CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 28 July 2006

CONTENTS

SECTION A. General description of project activity

A.1 Title of the project activity:

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Title: Bundled wind energy power projects (2003 policy) in Rajasthan
Version: 8.0
Date of completion of PDD: 25/01/2012

A.2. Description of the project activity:

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Objective of the Project

The objective is development, design, engineering, procurement, finance, construction, operation and maintenance of bundled wind power projects totalling 30.59[1] MW wind power project ("Project") in the Indian state of Rajasthan to provide reliable, renewable power to the Rajasthan state electricity grid which is part of the Northern regional electricity grid. The Project will lead to reduced greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants. The original capacity of the Project was 30.59 MW at the time of project commissioning. Afterwards, from this bundle, the sub-project comprising of one WEC of 0.6 MW by Dempo Industries Pvt. Ltd. has been decommissioned and the ownership of the sub – project comprising of one WEC of 0.23 MW by Prerna Pharma Intermediates Pvt. Ltd. has been changed to Jitendra K. Newaskar[2]. Dempo Industries Pvt. Ltd. decided to decommission this sub – project (one WEG) due to shortfall in generation of power during the project operational period. The change in ownership of this sub – project (one WEG) from M/s. Prerna Pharma Intermediates Pvt. Ltd. to M/s. Jitendra K. Newaskar was a normal business decision. As per the notification submitted to UNFCCC, these two sub-projects have been excluded from the bundle[3] and the revised capacity of this bundle is 29.76 MW. Accordingly, the emission reduction estimation has been revised in the respective sections.

Nature of Project

The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. Enercon (India) Ltd ("Enercon" or "EIL") is the equipment supplier and the operations and maintenance contractor for the Project. The generated electricity will be supplied to Rajasthan Rajya Vidyut Prasaran Nigam Ltd ("RRPVN")/ Jodhpur Electricity Distribution Company Ltd ("Jodhpur Discom") under a long-term power purchase agreement (PPA). The details of the sub-projects comprising the Project are as under:

- Enercon Wind Farm (Rajasthan) Pvt Ltd: 24 MW
- Modular Power: 0.23 MW
- Vijay Traders: 0.23 MW

[1] The total installed capacity of this bundle is now 29.76 MW.

[2] The supportive documents have been provided to the DOE.

[3] Please refer to section B.5 of the PDD and the notification submitted to UNFCCC.

- Vijay Developers: 0.23 MW
- Vikas Agencies: 0.23 MW
- G. C. Chemie Pharmie Ltd.: 0.23 MW
- Cooper Metals Pvt. Ltd.: 0.46 MW
- Kataria Infrastructure Corporation: 0.6 MW
- D.P.Power: 0.23 MW
- Kataria Infrastructure Corporation: 0.23 MW
- Kataria Wires: 0.23 MW
- Ratlam Wires: 0.23 MW
- Kwality Tobacco Products: 0.23 MW
- D P Power: 0.6 MW
- Unique Power Corporation: 0.6 MW
- P.V. Chandran: 0.6 MW
- Srinivaas Sirigeri: 0.6 MW

Contribution to sustainable development

The Project meets several sustainable development objectives including:

- contribution towards the policy objectives of Government of India and Government of Rajasthan of incremental capacity from renewable sources;
- contribution towards meeting the electricity deficit in Rajasthan;
- CO_2 abatement and reduction of greenhouse gas emissions through development of renewable technology;
- reducing the average emission intensity (SO_x, NO_x, PM, etc.), average effluent intensity and average solid waste intensity of power generation in the system;
- conserving natural resources including land, forests, minerals, water and ecosystems; and
- developing the local economy and create jobs and employment, particularly in rural areas, which is a priority concern for the Government of India;

A.3. Project participants:

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Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Government of India (Host)	Enercon (India) Ltd	No
Government of Japan	Japan Carbon Finance	No

All the sub-projects have authorised Enercon (India) Ltd to take the project forward as CDM project.

The contact details of the entities are provided in Annex – 1.

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.

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

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The Project is located in the State of Rajasthan that forms part of the Northern regional electricity grid of India.

A.4.1.3. City/Town/Community etc:

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The sub-projects are located at the following sites in Jaisalmer District of Rajasthan state in India:

- Asloi: Enercon Wind Farm Rajasthan
- Korwa: Prerna Pharma Intermediates Pvt. Ltd., Modular Power, Vijay Traders, Vijay Developers, Vikas Agencies, G. C. Chemie Pharmie Ltd., Cooper Metals Pvt. Ltd.
- Sodabandhan: Kataria Infrastructure Corporation, Dempo Industries Pvt. Ltd.
- Temderai I: D.P.Power, Kataria Infrastructure Corporation, Kataria Wires, Ratlam Wires, Kwality Tobacco Products
- Temderai II: D P Power, Unique Power Corporation
- Temderai III: P.V.Chandran, Srinivaas Sirigeri

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 project area extends between

- Asloi: latitude 26^o 33’ & 26^o 34.5’ North and longitude 70^o 51’ & 70^o 53’ East.
- Korwa: latitude 26^o 32’ & 26^o 33’ North and longitude 70^o 53’ & 70^o 54’ East.
- Sodabandhan: latitude 26^o 32.5’ & 26^o 36’ North and longitude 70^o 53’ & 70^o 55’ East.
- Temderai I, II, III: latitude 26^o 42.5’ & 26^o 46’ North and longitude 70^o 52.5’ & 70^o 54.5’ East.

The Project is connected to the RRVPN 33/132/220 kV substation at Amarsagar. The sites are located at a distance of 35 km from Jaisalmer by road. The nearest railway station is at Jaisalmer. A location map is attached at Appendix – 1.

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)', the project activity may 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 Project involves 30 wind energy converters (WECs) of Enercon make 800 kW E-48, 5 WECs of Enercon make 600 kW E-40 and 13 WECs of Enercon make 230 kW E-30 with internal electrical lines connecting the Project with local evacuation facility. The WECs generates 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%. The other salient features of the state-of-art-technology are:

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

Enercon (India) Ltd has secured and facilitated the technology transfer for wind based renewable energy generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.

A.4.4 Estimated amount of emission reductions over the chosen crediting period:

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Crediting Period for the Project: fixed for 10 years

Years	Annual estimation of emission reductions in tonnes of CO2e
15 Aug 2007-31 Mar 2008	31,324
01 Apr 2008-31 Mar 2009	50,119
01 Apr 2009-31 Mar 2010	50,119
01 Apr 2010-31 Mar 2011	50,119
01 Apr 2011-31 Mar 2012	50,119

Years	Annual estimation of emission reductions in tonnes of CO2e
01 Apr 2012-31 Mar 2013	50,119
01 Apr 2013-31 Mar 2014	50,119
01 Apr 2014-31 Mar 2015	50,119
01 Apr 2015-31 Mar 2016	50,119
01 Apr 2016-31 Mar 2017	50,119
01 Apr 2017-14 Aug 2017	18,795
Total estimated reductions (tones of CO2e)	501, 190
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2e)	50,119

A.4.5. Public funding of the project activity:

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There is no ODA financing involved in the Project.

SECTION B. Application of a baseline and monitoring methodology

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

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The original capacity of the Project was 30.59 MW at the time of project commissioning. Afterwards, from this bundle, the sub-project comprising of one WEC of 0.6 MW by Dempo Industries Pvt. Ltd[4] has been decommissioned and the ownership of the sub-project comprising of one WEC of 0.23 MW by Prerna Pharma Intermediates Pvt. Ltd. has been changed to Jitendra K. Newaskar[5]. The revised capacity of this bundle is 29.76 MW after exclusion of these two sub-projects.

The change in the capacity does not change the scale of the project and it still remains as a large scale project, therefore, the applicable methodology will remain same as follows.

The approved consolidated baseline and monitoring methodology **ACM0002 Version 6.0** (19 May 2006) has been used. The titles of these baseline and monitoring methodologies are "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" and "Consolidated monitoring methodology for grid-connected electricity generation from renewable sources.

[4] The supportive documents have been provided to the DOE.

[5] The supportive documents have been provided to the DOE.

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

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The Project is wind based renewable energy source, zero emission power project connected to the Rajasthan state grid, which forms part of the Northern regional electricity grid. The Project will displace fossil fuel based electricity generation that would have otherwise been provided by the operation and expansion of the fossil fuel based power plants in Northern regional electricity grid.

The approved consolidated baseline and monitoring methodology ACM0002 Version 6 is the choice of the baseline and monitoring methodology and it is applicable because:

- the Project is grid connected renewable power generation project activity
- the Project represents electricity capacity additions from wind sources
- the Project does not involve switching from fossil fuel to renewable energy at the site of project activity since the Project is green-field electricity generation capacities from wind sources at sites where there was no electricity generation source prior to the Project, and
- the geographical and system boundaries of the Northern electricity grid can be clearly identified and information on the characteristics of the grid is available.

B.3. Description of the sources and gases included in the project boundary

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According to ACM0002, for the baseline emission factor, the spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

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

The project boundary encompasses the physical extent of the northern regional electricity grid which includes the project site and all power plants connected physically to the electricity system.

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

	Source	Gas	Included?	Justification/ Explanation
B a s	Electricity generation from	CO_2	Included	Main emission source

	power plants connected to the Northern Grid	CH_4	Excluded	This source is not required to be estimated for wind energy projects under ACM0002
		N_2O	Excluded	This source is not required to be estimated for wind energy projects under ACM0002
Project Activity	Electricity generation from the Project	CO_2	Excluded	Wind energy generation does not have any direct GHG emissions.
		CH_4	Excluded	
		N_2O	Excluded	

B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

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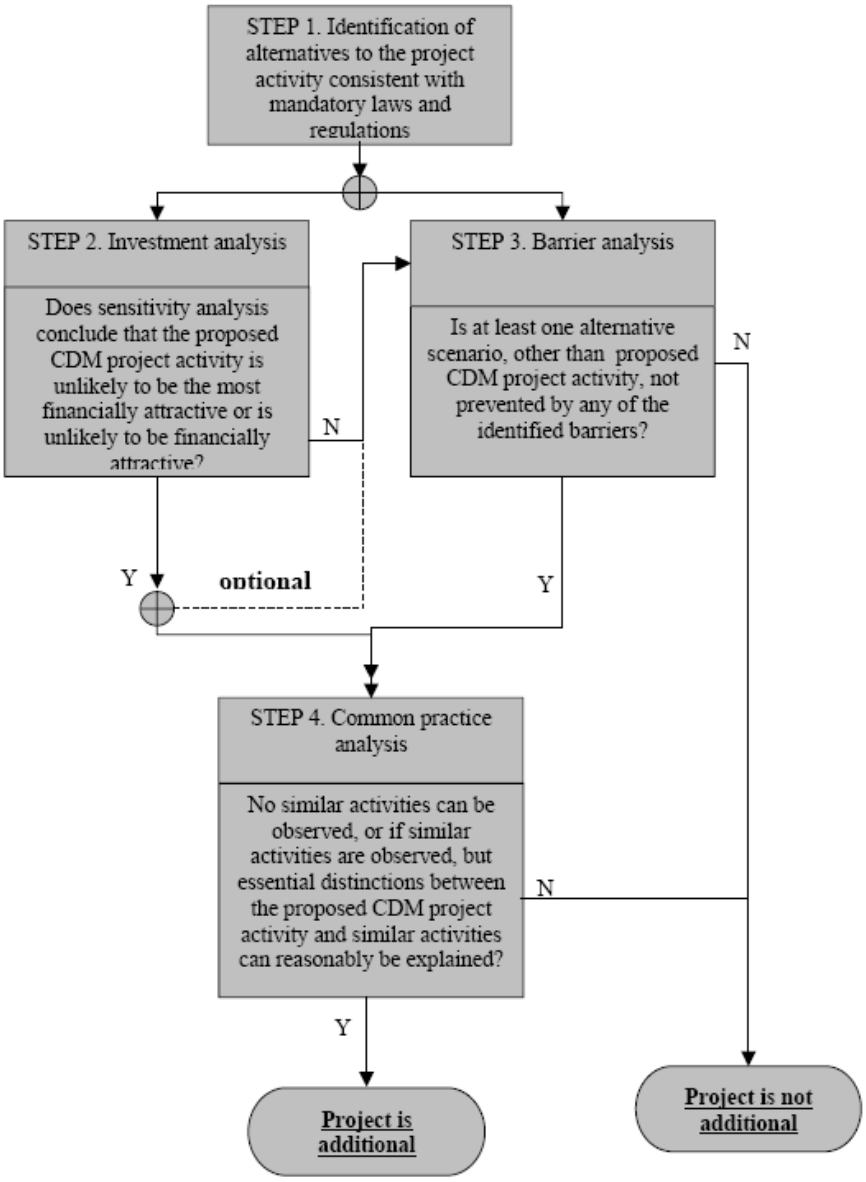
According to ACM0002, for project activities that do not modify or retrofit an existing electricity generation facility, the baseline scenario is the following:

Electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described below.

As the Project does not modify or retrofit an existing generation facility, the baseline scenario is the emissions generated by the operation of grid-connected power plants and by the addition of new generation sources. This is estimated using calculation of Combined Margin multiplied by electricity delivered to the grid by the Project.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered CDM project activity (assessment and demonstration of additionality): >>

The latest additionality tool i.e. Tool for the demonstration and assessment of additionality version 3.0 approved by CDM Executive Board in its 29th meeting is used to demonstrate project additionality.



The following evidence will be made available to the validator to demonstrate that CDM benefits were considered while considering investments in these projects:

- The Management Committee of Enercon set out the CDM initiative in 2000 and since then monitored the progress of the CDM initiative. Enercon 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.

- In late 2001, Government of Netherlands came out with the CERUPT Tender. Enercon participated in CERUPT tender by offering 15 MW + 15 MW wind farm projects and was selected under the tender. Enercon was not able to conclude the contract with CERUPT and the 15 MW + 15 MW projects were

subsequently cancelled. However, this provided Enercon with a considerable experience in the CDM process.

- Enercon appraised its customers in Rajasthan about the CDM benefits.

- The loan documentation of Enercon Wind farm (Rajasthan) Pvt Ltd, one of the sub-projects in this PDD, contains provision of sharing of CDM benefits.

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 Project is not undertaken as a CDM project activity.

(b) Setting up of comparable utility scale fossil fuel fired or hydro power projects that supply to the Rajasthan grid under a PPA.

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 3.5% and peak (MW) shortages of 13.7% in 2005-06 (Source: Northern Region Power Sector Profile, July 2006, Ministry of Power).

Outcome of step 1 a:

Alternatives a and b, as identified above are realistic and credible alternatives to the project activity.

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 (a) and (b) from occurring.

Outcome of step 1 b
Both alternative a and alternative b are in compliance with mandatory laws and regulations taking into account the enforcement in the region or country and EB decision on national and sectoral policies. Hence Alternative a and b as identified in the step 1 a, are realistic and credible alternatives to the project activity.

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

Determine whether the proposed project activity is the economically or financially less attractive than other alternatives without the revenue from the sale of certified emission reductions (CERs). To conduct the investment analysis, use the following sub-steps:
Sub-step 2a. - Determine appropriate analysis method

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

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

2. Document the costs associated with the CDM project activity and demonstrate that the activity produces no economic benefits other than CDM related income.

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., levelized 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 – Simple cost analysis is not applicable as the project activity sells electricity to the grid and obtains economic benefits in the form of electricity tariffs.

Enercon 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.
As discussed in section A.2, the original capacity of the Project was 30.59 MW at the time of project commissioning. Afterwards, from this bundle, the sub-project comprising of one WEC of 0.6 MW by Dempo Industries Pvt. Ltd[6] has been decommissioned and the ownership of the sub-project comprising of one WEC of 0.23 MW by Prerna Pharma Intermediates Pvt. Ltd. has been changed to Jitendra K. Newaskar[7]. As per the notification submitted to UNFCCC, these two sub- projects have been excluded from this bundle. The revised capacity of the bundle is now 29.76 MW after exclusion of these two sub-projects.

[6] The supportive documents have been provided to the DOE.

[7] The supportive documents have been provided to the DOE.

The additionality assessment of this bundle is done separately for all the sub-projects. Therefore, the project will still remain additional after removal of the decommissioned sub-project (one WEC) by Dempo Industries Pvt. Ltd. from the bundle.

The change in ownership will impact on the additionality of the sub-project of Jitendra K. Newaskar (formerly Prerna Pharma Industries Pvt. Ltd.) after considering the revised cost in the investment analysis (as per the purchase deed[8]). Hence, this particular sub – project has been removed from the bundle.
However, as the additionality for each of the sub – project has been demonstrated separately, therefore, removal of this sub – project has no impact on the overall additionality of this bundle.

Therefore, it can be seen that the project will remain additional after these two changes. Accordingly, the additionality assessment will remain same as explained below.

Our project is a 30.59[9] MW bundled wind power project that generates and supplies electricity to the state electricity grid in the state of Rajasthan, India. During the request for registration stage, the EB referred our project to "request for review" and sought clarifications from us. In response to the queries raised in request for review, we presented the clarifications in EB 36. The EB then instructed to register our project with corrections provided we submit a revised PDD and corresponding revised validation report that provides clarification regarding suitability of the 16% regulatory commission benchmark. Subsequently, the Executive Board in EB 40 meeting ruled that the 16% post tax return considered by regulatory commissions is not a suitable benchmark.

We also understand that as per Guidance to investment analysis issued in EB 51 (paragraph 12), the required return on equity can be considered as appropriate benchmark for Equity IRR. In light of this and keeping in mind the EB 40 ruling, we have considered the cost of equity[10] applicable to the project type i.e. electricity generation projects, as the suitable benchmark for the project. The cost of equity has been determined using the Capital Asset Pricing Model (CAPM) considering Beta values of all listed power generating companies in India. The CAPM economic model is widely used to determine the required/expected return on equity based on potential risk of an investment. The CAPM framework is the Nobel award winning work of financial economist Dr. William Sharpe.

In line with the requirements of the Guidance to Investment Analysis (paragraph 13), data and parameters used in calculation of cost of equity i.e. beta values of power generating companies in India, risk free rate of return, market risk premium etc. have been derived from publicly available data sources. The detailed calculations of cost of equity along with an elaboration of the approach are provided in Appendix 4.

As can be seen, the benchmark cost of equity works out to 16.09%

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[8] Submitted to the DOE. Please also refer to the notification submitted to UNFCCC.

[9] The total capacity of this bundle is now 29.76 MW.

[10] The Guidance to investment analysis (paragraph 13) states that, for projects where there are more than one possible project developers, the internal cost of equity cannot be considered as the benchmark as benchmarks should not include the subjective profitability expectations or risk profile of a particular project developer. The project activity is a Greenfield renewable energy generation activity that generates and supplies electricity to the Rajasthan state grid; and hence can have more than one potential project developer. Therefore, we have not used company or project specific parameters for the calculation of the benchmark (such as company Beta etc.).

Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III):

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.

Apply a fixed electricity tariff through out the life time of the project

In EB 36, the Executive Board has required us to consider a fixed electricity tariff for the entire project life period. We would like to submit that the tariff for our project is governed by a legally binding Power Purchase Agreement (PPA) signed between the project developer and the off-taker.

There are two tariff regimes that are applicable for the different subprojects included in the bundle:-

(1) Base year tariff of Rs.3.34 per kWh (for base year) with yearly escalation of 5% till the 10th year. Thereafter, the tariff will be as mutually agreed between the PP and the utility.
(2) Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.

The tariff regime of all the sub-projects included in the bundle is given below.

S.No.	Sub-Project	Tariff regime
1	Enercon Wind Farm (Rajasthan) Pvt Ltd	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
2	D P Power	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
3	D P Power	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
4	Unique Power Corporation	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
5	Srinivaas Sirigeri	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
6	Kataria Infrastructure Corporation (0.60 MW)	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.

7	Kataria Infrastructure Corporation (0.23 MW)	Tariff is fixed at Rs.3.34 per kWh (for base year) with yearly escalation of 5% till the 10th year. Thereafter tariff shall be fixed as mutually agreed between the parties.
8	Kataria Wires	Tariff is fixed at Rs.3.34 per kWh (for base year) with yearly escalation of 5% till the 10th year. Thereafter tariff shall be fixed as mutually agreed between the parties.
9	Ratlam Wires	Tariff is fixed at Rs.3.34 per kWh (for base year) with yearly escalation of 5% till the 10th year. Thereafter tariff shall be fixed as mutually agreed between the parties.
10	Cooper Metals Pvt. Ltd.	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
11	Cooper Metals Pvt. Ltd.	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
12	G. C. Chemie Pharmie Ltd.	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
13	Vijay Developers	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
14	Vijay Traders	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a

		period upto the 20th year of the project.
15	Vikas Agencies	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
16	Kwality Tobacco Products	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
17	Modular Power	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.
18	P V Chandran	Rs. 3.32 per unit for power supplied during 2003-04 which shall be increased at a simple rate of 2% (of Rs. 3.32) every year on 1st April of the year for a period of up to 10 years i.e. up to 2012-13 with Base year 2003-04. Thereafter, from 2013-14 and onwards a fixed rate of Rs. 3.92 per unit charges to be paid by utility for a period upto the 20th year of the project.

Tariff Regime 1

The tariff regime 1 was issued by Govt. of Rajasthan on 4th Feb 2000 for attracting investment of 100 MW exclusively in the wind power in the state of Rajasthan. This capacity envisaged under this policy was expected to be achieved by Dec 2000.

The tariff regime 2 was issued by the Government of Rajasthan on 30th April 2003. This wind power policy allowed the earlier policy dated 4th Feb 2000 to be applicable to the wind power projects upto the cap of 100 MW envisaged in the policy. The projects of Kataria Infrastructure Corporation, Kataria Wires and Ratlam wires were able to achieve the tariff approved the under policy dated 4th Feb 2000. Therefore we have carried out the analysis for these projects at the tariff approved under the policy dated 4th Feb 2000.

As per PPA, the tariff is fixed at Rs.3.34 per kWh (for base year) with yearly escalation of 5% till the 10th year. Thereafter tariff shall be fixed as mutually agreed between the parties.

As a conservative estimate, the tariff from 11th year onwards has been taken same as that of the 10th year. The reason why the tariff number should come down substantially after the 10th year is because the largest component of tariff being the debt service (principal repayment and interest payments) is over by the 10th year of operations and these have already been factored in while determining the regulated tariff for the first 10 years.
It is therefore clear that the tariff for the project activity beyond the initial PPA period would be lower. This is bound to happen in any regulated tariff structure and several instances are available in the cost plus tariff regulated power projects (both in case of non conventional as well as conventional coal-fired power projects) where the tariff comes down significantly after the debt service is over.

For example, in case of Maharashtra wind power projects, the MERC order provides a clear understanding of the approach to be followed for tariff setting beyond the initial PPA period. [MERC order Section 1.4.2, Para 2, page-25 of 116, weblink: http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf]

The Commission notes that in Cost Plus Approach, which the Commission has adopted for tariff proposal, rate per unit charged by such projects during initial period of 10 years is bound to be higher as during this period the project has various debt related obligations. However, it is essential that the consumer is able to enjoy the benefit of cheaper power once all debt related obligations are paid off and project has virtually no variable costs.

This can be further corroborated from the table 3 on page 69 of MERC order (link: http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf) that beyond the 11th year the cost of electricity only comprises O & M cost and return of equity for tariff calculation.

Also in case of projects in other states, like Maharashtra, that are approaching the end of the term for the PPA, the state utilities have applied for the petition for revision in tariff which is much lower than the tariff for the term of the PPA. The state utility in the state of Maharashtra has approached commission for revision in tariff after the period of 13 years of the PPA (MERC has provided PPA term for the period of 13 years for wind power projects) at the rate of INR 1.17 per kWh [Source: MERC order dated 20 November 2007, para 2(a)] which is much lower than the tariff [INR 3.50 per kWh with escalation of INR 0.15 per year for the first 13 years of operation] approved by the Maharashtra electricity regulatory commission for the first 13 years under PPA.

As you would note from the above the regulatory framework for tariff setting in India do not allow us to obtain a fixed tariff throughout the lifetime of the project activity. Therefore, for carrying out the investment analysis, we have considered the tariff in accordance with the terms of the Power Purchase Agreement that governs the sale of electricity for the first 10 years and conservatively assumed the tariff from 11th year onwards to same as that of the 10th year.

Tariff Regime 2

The tariff schedule is Rs.3.32 per kWh (for the base year) with yearly escalation of 6.64 paisa till 2014 and from 2014 till 20th year it will be a fixed at Rs.3.92. This has been taken in accordance with the Rajasthan Wind Power Policy
"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)." (Source: http://www.rajenergy.com/wind_pol.pdf)

The given tariff schedule has been fixed for the entire life (20 Years) of the project activity through the Power Purchase Agreement entered into between the Project and the off-taker (Discom/RRVN) and actual revenue flows to the project would be on the basis of this PPA. Accordingly, the financial analysis of the project has also been carried out considering the same tariff schedule.

The key assumptions used for calculating the benchmark (post-tax equity IRR) are set out below. These details are taken for Enercon Wind Farm (Rajasthan) Pvt Ltd.:

Project Capacity in MW	24
Project Commissioning Date	1-Apr-05
Project Cost per MW (Rs. In Millions)	48.4

Operations	
Plant Load Factor - 1st to 5th year	22.00%
Plant Load Factor - 6th to 9th year	22.00%
Plant Load Factor - 10th to 13th year	22.00%
Plant Load Factor - 14th to 17th year	22.00%
Plant Load Factor - 18th to 20th year	22.00%
Insurance Charges @ % of capital cost	0.18%
Operation & Maintenance Cost base year @ % of capital cost	1.25%
% of escalation per annum on O & M Charges	5.0%

Tariff	
Base year Tariff (2003-04) - Rs./kWh	3.32
Annual Escalation (Rs./kWh per Year)	0.0664
Tariff applicable from 2013-14 onwards (Rs/kWh)	3.92

Project Cost Land and Infrastructure, Generator & Electrical Equipments, Mechanical Equipments, Civil Works, Instrumentation & Control, Other Project Cost, Pre operative Expenses, etc.	Rs Million
Total Project Cost	1,161.60

Means of Finance		Rs Million
Own Source	30%	348.48
Term Loan	70%	813.12
Total Source		1,161.60
Terms of Loan		
Interest Rate	8.50%	
Tenure	10	Years
Moratorium	6	Months

Income Tax Depreciation Rate (Written Down Value basis)	
on Wind Energy Generators	80%
On other Assets	10%
Book Depreciation Rate (Straight Line Method basis)	
On all assets	7.86%
Book Depreciation up to (% of asset value)	90%

Income Tax	
Income Tax rate	30%
Minimum Alternate Tax	10%
Surcharge	10%
Cess	2%

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

CER Revenues	
CER Price in US$	6.50
Exchange rate Rs./US$*	43.59

* RBI reference rate as of 30 March 2007

Crediting period starts	15-Aug-07
Length of Crediting period	10

Baseline Emission Factor for Northern Region (tCO2/GWh)	873.87

The equity IRR for the Project without CDM revenues is 12.2% and with CDM revenues is 13.5%.

Applying input values for the specific project activity rather than input values scaled up from the planned lower capacity

The assumptions of Enercon wind Farm Pvt. Ltd were provided in the PDD. We have now extended the investment analysis to all the sub-projects that are included in the bundle. We have now included input parameters of all other subprojects that are included in the bundle in appendix 3 of the PDD. The equity IRR for all the other subprojects (except for the Enercon Wind Farm (Rajasthan) Pvt. Limited that was provided earlier in the PDD) is given in the table below.

S.No.	Sub Project	Post Tax Equity IRR
1	D P Power (0.6 MW)	9.84%
2	D P Power (0.23 MW)	7.74%
3	Unique Power Corporation	9.84%
4	Srinivaas Sirigeri	10.50%
5	Kataria Infrastructure Corporation (0.60 MW)	9.63%
6	Kataria Infrastructure Corporation (0.23 MW)	10.70%
7	Kataria Wires (0.23 MW)	10.61%
8	Ratlam Wires (0.23 MW)	10.61%
9	Cooper Metals Pvt. Ltd.	5.80%
10	Cooper Metals Pvt. Ltd.	6.34%
11	G. C. Chemie Pharmie Ltd.	6.57%
12	Vijay Developers	5.54%
13	Vijay Traders	5.58%
14	Vikas Agencies	5.54%
15	Kwality Tobacco Products	6.56%
16	Modular Power	7.29%
17	P V Chandran	8.86%

Explanation regarding change in total investment cost and equity value in post-tax equity IRR.

PP Response: The PP would like to clarify that there is no revision in Capital cost and equity values. The apparent changes in project cost and equity values are detailed in the table below:

	VALUE IN THE INITIAL PDD	VALUE IN THE REVISED PDD		EXPLANATION
		Enercon	**Other sub-projects**	
Project Capacity	30.59 MW	24 MW	6.59 MW	No change in aggregate capacity[11]
Project Cost	INR 1481 million @ Rs.48.4 million per MW	INR 1161 million @ Rs. 48.4 million per MW	INR 345.08 million @ INR 52.36 million per MW	In the initial PDD, the project cost of INR.1481 million was arrived at by extrapolating the capital cost of Enercon for the entire capacity. The capital cost of Enercon project was INR 1161 million for 24 MW which when extrapolated for 30.59 MW works out to INR 1481 million i.e. 30.59 MW @ INR 48.41 million/MW[12]. As can be seen, the capital cost/MW for the Enercon project is lower as compared to other sub-projects. Hence this was conservative. Based on the "corrections request", investment analysis has been carried for all sub-projects, separately. The apparent discrepancy is because in the earlier PDD the capital

[11] As discussed in section A.2, the original capacity of the Project was 30.59 MW at the time of project commissioning. Afterwards, from this bundle, the sub-project of 0.6 MW by Dempo Industries Pvt. Ltd. has been decommissioned and the ownership of the sub-project of 0.23 MW by Prerna Pharma Intermediates Pvt. Ltd. has been changed to Jitendra K. Newaskar. The revised capacity of this bundle is 29.76 MW. However, as the additionality for each of the sub – project has been demonstrated separately, therefore, one sub – project becoming non – additional has no impact on the overall additionality of this bundle. Therefore, as discussed in this section (above), the project will remain additional after these two changes also.

[12] The total installed capacity of the bundle is now 29.76 MW. Accordingly, when the capital cost of Enercon project (INR 1161 million) for 24 MW was extrapolated, for 29.76 MW, it works out to INR 1439 million i.e. for 29.76 MW @ INR 48.37 million/ MW. The capital cost/ MW for Enercon project is lower as compared to other sub-projects. Hence, this is also conservative.

				cost (INR 1481 Million) was mentioned for the entire 30.59 MW whereas in the revised PDD the capital cost for Enercon (24 MW – INR 1161 million) and other sub-projects (6.59 MW – INR 345.08 million) is bifurcated.
Equity	INR 444 million @ INR 14.52 million/MW	INR 348 million @ INR 14.52 million/MW	INR 243.89 million @ 37.00 per MW	The change in equity value is again because of reasons described above. In the earlier PDD the equity contribution was arrived at extrapolating the equity contribution for Enercon to the entire project capacity. The equity contribution of Enercon is INR 348 million i.e. INR 14.52 million/MW which when extrapolated for 30.59 MW works out to INR 444 million i.e. 30.59 MW @ INR 14.52 million/MW[13]. This was considered to be conservative since the "per MW" equity contribution for other projects is higher than Enercon. The apparent change in equity value is because in the earlier PDD the equity value (INR 444 Million) was mentioned for the entire 30.59 MW whereas in the revised PDD the equity for Enercon (24 MW – INR 341 million) and other sub-projects (6.59 MW – INR 345.08

[13] The total installed capacity of this bundle is now 29.76 MW. Accordingly, the equity contribution of Enercon is extrapolated for 29.76 MW works out to INR 432 million @ INR 14.52 million/MW Hence, this is also conservative.

				million) is bifurcated.

The Equity IRR mentioned in the PDD was for the Enercon project. Earlier the investment cost and equity value was presented for the entire 30.59[14] MW but now these are presented separately for Enercon and all other sub-projects. Therefore, there is no change in the original and post tax equity IRR calculations.

Purchase order have been submitted to DoE for Investment costs and Chartered Accountant certificates have been submitted to DoE for verification of equity component of each specific investor.

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 favor 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 of the Equity IRR to the Plant Load Factor (the most critical assumption) has been carried out considering a plant load factor of 20% (plant load factor as observed in recent past for other Enercon projects) and 23.97% (highest plant load factor achieved according to RERC, in its Order dated 29 September 2006). Plant Load Factor is the key variable encompassing variation in wind profile, variation in off-take (including grid availability) including machine downtime. The post tax Equity IRRs at the stated PLFs are as follows:

	PLF at 20%	PLF at 23.97%
Post tax Equity IRR without CER revenues	9.3%	15.1%
Post tax Equity IRR with CER revenues	10.4%	16.5%

The post tax Equity IRRs for Enercon wind farm (Rajasthan) Pvt. Limited is given in the table above. We now present post tax Equity IRRs at the stated PLFs without CDM revenues for all the sub projects.

S.No.	**Sub Project**	PLF at 20%	PLF at 22%	PLF at 23.97%
1	D P Power (0.6 MW)	8.30%	9.84%	11.29%
2	D P Power (0.23 MW)	6.28%	7.74%	9.11%
3	Unique Power Corporation	8.30%	9.84%	11.29%

[14] The total installed capacity is now 29.76 MW after exclusion of the two sub-projects.

4	Srinivaas Sirigeri	8.23%	10.50%	12.72%
5	Kataria Infrastructure Corporation	8.09%	9.63%	11.08%
6	Kataria Infrastructure Corporation	9.20%	10.70%	12.11%
7	Kataria Wires	9.12%	10.61%	12.01%
8	Ratlam Wires	9.12%	10.61%	12.01%
9	Cooper Metals Pvt. Ltd.	3.83%	5.80%	7.70%
10	Cooper Metals Pvt. Ltd.	4.34%	6.34%	8.26%
11	G. C. Chemie Pharmie Ltd.	4.73%	6.57%	8.31%
12	Vijay Developers	3.28%	5.54%	7.72%
13	Vijay Traders	3.32%	5.58%	7.76%
14	Vikas Agencies	3.28%	5.54%	7.72%
15	Kwality Tobacco Products	5.13%	6.56%	7.88%
16	Modular Power	5.83%	7.29%	8.65%
17	P V Chandran	6.99%	8.86%	10.63%

As can be seen from above, equity IRR of the sub projects is less than the benchmark. Thus the Project is not the most financially attractive (as per step 2c para 8a) we proceed to Step 4 (Common practice analysis).

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.

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.

We analyze the extent to which wind energy projects have diffused in the electricity sector in Rajasthan. In 2005 – 06, electricity generation from wind sources was 417 GWh which is expected to increase to 512 GWh in 2006 – 07. This works out to 1.35% of total generation available to the state of Rajasthan in 2005 – 06 and 1.66% of total expected generation available to the state of Rajasthan in 2006 – 07. Clearly, electricity generation from wind is not a common practice in Rajasthan.

We analyze the wind energy projects in Rajasthan that have come under different policy regimes and in different years. Briefly, the various policies have progressively decreased the electricity tariffs payable by the offtaker (RRVPN/Discoms) and have progressively passed on burden of providing or paying for transmission facilities. Below is the electricity tariff payable under different policies:

Electricity tariff (Rs/kWh)	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08
1999 Policy	2.89	3.03	3.18	3.34	3.51	3.69	3.87	4.06	4.27
2000 Policy		3.03	3.18	3.34	3.51	3.68	3.87	4.06	4.26
2003 Policy					3.32	3.39	3.45	3.52	3.59
2004 Policy (Original)						2.91	2.96	3.01	3.06
2004 Policy (Amended)							3.25	3.31	3.37

Out of the 279 MW installed up to 31 March 2005, the wind power projects under various policies of Government of Rajasthan are set out below:
Policy 1999 (effective 11th March 1999): 4.25 MW
Policy 2000 (effective 4th Feb 2000): 82.23 MW
Policy 2003 (effective 30th April 2003): 174.29 MW
Policy 2004 (effective 25th October 2004): 18.85 MW

Based on the commissioning dates of the wind projects in the CDM pipeline (on the cdm.unfccc.int website), we estimate that the following capacities are being developed or have been developed as CDM project activities (including this Project):

- Policy 2000: 28.16 MW
- Policy 2003: 79.45 MW + 30.59 MW[15] (this Project) = 110.04 MW
- Policy 2004: 15.75 MW

[15] The total installed capacity of this bundle is now 29.76 MW after exclusion of the two sub-projects.

Clearly, wind power project development in Rajasthan is insignificant when compared to the power sector of Rajasthan. Further, wind power project development is substantially dependent on CDM mechanism and thus is not common practice.

Outcome of step 4
Clearly, wind power project development in Rajasthan is insignificant when compared to the power sector of Rajasthan. Further, wind power project development is substantially dependent on CDM mechanism and thus is not common practice.

Sub-steps 4a and 4b are satisfied.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

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According to the approved baseline methodology ACM0002, the emission reductions ***ERy*** by the project activity during a given year "*y*[1]" is

ERy = BEy – PEy – Ly…….(1)

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

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

BEy = EGy * EFy …….(2)

where *EGy* is the electricity supplied to the grid, *EFy* is the CO_2 emission factor of the grid as calculated below.

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

$$EF_y = w_{OM} * EF_{OM,y} + w_{BM} * EF_{BM,y} \text{……..(2)}$$

with respective weight factors w_{OM} and w_{BM} (where $w_{OM} + w_{BM} = 1$).

The Operating Margin emission factor

[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.

As per ACM0002, dispatch data analysis should be the first methodological choice. However, this option is not selected because the information required to calculate OM based on dispatch data is not available in the public domain for the Northern electricity regional grid.

The Simple Operating Margin approach is appropriate to calculate the Operating Margin emission factor applicable in this case. As per ACM 0002 the Simple OM method can only be used where low cost must run resources constitute less than 50% of grid generation based on average of the five most recent years. The generation profile of the Northern grid in the last five years is as follows:

Generation in GWh	**2004-05**	**2003-04**	**2002-03**	**2001-02**	**2000-01**
Low cost/must run sources					
Hydro	36,128	38,279	30,335	29,129	29,020
Wind	332	15	25	19	6
Nuclear	7,503	7,380	8,800	8,158	6,669
Other sources					
Coal	106,156	103,232	100,362	96,882	92,417
Diesel	-	-	-	24	-
Gas	19,991	18,758	17,262	17,634	16,863
Total Generation	**170,109**	**167,663**	**156,785**	**151,845**	**144,975**
Low cost/must run sources	43,962	45,674	39,160	37,305	35,695
Low cost/must run sources	26%	27%	25%	25%	25%

Source: Table 3.4 of CEA General Review 2004-05, 2003-04, 2002-03, 2001-02, 2000-01

From the available information it is clear that low cost/must run sources account for less than 50% of the total generation in the Northern grid in the last five years. Hence the Simple OM method is appropriate to calculate the Operating Margin Emission factor applicable.

Build Margin Emission Factor

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 recent 20% of the generating units built (summation is over such plants specified by k):

$$EF_{BM,y} = [\sum_i F_{i,m,y} * COEFi] / [\sum_k GEN_{k,m,y}] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

The summation over *i* and *k* is for the fuels and electricity generation of the plants in sample *m* mentioned above.

The choice of method for the sample plant is the most recent 20% of the generating units built as this represents a significantly larger set of plants, for a large regional electricity grid have a large number of power plants connected to it, and is therefore appropriate.

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO2 Baseline Database provides information about the Operating Margin and Build Margin Emission Factors of all the regional electricity grids in India. The Operating Margin in the CEA database is calculated ex ante using the

Simple OM approach and the Build Margin is calculated ex ante based on 20% most recent capacity additions in the grid based on net generation as described in ACM0002. We have, therefore, used the Operating Margin and Build Margin data published in the CEA database, for calculating the Baseline Emission Factor.

Combined Margin Emission Factor

As already mentioned, baseline emission factor (EFy) of the grid is calculated as a combined margin (CM), calculated as the weighted average of the operating margin (OM) and build margin (BM) factor. In case of wind power projects default weights of 0.75 for EF_{OM} and 0.25 for EF_{BM} are applicable as per ACM0002. No alternate weights are proposed.

Using the values for operating margin and build margin emission factors provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 873.87 tCO2e/GWh or 0.87387 tCO2e/MWh.

Project Emissions:

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

PEy = 0

Leakage:

Emissions Leakage on account of the project activity is ignored in accordance with ACM0002.

Ly = 0

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

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Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO2e/MWh
Description:	Operating Margin Emission Factor of Northern Regional Electricity Grid
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied:	2002 – 03: 0.9993 2003 – 04: 0.9869 2004 – 05: 0.9756
Justification of the choice of data or description of	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach in accordance with

measurement methods and procedures actually applied :	ACM0002.

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO2e/MWh
Description:	Build Margin Emission Factor of Northern Regional Electricity Grid
Source of data used:	"CO2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value applied:	2004 – 05 | 0.5335
Justification of the choice of data or description of measurement methods and procedures actually applied :	Build Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with ACM0002.

B.6.3 Ex-ante calculation of emission reductions:

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The original capacity of the Project was 30.59 MW at the time of project commissioning. Afterwards, from this bundle, the sub-project comprising of one WEC of 0.6 MW by Dempo Industries Pvt. Ltd[16] has been decommissioned and the ownership of the sub-project comprising of one WEC of 0.23 MW by Prerna Pharma Intermediates Pvt. Ltd. has been changed to Jitendra K. Newaskar[17]. After removal of these two WECs from this bundle, as discussed in the section B.5, the total installed capacity of this bundle is 29.76 MW. Accordingly, the emission reduction estimation has been revised.

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

Baseline emission factor (combined margin)
= 873.87 tCO2e/ GWh

Annual electricity supplied to the grid by the Project
= 29.76 MW (Capacity) x 22% (PLF) x 8760 (hours) / 1000 GWh
= 57.353 GWh

Annual baseline emissions
= 873.87 tCO2e/GWh x 57.353 GWh

[16] The supportive documents have been provided to the DOE.

[17] The supportive documents have been provided to the DOE.

= 50,119 tCO2e

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

>>

Year	Estimation of project activity emissions (tonnes of CO2e)	Estimation of baseline emissions (tonnes of CO2e)	Estimation of leakage (tonnes of CO2e)	Estimation of overall emission reductions (tonnes of CO2e)
15 Aug 2007-31 Mar 2008	0	31,324	0	31,324
01 Apr 2008-31 Mar 2009	0	50,119	0	50,119
01 Apr 2009-31 Mar 2010	0	50,119	0	50,119
01 Apr 2010-31 Mar 2011	0	50,119	0	50,119
01 Apr 2011-31 Mar 2012	0	50,119	0	50,119
01 Apr 2012-31 Mar 2013	0	50,119	0	50,119
01 Apr 2013-31 Mar 2014	0	50,119	0	50,119
01 Apr 2014-31 Mar 2015	0	50, 119	0	50, 119
01 Apr 2015-31 Mar 2016	0	50,119	0	50,119
01 Apr 2016-31 Mar 2017	0	50,119	0	50,119
01 Apr 2017-14 Aug 2017	0	18,795	0	18,795
Total (tonnes of CO2e)	0	501,190	0	501,190

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

>>

B.7.1 Data and parameters monitored:

Data / Parameter:	EGy
Data unit:	MWh (Mega-Watt hour)
Description:	Net electricity supplied to the grid by the Project
Source of data to be used:	Calculated as the difference of EG_{Export} and EG_{Import} and sourced from the monthly credit notes. This value can be cross-checked from the invoices raised to the DISCOM.
Value of data applied for the purpose of calculating expected emission reductions in section B.5:	Annual electricity supplied to the grid by the Project = 29.76 MW (Capacity) x 22% (PLF) x 8760 (hours) = 57,353 MWh
Description of measurement methods and procedures to be applied:	All the WECs of the Project along with the other wind firms are connected to the backup/check meter at Temderai sub-station, which is further connected to the Sub-station at Amarsagar at 220 kV. The generation readings of all WECs of all the customers are collectively displayed at this Main Billing meter (Main Meter 1 & Main Meter 2) at 220 kV Amarsagar substation. Therefore, the main meter reading reflects the aggregate electricity supplied by all these wind farms, including the project activity. The net electricity supplied by individual wind turbines is determined by following a process of allocating the total electricity (recorded at the Main Meter 1 & Main Meter 2) to the individual turbines in proportion of the electricity generation recorded by the LCS meters at the individual wind turbines. The apportionment procedure has further been described in section B.7.2. This value is directly used for calculation of emission reduction.
QA/QC procedures to be applied:	Details of the QA/QC procedures have been described in Annex 4. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Any comment:	-

Data / Parameter:	$EG_{JMR, Export}$
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported as recorded by the main meter at EB substation.
Source of data to be used:	Export value from the Joint Meter reading taken at the substation in the presence of Enercon representatives and the State Utility representatives.
Value of data applied for the purpose of calculating expected emission reductions in section B.5:	As measured

Description of measurement methods and procedures to be applied:	Measured in continuous basis and recorded on Monthly basis
QA/QC procedures to be applied:	The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in Annex 4. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Any comment:	-

Data / Parameter:	**$EG_{JMR, Import}$**
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity import as recorded by the main meter at EB substation.
Source of data to be used:	Import value from the Joint Meter reading taken at the substation in the presence of Enercon representatives and the State Utility representatives.
Value of data applied for the purpose of calculating expected emission reductions in section B.5:	As measured
Description of measurement methods and procedures to be applied:	Measured in continuous basis and recorded on Monthly basis
QA/QC procedures to be applied:	The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in Annex 4. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Any comment:	-

Data / Parameter:	**$\Sigma EG_{Controller, Export}$**
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported by all the WECs connected to the main meter at the substation, as measured at the controller panel.
Source of data to be used:	This value is monitored on continuous basis by online monitoring system at the site and can also be seen at the electronic panel inside the WTG tower.
Value of data applied for the purpose of calculating expected emission reductions in section B.5:	As measured
Description of measurement methods and procedures to be applied:	Monthly basis; This value is monitored on continuous basis by online monitoring system at the site.
QA/QC procedures to be applied:	The LCS meters (for panel reading) 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

	WECs. 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 data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Any comment:	-

Data / Parameter:	**EG_{Export}**
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported to the grid by the project activity
Source of data to be used:	The calculation procedure has been shown in the section B.7.2.
Value of data applied for the purpose of calculating expected emission reductions in section B.5:	As calculated
Description of measurement methods and procedures to be applied:	Calculated as per the procedures shown in section B.7.2. $\mathbf{EG_{Export} \sim \Sigma EG_{WEC, Export}}$
QA/QC procedures to be applied:	No separate QA/QC procedures will be followed. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Any comment:	-

Data / Parameter:	**EG_{Import}**
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity Import from the grid by the project activity
Source of data to be used:	The calculation procedure has been shown in the section B.7.2.
Value of data applied for the purpose of calculating expected emission reductions in section B.5:	As calculated
Description of measurement methods and procedures to be applied:	Calculated as per the procedures shown in section B.7.2. $\mathbf{EG_{Import} \sim \Sigma EG_{WEC, Import}}$
QA/QC procedures to be applied:	No separate QA/QC procedures will be followed. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Any comment:	-

B.7.2 Description of the monitoring plan:

>>

Approved monitoring methodology ACM0002/ Version 06, Sectoral Scope: 1, “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”, by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

This approved monitoring methodology requires monitoring of the following:

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

Since the baseline methodology is based on ex-ante determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required. The sole parameter for monitoring is the net electricity supplied by the Project to the grid.

In order to determine the net electricity supplied to the grid by the project, the following procedure is followed:

All the WECs of the Project along with the other wind firms are connected to the backup/check meter at Temderai sub-station, which is further connected to the Sub-station at Amarsagar at 220 kV. The generation readings of all WECs of all the customers are collectively displayed at this Main Billing meter at 220 kV Amarsagar substation. Therefore, the main meter reading reflects the aggregate electricity supplied by all these wind farms, including the project activity.

Representatives of Discom and Enercon will jointly take the main meter reading at Amarsagar and sign the meter reading on the first day of every month. Simultaneously, the joint meter reading of the backup metering system at Temderai substation will also be taken by representatives of the Discom and Enercon.
To calculate the net amount of electricity generation from each wind turbine, apportionment of this collective meter reading of the main billing meter (recorded at Main meter 1 & Main meter 2) is done on the basis of the controller panel reading at the individual wind turbine end. This controller panel reading is recorded and maintained by Enercon.

The apportionment procedure has been explained as follows:

$EG_{JMR, Export}$	= Electricity exported, as recorded by the main meter at the substation
$EG_{JMR, Import}$	= Electricity imported, as recorded by the main meter at the substation
$EG_{Controller, Export}$	= Electricity exported by a WEC, as measured at the controller
$\Sigma EG_{Controller, Export}$	= Electricity exported by all the WECs connected to the main meter at the substation, measured at the controller of each WEC
$EG_{WEC, Export}$	= Electricity exported by a WEC to the grid, calculated
$EG_{WEC, Import}$	= Electricity imported by a WEC from the grid, calculated

Electricity exported by each WEC is apportioned on the basis of electricity export recorded at the controller of each WEC and the electricity export at the main meter as mentioned in the JMR. The export multiplication factor is calculated as follows:

Export Multiplication factor = $EG_{JMR, Export} / \Sigma EG_{Controller, Export}$ ……………………………………(1)

Therefore, the energy exported by a WEC to the grid is calculated as:

$EG_{WEC, Export}$ = Export Multiplication factor x $EG_{Controller, Export}$ …….(2)

As the controller meter doesn't record import, the apportioning of energy import by each WEC is also done on the basis of electricity exported recorded at the controller of each WEC and the electricity import at the main meter as mentioned in the JMR. The import multiplication factor is calculated as follows:

Import Multiplication factor = $EG_{JMR, Import}$/ $\Sigma EG_{Controller, Export}$ …….(3)

Therefore, the energy imported by a WEC to the grid is calculated as:

$EG_{WEC, Import}$ = Import Multiplication factor x $EG_{Controller, Export}$..... (4)

Hence, the net electricity exported by a WEC of the project is calculated as:

$\mathbf{EG_{WEC,\ Export} - EG_{WEC,\ Import}}$

The net electricity exported by all the WECs of the project activity is calculated as:

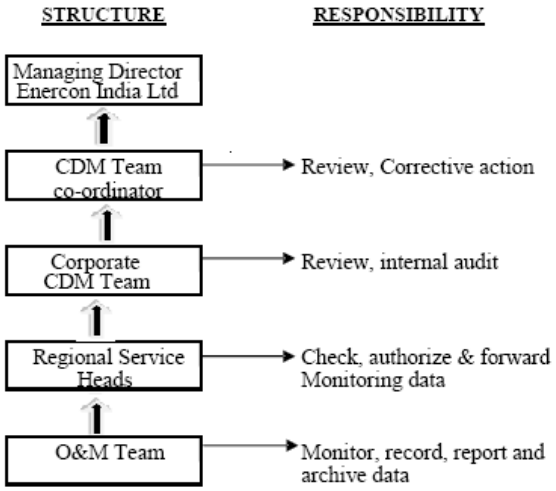
$$\mathbf{EGy} = \Sigma\ \mathbf{EG_{WEC,\ Export}} - \Sigma\ \mathbf{EG_{WEC,\ Import}}$$
$$= \mathbf{EG_{\ Export} - EG_{\ Import}}$$

Where,

$\Sigma\ \mathbf{EG_{WEC,\ Export}}$ = Export from all the WECs under the project activity
$\Sigma\ \mathbf{EG_{WEC,\ Import}}$ = Import from all the WECs under the project activity

The summation is done considering the WECs which belong to the project activity.

The Project is operated and managed by Enercon (India) Ltd. The operational and management structure implemented by Enercon is as follows:



Training and maintenance:

In order to ensure that Enercon's staffs who are positioned to take care all the activities starting from project construction to operation and maintenance, Enercon Training Academy provides need based periodical training to meet the requirements of the project. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all the trainees. The training facility is located at Daman and is fully functional and equipped with qualified trainers, training equipments, classrooms and hostel facilities.

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

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Date of completion: 30/03/2007

Name of responsible person/entity:
PricewaterhouseCoopers Private Limited (not a Project Participant)

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:

>>
30/04/2003 being the date of placement of purchase order for the first project in the bundle.

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:

>>
15/08/2007, being the beginning of the month subsequent to the month in which the project is expected to be registered.

C.2.2.2. Length:

>>
10 years

SECTION D. Environmental impacts

>>

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

>>
Enercon appointed Aditya Environmental Services Private Limited to conduct rapid environmental impact assessment study to assess the impact of the project on the local environment.

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

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

The study area represents part of Jaisalmer district, which is part of the Thar desert. The terrain is rough comprising sandy or stony wasteland & is very sparsely populated. The windfarm is located in the mist of the Indian 'Thar' Desert and does not come in the path of the migratory birds. There is no wild life or forestland near the project sites.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

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

SECTION E. Stakeholders' comments

>>

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

>>

The comments from local stakeholders were invited through a local stakeholder meeting conducted at Gorbandh Palace, Jaisalmer on 18 September 2006. A letter for the meeting to be conducted was provided to the gram sarpanch 1st September 2006 inviting the local stakeholders for the meeting.

The local stakeholder consultation meeting had representatives from the nearby villages, representatives of Enercon and representative of Aditya Environmental Services (consultant to Enercon). The minutes of the meeting are set out in Appendix 2.

E.2. Summary of the comments received:

>>

The comments from local stakeholders covered the benefits the wind project activities have provided including employment opportunities to the local people, better transportation facilities to the near by towns, improved water availability, etc.

The local stakeholders did not find any negative impacts on account of the project activity on, inter alia, grazing by the cattle, affecting migratory patterns of the birds, noise levels, accidents, etc.

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

>>

Enercon provided the following responses in relation to the comments received from the local stakeholders:

- The benefits to the local stakeholders will be through employment opportunities provided by the project in terms of small shops and construction workers. It will also lead to better connectivity to nearby towns.
- The project does not affect the grazing by the cattle. Enercon does not use any kind for boundary wall to protect their machines and hence the accessibility of cattle to areas for grazing and drinking water is not affected.
- The Project does not fall under migratory patterns of the birds.
- 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.
- Enercon has appropriate protocols are in place to take care of all the safety issues. No incidence of accident has occurred.
- No noise disturbances have been observed so far and local inhabitation is far away from the project site.
- A school was reconstructed by Enercon India Limited in police lane in Jaisalmer, Rajasthan in 2004 – 05. Enercon will bear in mind the requirement of school in the village and opportunities for women in the village when it undertakes further developmental work.

The local stakeholders were satisfied with the explanations provided during the meeting.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Enercon (India) Limited
Street/P.O.Box:	A-9, Veera Industrial Estate, Veera Desai Road, Andheri West-400053
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State/Region:	Maharashtra
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Telephone:	+91-22-66924848
FAX:	+91-22-67040473
E-Mail:	a.raghavan@enerconindia.net
URL:	
Represented by:	
Title:	Associate Vice President
Salutation:	Mr.
Last Name:	A V Raghavan
Middle Name:	
First Name:	
Department:	Corporate
Mobile:	+91-98200 45724
Direct FAX:	+91-22-5692 1175
Direct tel:	+91-22-6692 4848 extn. 7169
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City:	Tokyo
State/Region:	
Postfix/ZIP:	102-0073
Country:	Japan
Telephone:	+81 3 5212 8870
FAX:	+81 3 5212 8886
E-Mail:	jcf@jcarbon.co.jp
URL:	http://www.japancarbon.co.jp/
Represented by:	
Title:	Deal Manager
Salutation:	Mr.
Last Name:	Shozo
Middle Name:	
First Name:	Watanabe
Department:	Carbon Finance Department

Mobile:	
Direct FAX:	+81 3 5212 8886
Direct tel:	+81 3 5212 8878
Personal E-Mail:	s-watanabe@jcarbon.co.jp

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No ODA financing has been used in the project activity.

Annex 3

BASELINE INFORMATION

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

Simple Operating Margin

	tCO2e/GWh
Simple Operating Margin - 2002-03	999.35
Simple Operating Margin - 2003-04	986.94
Simple Operating Margin - 2004-05	975.68
Average Operating Margin of last three years	987.32

Build Margin

	tCO2e/GWh
Build Margin – 2004-05	533.52

Combined Margin calculations

	Weights	**tCO2e/GWh**
Operating Margin	0.75	987.32
Build Margin	0.25	533.52
Combined Margin		**873.87**

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

Annex 4

MONITORING INFORMATION

Metering:

- The project along with the other wind firms are connected to grid through common metering point (backup meter) at Temderai substation and further connected to Amarsagar sub-station (EB main meter), where metering is done for billing purpose.

Meter Reading:

- Representatives of Discom and Enercon will jointly take the main reading and sign the meter reading on the first day of every month at Temderai and Amarsagar substation.

- The export, import and net electricity supplied to the grid by individual customer will be sourced from the credit notes and can be cross-checked with the invoices raised to the DISCOM and will be used for calculation of emission reduction.

Metering Equipment:

- The meters used are Tri-vector of accuracy class 0.2 and the manufacturer is the Secure Meters Ltd. The meters are two-way meters and measure the electricity import and export.

Meter Test Checking:

- The main and backup/ check meters will jointly inspected/tested once in a year as per the terms of the PPA.

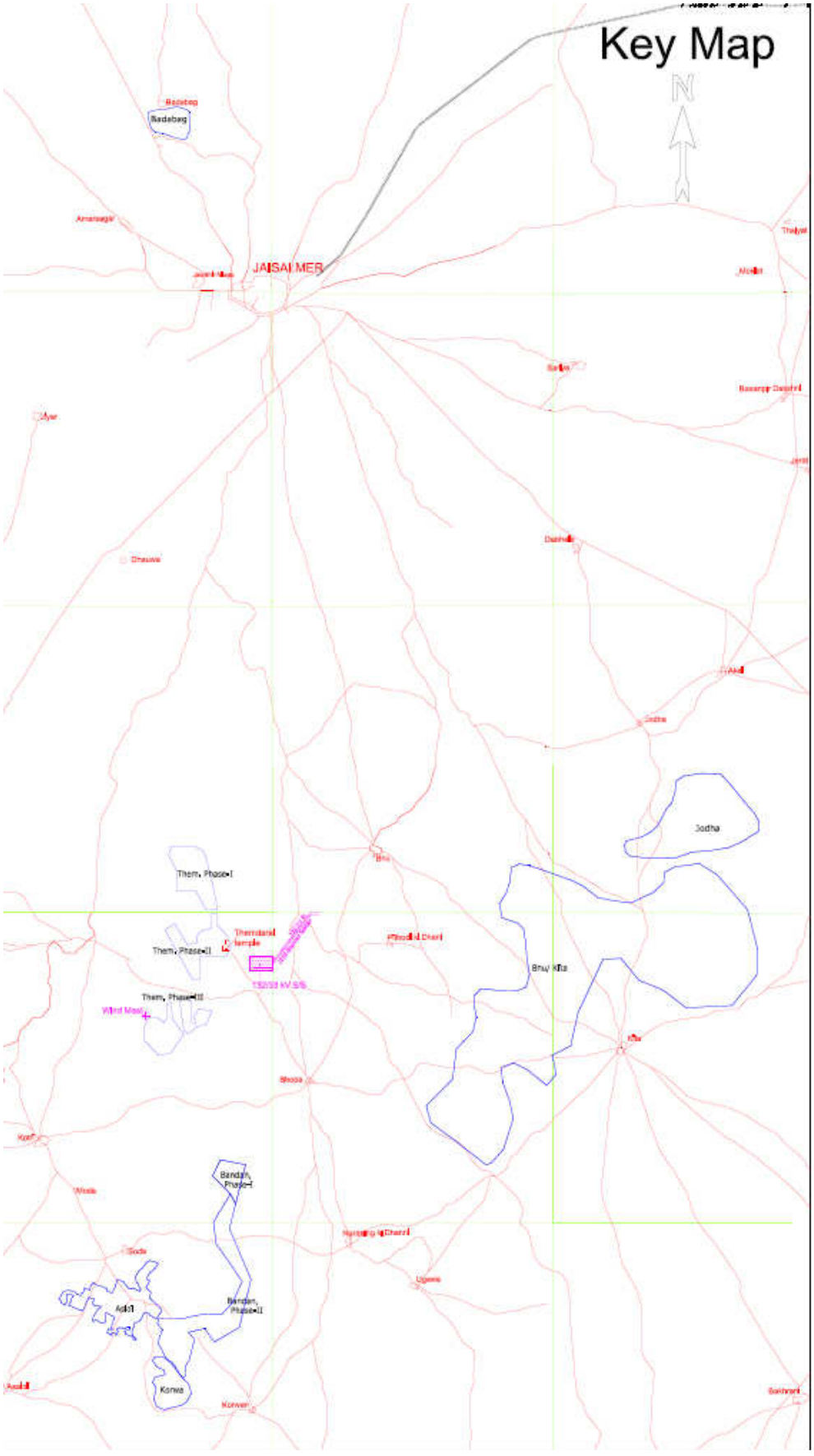
- The LCS meters (for panel reading) do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WECs. In case, there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system, the machine will stop working and generate the error report.

Inspection of Energy Meters:

- In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Whenever a main meter goes defective, 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 RRVPNL/Jodhpur Discom.

Appendix 1 – Location Map



Appendix 2 – Minutes of stakeholder consultation meeting

	Public Consultation Meeting for Wind Energy Projects at Clean Development Mechanism Project of Enercon (India) Limited. situated at Kita. Bhu, Sodabhandhan, Temderai (Phase I, PhaseII and PhaseIII), Asloi, Jodha, Korwa and Badabagh in Jaisalmer, Rajasthan **Jaisalmer, District Rajasthan, India** **MINUTES OF THE MEETING**	
	Venue: Gorbandh Palace, Jaisalmer	Date: 18 Sep 2006
	The people participated are the following:	
	Representatives:	
	Representatives from the Village: Shri. Rahim Singh Shri. Punam Singh Shri Kishan Singh The list of all other people from the villages is annexed. **Enercon (India) Limited:** Mr. Anupam Mathur Mr. Rajendra Vyas Mr. Rakesh Chhangani Mr. Dilip Sharma Mr. Neeraj Gupta **Aditya Environmental Services Pvt. Ltd.** Mr. Gurmeet Singh	
	Mr. Anupam Mathur invited Mr. Punam Singh, Ex- Sarpanch 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 **WELCOME ADDRESS** Mr. Dilip Sharma, Security and Liasoning person from Enercon India Limited welcomed all the people who came to take part in the meeting. There were more than 20 people from all the villages that fall in the vicinity of the project sites. **Description of the Project Details.** The present stakeholder consultation is for 60 MW of Enercon Wind Farm Hindustan Limited and for 82.74 MW of the customer projects out of which 47.01 MW has been finalized and the rest 35.73 MW is in the process to be considered. Some the projects will also come up in addition to the finalised projects for CDM. The Knowledge of the wind farm was communicated to the local people in the local language. The wind farm projects falls in the category of the renewable energy. The meaning of the renewable energy was explained. The sites where the projects are located have no commercial activity and is a waste land. 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 advantages of the windmill to the people. Self reliance on using renewable energy sources is	

	observed in Jaisalmer. The comparison between the wind farm projects and other alternatives is drawn in order to convey the advantages that wind power possess over other alternatives. The sites are located near Badabagh, Sodabandhan, Korwa, Asloi, Bhu, Temderai (Phase I, Phase II and Phase III) and Kita. In addition several other support services augmented by Enercon to local people in terms of transportation, mid –day meals to school children, renovation of Temedarai temple etc. as its social community initiatives. **SPEECH BY MR. PUNAM SINGH** The chairperson of the meeting briefed the advantages of the wind farm. The project has provided the employment opportunities to the local people as the result of which the income of the people have increased. He also praised Enercon India Limited for investing in district of Jaisalmer. **Mr. Rahim Singh (BHU Sarpanch)** The villagers in this part of the state are very backward but the times are changing with coming up of the wind farm projects of the Enercon India Limited. The project has provided the employment opportunities to the people. Security, drivers and labour people are selected among the local villagers.
	Mr. Gurmeet Singh, Aditya Environmental Services 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. The Government of Rajasthan is also encouraging the development of renewable energy. 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 project has provided the people with the employment opportunities. The project has given jobs and economic opportunities in terms of small shops and construction workers. The transportation facilities has improved and has increased their accessibility to the near by town.
2.	Has the project affected the grazing of local cattle?	No, the project does not affect the grazing by the cattle. Enercon India Limited does not use any kind for boundary wall to protect their machines and hence the accessibility of cattle to areas for grazing and drinking water is not affected.
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	The project has improved the availability of water,

	availability? How far are the tube wells located from the site?	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.
6.	Do Enercon take care of safety issues?	The Enercon India Limited takes care about the safety issues. Appropriate protocols are in place to take care of all the safety issues.
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. Local inhabitation is far away from the project site.

Women Representative

The women representative asked if school could be provided for the education of the children. The school can provide the much need education to the children. Also, women should be provided with the good opportunities.

Vote of thanks

Mr. Dilip Sharma thanked all the people for sparing their time for this meeting and requested them to continue their support towards the projects of Enercon India Limited. The representatives of the villages and also the local population represented their happiness towards Enercon India Limited.

Appendix 3

Input values for the sub projects (other than Enercon Wind Farm (Rajasthan) Pvt. Limited; the input values and the results for Enercon wind farm (Rajasthan) Pvt. Limited is provided in section B.5 substep 2c**.** Therefore we have now listed the input parameters for other subprojects that are included in the bundle in the table below.**)**

Sr.No.	Name of the Customer	Capacity of Each WEC (MW)	No. of WEC	Capacity of each sub project (MW)	COD*	Debt (Million Rs.)	Debt (%)	Equity (Million Rs.)	Equity (%)	Interest rate (%)	Tenure (Years)	Project Cost (Million Rs)	Per MW cost (Million Rs)
1	D P Power	0.6	1	0.6	30-Jun-04	0	0.00%	29.00	100.00%	0.00%	-	29.00	48.33
2	D P Power	0.23	1	0.23	29-Sep-03	0	0.00%	12.50	100.00%	0.00%	-	12.50	54.35
3	Unique Power Corporation	0.6	1	0.6	30-Jun-04	0	0.00%	29.00	100.00%	0.00%	-	29.00	48.33
4	Srinivaas Sirigeri	0.6	1	0.6	03-Mar-04	21.00	72.41%	8.00	27.59%	9.50%	5.50	29.00	48.33
5	Kataria Infrastructure Corporation	0.6	1	0.6	29-Sep-03	0	0.00%	29.00	100.00%	0.00%	-	29.00	48.33
6	Kataria Infrastructure Corporation	0.23	1	0.23	29-Mar-03	0	0.00%	12.50	100.00%	0.00%	-	12.50	54.35
7	Kataria Wires	0.23	1	0.23	29-Sep-03	0	0.00%	12.50	100.00%	0.00%	-	12.50	54.35
8	Ratlam Wires	0.23	1	0.23	29-Sep-03	0	0.00%	12.50	100.00%	0.00%	-	12.50	54.35
9	Cooper Metals Pvt. Ltd.	0.23	1	0.23	12-Jun-04	9.98	75.00%	3.33	25.00%	11.50%	5.50	13.30	57.83
10	Cooper Metals Pvt. Ltd.	0.23	1	0.23	29-Mar-04	9.98	75.00%	3.33	25.00%	11.50%	5.50	13.30	57.83

11	G. C. Chemie Pharmie Ltd.	0.23	1	0.23	29-Mar-04	7.54	58.00%	5.46	42.00%	11.75%	5.00	13.00	56.52
12	Vijay Developers	0.23	1	0.23	29-Mar-04	10.00	74.63%	3.40	25.37%	13.00%	8.00	13.40	58.26
13	Vijay Traders	0.23	1	0.23	29-Mar-04	10.00	74.77%	3.38	25.23%	13.00%	8.00	13.375	58.15
14	Vikas Agencies	0.23	1	0.23	29-Mar-04	10.00	74.63%	3.40	25.37%	13.00%	8.00	13.40	58.26
15	Kwality Tobacco Products	0.23	1	0.23	29-Sep-03	0	0.00%	13.50	100.00%	0.00%	-	13.50	58.70
16	Modular Power	0.23	1	0.23	29-Mar-04	0	0.00%	12.80	100.00%	0.00%	-	12.80	55.65
17	P V Chandran	0.6	1	0.6	30-Nov-03	14.00	46.67%	16.00	53.33%	11.00%	5.00	30.00	50.00

** commercial date of operation*

Appendix 4

COST OF EQUITY CALCULATION

Calculation of Cost of Equity:

The expected return on equity has been determined using the Capital Asset Pricing Model (CAPM)[18]. The CAPM economic model is used worldwide to determine the required/expected return on equity based on potential risk of an investment. The CAPM framework is the Nobel award winning work of financial economist Dr. William Sharpe.

Ke = Rf + B x (Rm – Rf)

where:

Ke = Rate of return on equity capital;

Rf = Risk-free rate of return;

B = Beta;

Rm – Rf = Market risk premium;

Risk free rate:

The risk free rate is understood as the rate of return on an asset that is theoretically free of any risks, therefore the rate of interest on government bonds are considered as risk free rates. Page 191 of text book on "Corporate Finance Theory and Practice" by Dr. Aswath Damodaran[19] of Stern School of Business, New York University describes that the long term government bond rates are suitable indicators of risk free rates when the time horizon for the investment is long term.

Accordingly the risk free rate has been taken from long dated Indian government bond rates at the project start date (which is August 2005) which has been considered as it was in the year of investment (i.e in that year, the company had the alternative of this long term risk free investment). The data on government bond rates is published by Reserve Bank of India. (Web-link: http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf)

The applicable risk free rate is 7.34%.

Risk Premium:

The most common approach for estimating the risk premium is to base it on historical data, in the CAPM, the premium is estimated by looking at the difference between average return on stocks and return on government securities. It is preferred to use long term premimums, since considering shorter time periods can lead to large standard errors because volatility in stock returns [page 191, Corporate Finance Theory and Practice, Dr. Aswath Damodaran]. It is also preferred to calculate the risk premium based on geometric mean of the returns since arithmatic mean overstates the risk premium. Geometric mean is defined as the compounded annual return over the same period [page 191, Corporate Finance Theory and Practice, Dr. Aswath Damodaran].

[18] The Capital Asset Pricing Model (CAPM) was published in 1964 by William Sharpe, for his work on CAPM Sharpe received the Nobel Prize in 1990. http://www.investopedia.com/articles/06/CAPM.asp

[19] Dr. Damodaran is one of the foremost authorities in the world in the field of Investment Analysis

Therefore the risk premium has been calculated as the difference in compounded annual return bewteen the BSE-Sensex since the year of inception of BSE Sensex and the Government bond rates. The detailed calculations are presented in the attached excel sheet.

Source: BSE Stock Exchange (www.bseindia.com)

The applicable risk premium is 7.96%.

Beta:

Beta (B) indicates the sensitivity of the company to market risk factors. For companies that are not publicly listed, the beta is determined by referring beta values of publicly listed companies that are engaged in similar types of business. The project activity type is wind power generation; the approach therefore should be to base the beta for the project on the beta values of listed wind power generation companies in India. In the absence of adequate data on companies which are exclusively into the exactly same type of business (i.e wind power projects), the next best option for assessing the risk of these projects is to consider the data available on companies which are involved in similar businesses.

Therefore, we have considered beta values of all electricity generating companies in India. The group of companies considered includes renewable as well as conventional power generating companies. Investors demand a higher return from renewable energy projects than from conventional energy ones, given the higher risks in renewable, including risks of technology, risks from significantly varying and unpredictable resource availability (e.g. wind), and a lower established support base for such projects relative to that for conventional power (e.g. grid connections, bank finance, suppliers, etc.).

The beta values are considered for the period of three years from the start date of the project activity. The Beta values are non-constant and changes with time. The start date of the project activity is April 2003 and hence the historical data from April 2000 to March 2003 has been considered for deriving beta values from Bloomberg.

The applicable Beta value has been determined on the basis of the Beta values of all power generating companies in India which were listed on the stock exchange at the time of this investment. Beta values of individual companies have been sourced from Bloomberg and screenshots of the beta values has been provided to the DoE for verification.

The table below summarises the beta values:

Company Name	**Beta**
Tata Power	1.481
Reliance	0.608
Neyveli Lignite	1.404
Gujarat Industries	1.137
CESC	0.866
Applicable Beta (Average)	**1.099**

Therefore we have applied average beta of 1.099 for computation of WACC.

Accordingly, the benchmark cost of equity works out to: Rf + B (Rm – Rf) = 7.34% + 1.099 x 7.96%
Cost of Equity = 16.09%.

***The suitability of the 16.09% benchmark calculated using capital asset pricing model* (CAPM) assuming 24-year data for the estimation of the market return.**

We have analysed the projects referred in the clarifications i.e. 1286, 1299 and 2163. The comparison is presented below:

UNFCCC Ref. No	No. of Years	Market Return
1286	13.08	16.71%
1299	23.33	15.67%
2163	4.91	16.16%
1167 (captioned project)	24	15.30%

It is clear from above table that the market return considered is lowest in comparison to the project 1286, 1299 and 2163. The lower the market return the lesser the Benchmark, therefore the market return considered is conservative.

In regard to the time period for Market returns, we would like to clarify that the Market return for the project has been determined considering the longest period for which data was available. We have used the CAPM approach described in text books on Corporate Finance. The relavant text of text book on "Corporate Finance Theory and Practice" by Dr. Aswath Damodaran (Stern School of Business, New York University), one of the foremost authorities in the world on corporate finance and the research papers that describe the procedure for calculation of cost of equity following the Capital Asset Pricing Model (CAPM) has been provided to DoE. The time period i.e. 24 years considered to calculate market return is well in line with the procedures outlined in the text book and research papers on corporate finance. The extracts from the text book are attached as Appendix 5. It can be confirmed that, the most common approach to estimating the risk premium is to use market returns over very long time periods. It is further verified from research paper titled "equity risk premiums" by Dr. Damodaran (Page no [6] of http://www1.worldbank.org/finance/assets/images/Equity_Risk_Premiums.pdf) that the standard errors from ten-year and twenty-year estimates are likely to be almost as large as or larger than the actual risk premium estimated. Thus for calculation of equity risk premiums, longer time periods (more than 20 years) are considered as appropriate.

The oldest and most prominent market index in India is the BSE Sensex which was established in 1979. As of the project start i.e. March 2003, the longest period over which data was available was 24 years and the same has been considered. The longer period mitigates the fluctuation in market return and hence longer period market return is appropriate.

Source used to calculate Market Return:

The Market returns data has been taken from the website of the Bombay Stock Exchange (the oldest available market index in India) http://www.bseindia.com/histdata/hindices.asp(Open webpage > select Index from drop down menu as "BSE SENSEX" > check 'monthly' > select period from drop down menu). The 24 years (from April 1979 to March 2003) BSE SENSEX data has been considered to compensate for short term fluctuations in the market. The average returns from BSE SENSEX over 24 year period comes to **15.30%.** The data taken to calculate market return is publicly available on the official website of the Bombay Stock Exchange.

Appendix 5

Extract for Demonstrating Market Return

- If no such securities exist in the market in which you are attempting to estimate a real riskless rate, it can be approximated by the long-term real growth rate of the economy. Thus, the real riskless rate in China may be set equal to 6% because that is what you expect the long-term real growth rate in the Chinese economy to be. It will be much lower (2–3%) for more mature, slower growth economies.

Risk Premium

The risk premium is a significant input in all the asset pricing models. In the following section, we begin by examining the fundamental determinants of risk premiums and then look at practical approaches to estimating these premiums.

What Is the Risk Premium Supposed to Measure? The risk premium measures the "extra return" that would be demanded by investors for shifting their money from a riskless investment to an average risk investment. It should be a function of how risk-averse investors are and how risky they perceive stocks (and other risky investments) to be, relative to a riskless investment. Because each investor in a market is likely to have a different assessment of an acceptable premium, the premium will be a weighted average of these individual premiums, where the weights will be based on the wealth the investor brings to the market. Investors with more wealth, like Warren Buffett, will therefore have their risk premiums weighted more than investors with less wealth.

✔ CG *7.1:* **Assume that stocks are the only risky assets and that you are offered two investment options. One is a riskless investment on which you can make 6.7%, and the other is a stock mutual fund. How much more than 6.7% would you need to be offered, on an expected basis, to pick the latter? Would you ever settle for less than 6.7%?**

Estimating Risk Premiums We look now at two ways to estimate the risk premium in the capital asset pricing model. One is to look at the past and estimate the premium earned by risky investments (stocks) over riskless investments (government bonds); this is called the **historical premium.** The other is to use the premium extracted by looking at how markets price risky assets today; this is called an **implied premium.**

Historical Risk Premiums. The most common approach to estimating the risk premium is to base it on historical data. In the arbitrage pricing model and multifactor models, the raw data on which the premiums are based are historical data on asset prices over very long time periods. In the CAPM, the premium is estimated by looking at the difference between average returns on stocks and average returns on riskless securities over an extended period of history.

In most cases, we follow these steps to find historical risk premiums. First, we define a time period for the estimation, which can range as far back as 1926 for U.S. data.[4] Then, we calculate the average returns on stocks and average returns on a riskless security over the period. Finally, we calculate the difference between the returns

[4] The most widely used database, from Ibbotson Associates, has returns going back to 1926. Jeremy Siegel at Wharton recently presented data going back to the early 1800s.