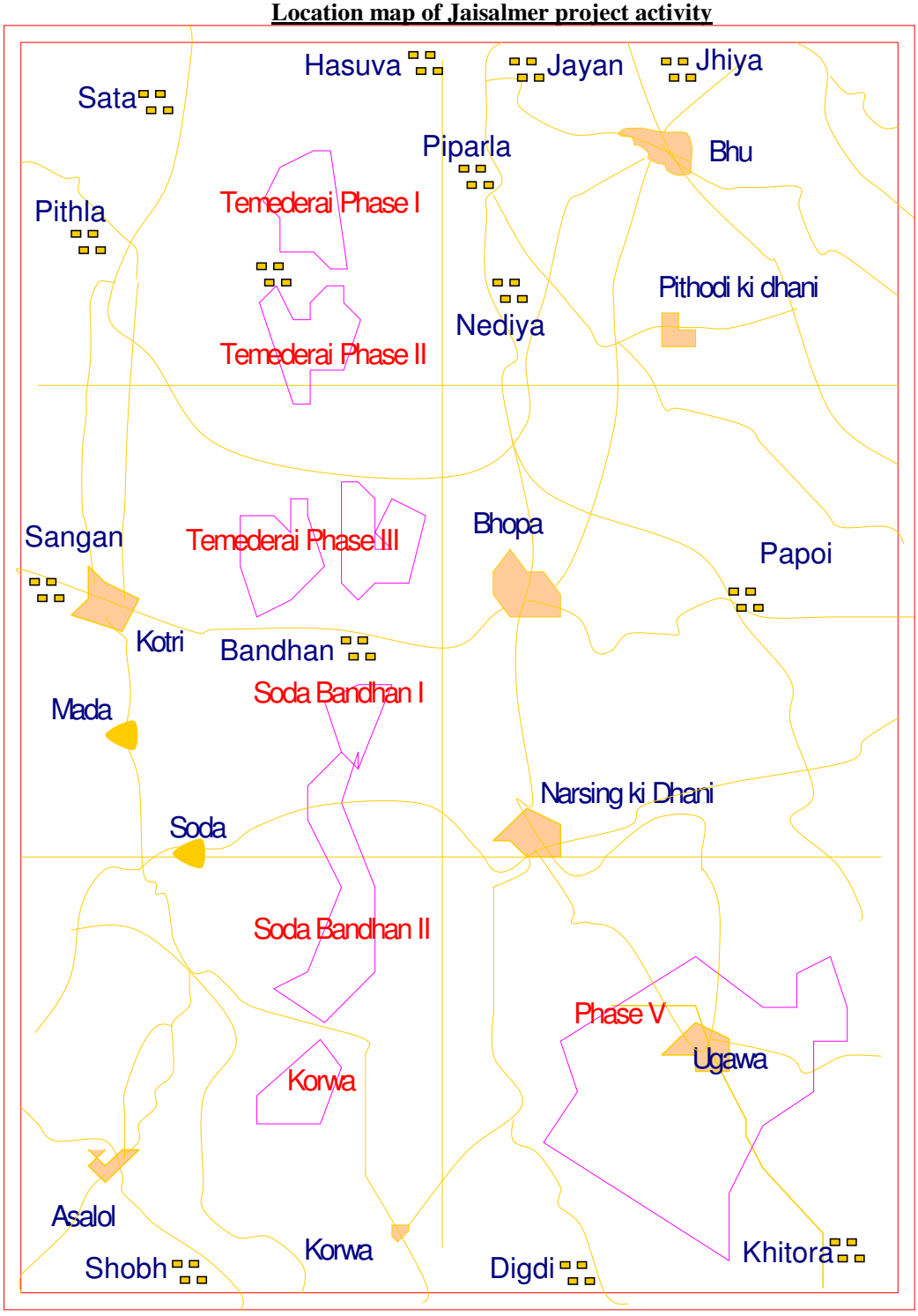
For further queries the representatives from ENERCON put forward to the participants that they could raise any queries within week, and the same can be submitted at ENERCON's site office at Jaisalmer or at the service office at Jaisalmer.

The meeting concluded with vote of thanks by Mr. V. K. Sharma

Name: ……..Sd:
Name: ……..Sd:
Name: ……..Sd:
Name: ……..Sd:
Name: ……..Sd:

Appendix 3

Location map of Jaisalmer project activity



Appendix 4
Unique Features OfThe ENERCON MAKE WIND ENERGY CONVERTOR

Gearless Construction of the Wind Energy Converter

Enercon's Turbine which is converting the wind energy into Electrical energy is based on principle of the main heart of the turbine without the Gear box.
Since gear box is eliminated, many of the moving parts like the High speed shaft ,low speed shaft ,two types of generators i.e. one for high wind,one for low wind is eliminated. This is resulting into very less wear and tear of the main part of the Turbine.

Variable Speed of Generator:

As compared to conventional turbine which works on fixed rpm of say 1500 rpm or 50 rpm this gearless technology WEC works at a very low rpm of say 18 to 32 rpm. This variable speed of generation, increases the life of the WEC as well as there is no cost for maintenance.

No Capacitors Bank used in WECs:

Enercon's WEC are having synchronous type of generator which eliminates the usage of Capacitors which are required by the conventional .Since Capacitors are not used during the start up or shut down of WEC due to low wind there is no surge of electrical current which not only protects the Generator and transformer of the WEC but also increases the life of the WEC. Also since capacitors are not used in WEC, it is not using any reactive power from grid for start up. In our case the usage of reactive is 1% compared to conventional WEC with capacitor bank which uses reactive power upto 10%.And if no capacitors are used by conventional WEC than it is as high as 30% during the start up of the WEC.

Elimination of Mechanical Brakes:

In case of Enercon WECs since the WEC work at low RPMs the mechanical brake system is eliminated. Hence no shocks on the WEC or wear and tear of the moving parts.

Lightning Protection for Blades:

The machines are having a unique ENERCON patented integrated lightning protection for the three blades as well as the WEC .This protects the complete WEC from the Lightning which happens and damages the blades. Since FRP (Fiber reinforced plastic) is used along with Aluminium strips along the periphery of the blade for manufacture of blades,the blades are light in weight as well as the design life of blade is also more.

Tubular Tower for the WECs:

The WECs use the tubular tower which protects the Cables from the Sunlight and rain which increases the life of the internal lines within the machine,as well as increase the life of the electrical panel.

Appendix 5

Chronology of changes in project configuration

Change 1: Ownership of 10 sub projects (total 28 WTGs) changed to Enercon Wind Farm (Tungbhadra) Pvt. Ltd. in the month of Mar 2008

Project configuration as per JMR & breakupsheet as on Feb 2008					Project configuration as per JMR & breakupsheet as on Mar 2008					Reference documents	
S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	Purchase Order placed by EWFTPL on sub project owners	Assignment of PPA by RREC**
1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur	1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur	-	-
2	Compucom Software Ltd.	2	1.2	Jaipur	2	Compucom Software Ltd.	2	1.2	Jaipur	-	-
3	Shriram Transport Finance Co Ltd	7	4.2	Ajmer	3	Shriram Transport Finance Co Ltd	7	4.2	Ajmer	-	-
4	BSL Limited	4	2.4	Jaipur	4	BSL Limited	4	2.4	Jaipur	-	-
5	LA-OPALA - RG Ltd.	1	0.6	Jaipur	5	LA-OPALA - RG Ltd.	1	0.6	Jaipur	-	-
6	Desai Brothers Ltd	5	3.0	Ajmer	6	Desai Brothers Ltd	5	3.0	Ajmer	-	-
7	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer	7	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer	-	-
8	Dinesh Pouches Ltd-I	3	1.8	Ajmer	8	Dinesh Pouches Ltd-I	3	1.8	Ajmer	-	-
9	Venlon Polyester Film Ltd	5	3.0	Jodhpur	9	Enercon Wind Farm (Tungbhadra) Pvt Ltd	5	3.0	Jodhpur	24-May-07	20-Mar-08
10	Texmo Industries Ltd.-I	3	1.8	Jodhpur	10	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	24-May-07	20-Mar-08
11	Dinesh Pouches Ltd-II	3	1.8	Jodhpur	11	Dinesh Pouches Ltd-II	3	1.8	Jodhpur	24-May-07	-
13	Texmo Industries Ltd.-II	1	0.6	Jodhpur	13	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	24-May-07	20-Mar-08
12	R.K.Premises Pvt. Ltd.	1	0.6	Jodhpur	12	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	24-May-07	20-Mar-08
14	Revathi Equipment Ltd.	4	2.4	Jodhpur	14	Enercon Wind Farm (Tungbhadra) Pvt Ltd	4	2.4	Jodhpur	24-May-07	20-Mar-08
15	R. K. Marbles Pvt Ltd	7	4.2	Jaipur	15	Enercon Wind Farm (Tungbhadra) Pvt Ltd	7	4.2	Jaipur	24-May-07	04-Feb-08
16	Supreme Buildestates Pvt. Ltd.	1	0.6	Jaipur	16	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	24-May-07	04-Feb-08
17	Premier Buildestates Pvt. Ltd.	1	0.6	Jaipur	17	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	24-May-07	04-Feb-08
18	Rennaissance Asset Management Co. Pvt. Ltd.	2	1.2	Jaipur	18	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jaipur	24-May-07	04-Feb-08
19	Texmo Precision Casting	3	1.8	Ajmer	19	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Ajmer	24-May-07	28-Feb-08
20	Dempo Industries Pvt Ltd - I	1	0.6	Ajmer	20	Dempo Industries Pvt Ltd - I	1	0.6	Ajmer	-	-

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Total	97	58.2

Total	97	58.2

***After assignment of PPA by RREC, changes of ownership has been reflected in JMR & Breakup sheet*

Change 2: (a) 05 WTGs out of 28 WTGs owned by Enercon Wind Farm (Tungbhadra) Pvt. Ltd. were decommissioned in June 2008

(b) 01 WTGs out of 03 WTGs owned by Dinesh Pouches Ltd-II was decommissioned in June 2008

(c) 01 WTGs owned by Dempo Industries Pvt Ltd - I was decommissioned in June 2008

(d) Total Capacity of bundled project reduced from 58.2 MW to 54.0 MW in June 2008

Project configuration as per JMR & breakupsheet as on May 2008					Project configuration as per JMR & breakupsheet as on June 2008					Date of change
S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	WTG removal date
1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur	1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur	-
2	Compucom Software Ltd.	2	1.2	Jaipur	2	BSL Limited	4	2.4	Jaipur	-
3	Shriram Transport Finance Co Ltd	7	4.2	Ajmer	3	Compucom Software Ltd.	2	1.2	Jaipur	-
4	BSL Limited	4	2.4	Jaipur	4	LA-OPALA - RG Ltd.	1	0.6	Jaipur	-
5	LA-OPALA - RG Ltd.	1	0.6	Jaipur	5	Desai Brothers Ltd	5	3	Ajmer	-
6	Desai Brothers Ltd	5	3	Ajmer	6	Dinesh Pouches Ltd-I	3	1.8	Ajmer	-
7	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer	7	Shriram Transport Finance Co Ltd	7	4.2	Ajmer	-
8	Dinesh Pouches Ltd-I	3	1.8	Ajmer	8	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer	-
9	Enercon Wind Farm (Tungbhadra) Pvt Ltd	5	3	Jodhpur	9	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	02-Jun-08
10	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	10	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur	02-Jun-08
11	Dinesh Pouches Ltd-II	3	1.8	Jodhpur	11	Dinesh Pouches Ltd-II	2	1.2	Jodhpur	02-Jun-08
12	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	12	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	-
13	Enercon Wind Farm (Tungbhadra) Pvt Ltd	4	2.4	Jodhpur	13	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	03-Jun-08
14	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	14	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	-
15	Enercon Wind Farm (Tungbhadra) Pvt Ltd	7	4.2	Jaipur	15	Enercon Wind Farm (Tungbhadra) Pvt Ltd	6	3.6	Jaipur	03-Jun-08
16	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	16	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	-
17	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	17	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	-
18	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jaipur	18	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jaipur	-

19	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Ajmer	19	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Ajmer	-
20	Dempo Industries Pvt Ltd - I	1	0.6	Ajmer	20	Dempo Industries Pvt Ltd - I	0	0	Ajmer	03-Jun-08
	Total	**97**	**58.2**			**Total**	**90**	**54.0**		

Change 3: Ownership of 02 WTGs owned by Dinesh Pouches Ltd-II was changed to Enercon Wind Farm (Tungbhadra) Pvt Ltdin the month of Oct 2008 as reflected in JMR & Breakup sheet.

Project configuration as per JMR & brekaupsheet as on Sep 2008					Project configuration as per JMR & brekaupsheet as on Oct 2008					Date of change
S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	Assignment of PPA by RREC
1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur	1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur	-
2	BSL Limited	4	2.4	Jaipur	2	BSL Limited	4	2.4	Jaipur	-
3	Compucom Software Ltd.	2	1.2	Jaipur	3	Compucom Software Ltd.	2	1.2	Jaipur	-
4	LA-OPALA - RG Ltd.	1	0.6	Jaipur	4	LA-OPALA - RG Ltd.	1	0.6	Jaipur	-
5	Desai Brothers Ltd	5	3	Ajmer	5	Desai Brothers Ltd	5	3	Ajmer	-
6	Dinesh Pouches Ltd-I	3	1.8	Ajmer	6	Dinesh Pouches Ltd-I	3	1.8	Ajmer	-
7	Shriram Transport Finance Co Ltd	7	4.2	Ajmer	7	Shriram Transport Finance Co Ltd	7	4.2	Ajmer	-
8	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer	8	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer	-
9	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	9	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	-
10	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur	10	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur	-
11	Dinesh Pouches Ltd-II	2	1.2	Jodhpur	11	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur	17-Oct-08
12	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	12	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	-
13	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	13	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	-
14	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	14	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	-
15	Enercon Wind Farm (Tungbhadra) Pvt Ltd	6	3.6	Jaipur	15	Enercon Wind Farm (Tungbhadra) Pvt Ltd	6	3.6	Jaipur	-
16	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	16	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	-
17	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	17	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	-
18	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jaipur	18	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jaipur	-
19	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Ajmer	19	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Ajmer	-
	Total	**90**	**54.0**			**Total**	**90**	**54.0**		

Change 4: Ownership of 07 WTGs owned by Shriram Transport Finance Co Ltd is changed to NuPower Renewables Ltd. in the month of Jan 2010.

Project configuration as per JMR & brekaupsheet as on Dec 2009					Project configuration as per JMR & brekaupsheet as on Jan 2010					Reference documents	
S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	S. No.	Name of Customer	No. of M/C	Capacity (MW)	Discom	Slum sale agreement b/w STFCL & Nu Power	Assignment of PPA by RREC
1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur	1	Enercon Wind Farms (Jaisalmer) Pvt. Ltd.	41	24.6	Jodhpur		-
2	BSL Limited	4	2.4	Jaipur	2	BSL Limited	4	2.4	Jaipur		-
3	Compucom Software Ltd.	2	1.2	Jaipur	3	Compucom Software Ltd.	2	1.2	Jaipur		-
4	LA-OPALA - RG Ltd.	1	0.6	Jaipur	4	LA-OPALA - RG Ltd.	1	0.6	Jaipur		-
5	Desai Brothers Ltd	5	3	Ajmer	5	Desai Brothers Ltd	5	3	Ajmer		-
6	Dinesh Pouches Ltd-I	3	1.8	Ajmer	6	Dinesh Pouches Ltd-I	3	1.8	Ajmer		-
7	Shriram Transport Finance Co Ltd	7	4.2	Ajmer	7	NuPower Renewables Ltd.	7	4.2	Ajmer	25-Mar-09	25-Nov-09
8	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer	8	Hindustan Platinum Pvt. Ltd.	2	1.2	Ajmer		-
9	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	9	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur		-
10	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur	10	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur		-
11	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur	11	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jodhpur		-
12	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	12	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur		-
13	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur	13	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Jodhpur		-
14	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur	14	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jodhpur		-
15	Enercon Wind Farm (Tungbhadra) Pvt Ltd	6	3.6	Jaipur	15	Enercon Wind Farm (Tungbhadra) Pvt Ltd	6	3.6	Jaipur		-
16	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	16	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur		-
17	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur	17	Enercon Wind Farm (Tungbhadra) Pvt Ltd	1	0.6	Jaipur		-
18	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jaipur	18	Enercon Wind Farm (Tungbhadra) Pvt Ltd	2	1.2	Jaipur		-
19	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Ajmer	19	Enercon Wind Farm (Tungbhadra) Pvt Ltd	3	1.8	Ajmer		-
	Total	**90**	**54.0**			**Total**	**90**	**54.0**			