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:

>>

Title: 75MW wind power project in Maharashtra by Essel Mining Industries Limited.
Current Version: 04
Date of completion : 07th November 2007

A.2. Description of the project activity:

>>

Purpose

The "*project activity*" includes "*successful installation and generation of 75MW equivalent units of electricity with efficient utilization of the available Wind Energy*" through adoption of state of the art technology. The electricity generated by the project activity displaces grid electricity (a grid mix contributed from different fuel sources) by its equivalent units and contributes to sustainable development through conservation of environment. Green power of approximately 130 Million Units (MU) per annum is being fed to the Maharashtra State Electricity Board (MSEB) grid (a part of Western regional grid of the country).

Essel Mining & Industries Limited (EMIL), a group company of Aditya Birla Group, is the owner and project proponent of this Wind Power Project under Clean Development Mechanism of Kyoto Protocol. EMIL is one of India's largest companies in the iron mining sector and believes that effective and efficient utilization of natural resources, coupled with responsible environmental considerations, is vital for sustainable development in India. This has been a guiding factor for EMIL towards conceptualization and installation of the 75MW Wind Power Project. EMIL, with a view to being in line with the sustainable development priorities of India, has developed the wind farm on barren land in the state of Maharashtra that has a deficit in power for meeting peaking electricity demands. This project has been developed with the objective of climate change mitigation through significant reduction in GHG emissions.

Description of the project

The project activity includes planning, installing and operating of a 75MW wind power project which has been set up in three stages at Dhule and Nandurbar districts of Maharashtra, India. Stage I & II are in Dhule and Stage III is in Nandurbar. The commissioning details are given below:

Stages	Capacity	Commissioning dates	Location
Stage I	15MW	▪ 6 WTGs on 25th March 05 ▪ 6 WTGs on 31st March 05	▪ At Dhule District
Stage II	30MW	▪ 8 WTGs on 20th September 05 ▪ 15 WTGs on 29th September 05 ▪ 1 WTG on 30th September 05	▪ At Dhule District
Stage III	30MW	▪ 4 WTGs on 9th December 05 ▪ 7 WTGs on 5th January 06 ▪ 13 WTGs on 7th February 06	▪ At Nandurbar District
Total	75MW	All in operation	

Technology:
EMIL has sourced the windmills from Suzlon Energy, an offshoot of Suzlon group that is considered as one of the leading manufacturers of site specific Wind turbine generators with R&D centres in Germany, Netherlands and in Asia. The WTG package for the project includes the latest model from Suzlon named S.70/1250 machines. These machines were being tried for the first time in Maharashtra wind zones. EMIL is the first customer in India as well as in Maharashtra to use S-70 model machines. The specifications of the Suzlon Wind turbo Generator S70 has been briefly explained in section A.4.3.

Emission Reductions from anthropogenic sources:
In the absence of the project activity, an equivalent amount of electricity would have been generated from the power plants connected to the grid, majority of whom are based on fossil fuels. Thus the project is replacing the anthropogenic emission from the fossil fuel based power plant connected to the project electricity grid.

The project activity is in line with the Renewable Energy Policy of the Government of India which targets 10% of additional grid power generation capacity to be from Renewable Energy sources by 2012. It is also getting the benefits provided by the National and sectoral policies[1] for promoting renewable energy generation in India, (e.g. promotional measures of Electricity Act 2003).

Total emission reduction for the 10 year crediting period is expected to be 1,18,2029 tCO_{2e}

Views of the project participant on contribution of the project activity to sustainable development
The Designated National Authority (DNA) for the Government of India (GoI) in the Ministry of Environment and Forests (MoEF), called the National CDM Authority (NCDMA), has stipulated four indicators on sustainable development for Clean Development Mechanism (CDM) projects structured in India. The project participants' views on the contribution of this project activity towards sustainable development follows these four indicators as explained below:

Environmental well being:
- Reduction in the consumption of fossil fuels at the grid for generating additional electricity equivalent to that generated by the project wind mills;
- Reduction in GHG emission (CH_4 and CO_2) and other air pollutants occurring from fossil fuel extraction, processing, transportation and burning
- Reducing other pollutants (SOx, NOx, PM, etc.) resulting from power generation;
- Conservation of natural resources including land, forests, minerals, water and ecosystems;

Economic well being:
- Rural and infrastructural development in the areas around the project site
- Assistance in the economic development of a remote village in Maharashtra by making investment in that area.

[1] Tariff policy under – MERC Order, dated November 24, 2003, for procurement of Wind Energy and Wheeling for third party-sale and or self-use

- Assists the state of Maharashtra and India as a whole in stimulating and accelerating the commercialization of grid-connected renewable energy technologies[2].

Social well being:

- Contribution towards achieving the objective of the policy on wind power generation of Government of India and state of Maharashtra., which is to promote generation of energy through non-conventional sources and supplement the ever increasing demand of the state.
- Encouragement to other entrepreneurs irrespective of sector to invest in wind technology
- Strengthening India's rural electrification coverage;
- Enhancing local employment and capacity building in the vicinity of the project, which is a rural area;

Technological well being:

- The successful implementation of the new model of wind turbo generator (S70 of Suzlon Energy) will result in increasing the reliability on efficient technology and large capacity wind mills.

A.3. Project participants:

>>

The project participant is identified in the table below, and the contact information of the project participant has been provided in Annex 1.

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, Ministry of Environment & Forests. (Host)	Essel Mining Industries Limited (EMIL) (Private)	No

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

>>

A.4.1.1. Host Party(ies):

>>

India

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

>>

Western region/ State – Maharashtra

A.4.1.3. City/Town/Community etc:

>>

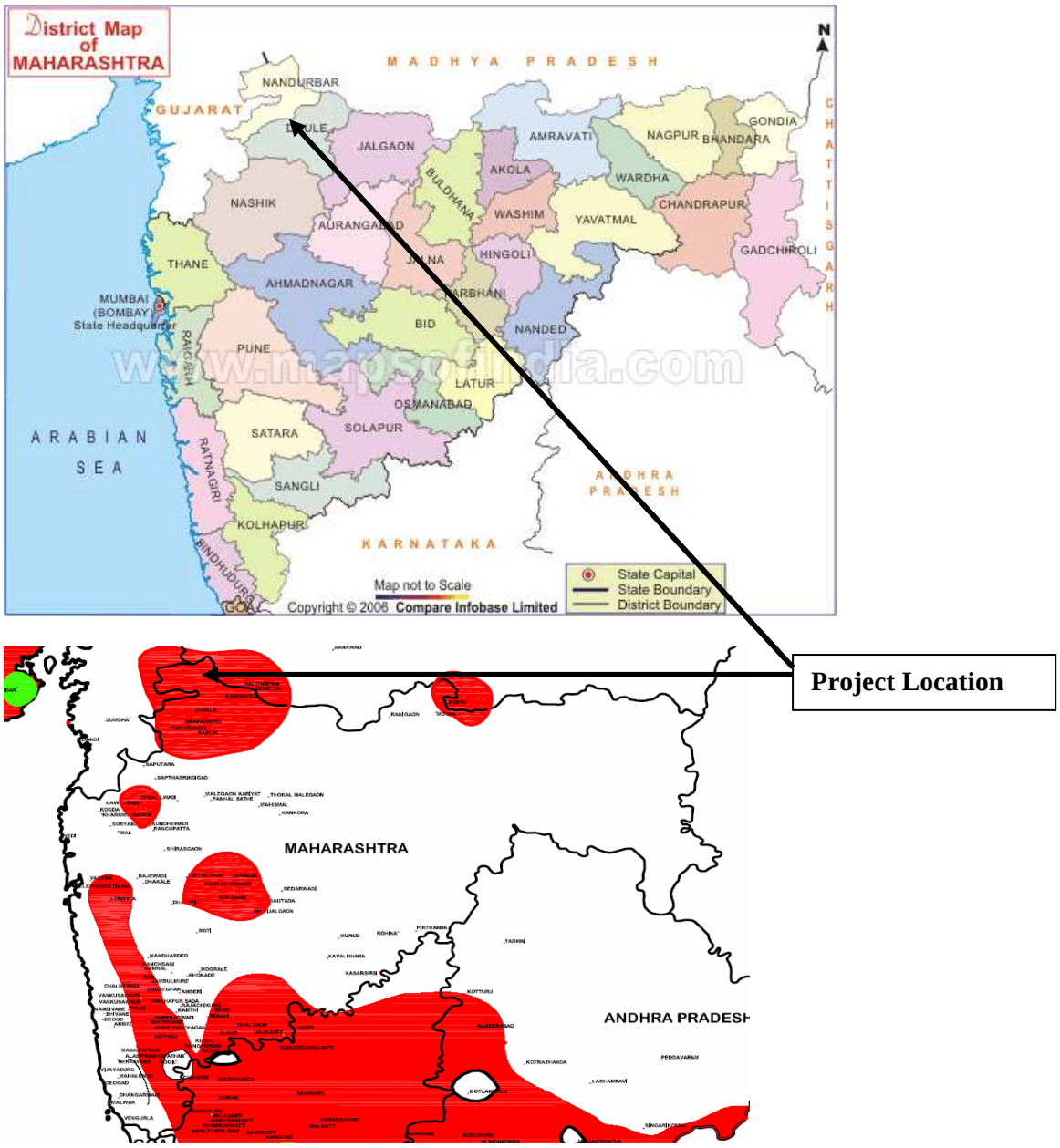
[2] Potential of wind energy in India – 45000MW whereas only about 6070.2 MW is commercially active; Source : http://mnes.nic.in/ach1.htm

Dhule and Nandurbar districts

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

>>

The project is located in the Dhule and Nandurbar districts of Maharashtra. Dhule is one of the good wind potential areas of the state. Wind farm site is about four hours drive from Diamond city – Surat (Gujarat), the nearest city from the site. The nearest railway station is Nandurbar (50 km) and Challisgaon (50 km). Nearest airports are Aurangabad/ Baroda (250 km). The latitude and longitude coordinates of the project is as follows – Dhule district - Latitude 20° 38' to 21° 61' N and Longitude 73° 50' to 75° 11' E ; Nadurbar district - Latitude 21.0 to 22.03 North and Longitude 73.31 to 74.32 East. The geo-coordinates of each of the 60 WEGs are attached as appendix–5.



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

>>

The project activity is applicable to 'Scope Number 1, Sectoral Scope - Energy industries (renewable/ non-renewable sources)', as per the CDM sectoral scope.

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

>>

Each wind turbo-generator essentially consists of - rotor system, gear box, coupling, generator, yaw system, brake system, control system and power evacuation system.

The Rotor system consists of 3 rotor blades, each of 69m diameters (blade length – 33.5) having swept area of 3740m^2, mounted on a spherical cast iron hub capable of rotating at a speed of 13.5 to 20.3rpm. There are three independent electrical pitching mechanisms where the pitch angle (-2^o to 88^o) of each blade is accurately adjustable by AC motors.

The three stage gear box – one stage planetary and other two helical, has a gear ratio 1:74.9 and capable of operating at 98% efficiency. The planetary part takes up the slow rotor speed/movement and distributes the high torque to the subsequent planetary gears and the Helical shape helps in noise dampening.

Suzlon's S70 model machines uses a synchronous pole switchable generator (6/4 poles) at rated output of 1250 kW and can provide harmonic-free power supply to grid.

The yaw system ensures that the turbine is positioned correctly in the wind at all times, thereby resulting in the optimal power production and minimum stress on the turbine drive train. The brake system consists of two independent braking systems. The primary system is the aerodynamic tip-brakes and the secondary system is the mechanical disk brake system which is located on the high speed shaft of the gearbox. During emergency brakes both the aerodynamic and mechanical brake systems are activated simultaneously thus ensuring more safety in the operations of the WTGs.

Power generated from the WTGs is fed to the respective sub-station of the WTG. This sub-station is placed near the WTG. Power is transmitted through step-up transformers 690 Volts / 33 KV, 1500 KVA. The sub-station is equipped with all electrical controls like – CT / PT / VCB etc.

The technology used in the project is environment friendly and safe to operate. Transfer of technological know-how is not a part of the project activity.

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

>>

Years	Annual estimation of emission reductions in tonnes of CO2 e
1st Year*	118203
2nd Year	118203
3rd Year	118203
4th Year	118203

5th Year	118203
6th Year	118203
7th Year	118203
8th Year	118203
9th Year	118203
10th Year	118203
Total estimated reductions (tones of CO2 e)	**1182029**
Total number of crediting years	**10**
Annual average over the crediting period of estimated reductions (tones of CO2 e)	118203
*** 1st year begins from the date of registration, and each year extends for 12 months**	

A.4.5. Public funding of the project activity:

>>

No public funding has been used in this project activity.

SECTION B. Application of a baseline and monitoring methodology

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

>>

The approved consolidated baseline methodology **"Consolidated baseline methodology for grid connected electricity generation from renewable resources"** has been applied to the project activity.

Reference – ACM0002, ver06, dated 19th May 2006.

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

>>

The adopted baseline methodology has been chosen for the project activity based on fulfilment of the applicability conditions as described below:

Sr. No.	Applicability Conditions as per ACM0002	Applicability to this Project Activity
1.	This methodology is applicable to grid-connected renewable power generation project activities under the following conditions: Applies to electricity capacity additions from: •Run-of-river hydro power plants; hydro power projects with existing reservoirs where the volume of the reservoir is not increased. •New hydro electric power projects with reservoirs having power densities (installed power generation capacity divided by the surface area at full reservoir level) greater than 4 W/m 2. **•Wind sources;** •Geothermal sources; •Solar sources; •Wave and tidal sources.	This project activity generates electricity from wind sources and supplies to the grid. Hence 1st applicability condition is fulfilled.
2.	This methodology is not applicable to project activities that involve switching from fossil fuels to renewable energy at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;	These windmills are new and not a switch over from any fossil fuel based power generation plant
3.	The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid	The project wind farm is connected to Maharashtra state electricity board grid which is a part of western regional grid of India, and

Sr. No.	Applicability Conditions as per ACM0002	Applicability to this Project Activity
	is available;	whose boundaries are clearly identified by the Central Electrical Authority (CEA) of India and grid information is also published by them. Website: http://www.cea.nic.in/
4.	Applies to grid connected electricity generation from landfill gas capture to the extent that it is combined with the approved "Consolidated baseline methodology for landfill gas project activities"	For the mentioned project activity this applicability condition is not relevant

This baseline methodology is used in conjunction with the approved monitoring methodology ACM0002 ("Consolidated monitoring methodology for grid-connected electricity generation from renewable sources").

Project also refers to “Version 02 of the Tool for demonstration and assessment of additionality”.

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

>>

	Source	Gas	Included	Justification/Explanation
Baseline	Source: Grid connected thermal power stations	CO_2	Included	As per the methodology ACM002 for the baseline determination, only CO2 emissions from electricity generation in fossil fuel fired power that is displaced (net displacement) due to the project activity shall be included
		CH_4	Not included	For simplification
		N_2O	Not included	For simplification
Project	Source: Grid connected electricity generation	CO_2	Not included	There will be no project emissions since wind mills convert wind energy to electricity Further, the electricity displaced at the grid is on net displacement of equivalent electricity generated by the project, i.e. (exports to grid less imports from grid equals net power displaced), hence auxiliary units consumed from grid is subtracted from benefits.
		CH_4	Not included	For simplification
		N_2O	Not included	For simplification

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

>>
The step-wise methodology followed for selection of baseline scenario is detailed below:

Step 1: Identification of baseline scenario:

The project activity is a newly installed wind farm. It is not a modification or retrofit of an existing electricity generation facility. Hence, as per the methodology ACM0002 the baseline scenario is the following:

Electricity delivered to the grid (net) 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 in the following sections. For detailed discussion on other alternatives available to the project please refer to Section – B.5 under Step 1a of additionality determination.

Step 2: Process and assumptions in combined margin calculation:

The combined margin calculations estimate the baseline emission factor for grid. It consists of a combination of operation margin (OM) and build margin (BM) factors obtained from publication issued by Central Electricity Authority (CEA) of India - CO2 Baseline Database for the Indian Power Sector, Version 1.1, December 2006[3]

Step 2.1: Choice of grid:
In India, there is no general guidance provided by the DNA for selection of grid. India being a large country having dispatch system upto state level, regional grid definition needs to be used for the identification of grid as per the methodology ACM0002 version 06.

There are five regional grids in India: Northern, Western, Southern, Eastern and North-Eastern. The project activity is in the state of Maharashtra which is connected to the Western Regional Grid, hence all the power plants connected with the western regional grid have been considered within the project grid boundary. Since the net imports of western regional grid for the last three years is maximum of 1.5% of its generation, this is insignificant as compared to the total generation of the grid and hence not considered within the grid boundary. For details on grid information refer to Annex 3 of this PDD.

Step 2.2 Choice of data vintage:
The data for the most recent three years (2004-05, 2004-03, 2003-02), that was available at the time of PDD finalization has been considered for the OM calculation. hence '*ex ante'* choice has been opted for this project activity.

The details of variables, formula for calculation of OM has been presented in Section B.6 of this document.

Step 2.3: Combined margin (CM) calculation:

[3] Ministry of Power, Central Electricity Authority, Sewa Bhawan, R.K.Puram, New Delhi-66

The combined margin is calculated as the weighted average of the operating margin emission factor and the build margin emission factor obtained from the database on CO2 Baseline for the Indian Power Sector by CEA, India. Since the project activity is on wind power the weightage factor for OM is taken as 0.75 and for BM is taken as 0.25, following the methodology ACM0002 version 06.

Step 3: Sources of data collection:

Calculation for this combined margin is based on data from publicly available "CO2 Baseline Database for the Indian Power Sector" report of Central Electrical Authority of India", an official source of the Government of India.

The spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system (grid).

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 additionality of the project activity has been demonstrated below. This is followed by descriptions of baseline and project scenarios and how emissions reductions would occur in the project activity.

Demonstration of Additionality for the project activity[4]

As required in ACM0002, additionality has been demonstrated and assessed using the latest version of the *"Tool for the demonstration and assessment of additionality"*.

Steps	Additionality Requirements	Status of Additionality Check
Step 0: Preliminary screening based on the starting date of the project activity	(1) The start of construction date for wind turbines is after 1 January 2000. Evidence on the same available with EMIL for verification by the DOE for project validation. (2) The EMIL management seriously considered CDM incentive for the project activity at the planning stage. This has been attached as appendix 1.	The additionality check has crossed Step 0, and may proceed to Step 1.
Step 1: Identification of alternatives to the project activity consistent with current laws and regulations		
Sub-step (1a): Define Alternatives to the project activity	EMIL has set up a 75MW wind power project to generate electricity and supply to the state electricity grid. The same objective could be met with the following alternatives also: ▪ Setting up coal based plant that would produce equivalent units of power; or	The additionality check has crossed Step 1, and may proceed to Step 2 (Investment

[4] Available at: <http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html>.

Steps	Additionality Requirements	Status of Additionality Check
Sub-step (1b): Enforcement of applicable laws and regulations	▪ Setting up the project without CDM benefits or ▪ Continuation of current situation, i.e. no project activity and equivalent amount of energy would have been produced by the project grid electricity system through its currently running power plants and or by new capacity addition to the grid. As per Ministry of Non-Conventional Energy Sources (MNES), capital cost for wind power project ranges between 45 million to 55 million per MW, depending on site and the wind electric generator selected for installation. This gives a levelised cost of energy generation in the range of INR 2.50 to INR 2.75 per kWh (depending upon the site)[5], taking into consideration the fiscal benefits extended by the Government. However, as per Central Electricity Authority (CEA) of India, the cost of power generation by coal based power plants stands as INR 1.88/kWh (based on domestic coal purchased from mines at 800 km away from load centre. Thus, if economic feasibility of the first two alternatives is considered from private investor point of view, the best plausible alternative to the project would be setting up a coal based plant. However, it is difficult to justify that equivalent amount of units would have been generated by coal based power plant (as a preferred substitute to the project). Also, for emission reduction, option 3, i.e. "no project option" where in the equivalent amount of energy would have been produced by the project grid electricity system", is the most plausible alternative as baseline option for the project since this option gives the lowest emissions in the baseline. Thus, suitable grid mix has been selected as baseline option and therefore for calculation of baseline emission. The project activity complies with all applicable laws and regulations in India as demonstrated below. ✓ Electricity generation from wind farm is not a legal requirement or a mandatory choice. There are state and sectoral policies, primarily framed to encourage wind based power project to attract more private investment as there are many anticipated risks under the project and requires good amount of equity to be involved.	Analysis) followed by Step 3 (Barrier Analysis), or directly to Step 3. In the present case, Step 2 has been used for additionality check, followed by Step 3.

[5] http://mnes.nic.in/business%20oppertunity/pgtwp.htm

Steps	Additionality Requirements	Status of Additionality Check
	✓ The Indian Electricity Act of 2003 does not restrict or empower any authority to restrict the fuel choice for power generation. In addition, it may be noted that the draft National Electricity Policy (revised in August 2004) asserts 'coal would necessarily continue to remain the major fuel'. ✓ The applicable environmental regulations do not restrict the use of wind energy for power generation. ✓ There is no legal requirement on the choice of a particular technology for power generation.	
Step 2. Investment analysis		
Sub-step (2a): Determine appropriate analysis method	The project activity generates revenue by selling electricity to state electricity board. Hence simple cost analysis cannot be applied. The returns on the equity investment of these windmills were lower compared to the benchmark required rate of returns identified by the State Government hence benchmark analysis with return on equity as the financial indicator has been chosen for the Investment barrier analysis.	The additionality check has crossed Step 2(a), and may proceed to Step 2(b) – Option III.
Sub-step (2b): Apply benchmark analysis	As per the MERC (Maharashtra Electricity Regulatory Commission) order dated 24th November 2003, the project activity comes under the group III category (commissioned after 31.03.2003). The salient points of this order that are relevant for this project economics are listed below: 1. The sales tax benefit what was being offered to the wind project promoters has been withdrawn for category III projects 2. The wind power tariff was fixed at INR 3.50 per unit for the first year from the date of commissioning of the project. This rate would increase at INR 0.15 per unit every year for a period of thirteen years from the date of commissioning. 3. The investors of the wind power projects are expected to earn 16% Return on Equity as per National policy. The 16% ROE for wind projects has been taken as the benchmark for the project	The additionality check has crossed Step 2(b), and may proceed to Step 2(c)

<table>
<tr><th>Steps</th><th>Additionality Requirements</th><th>Status of Additionality Check</th></tr>
<tr><td></td><td>Further, the internal hurdle rate for the project stands to be 16.9%. For project proponent this has been taken as the benchmark for the project.

Thus, sensitivity analysis has been detailed in the next section to show how the project’s financial barrier needs to be overcome with CDM revenue.

The implication of the other two points of the MERC order are discussed in Sub step (3) & (4) of this section</td><td></td></tr>
<tr><td>Sub-step (2c): Calculation and comparison of financial indicators</td><td>The assumptions for financial analysis which were presented to the board of directors of EMIL in their meeting held on 27th September 2004 for decision making on the project (attached as appendix 1) are as under :
<table>
<tr><td>Capacity of the windfarm</td><td>75MW</td></tr>
<tr><td>No. of machines</td><td>60 No</td></tr>
<tr><td>Capacity of machines</td><td>1250 kW</td></tr>
<tr><td>Plant load factor (Sourced from draft Energy Purchase Agreement based on the MERC Order for procurement of electricity from wind installations in the state of Maharashtra, forwarded by the state electricity utility for all group III wind installations carried out in the state of Maharashtra after April 1, 2003.)</td><td>20%</td></tr>
<tr><td>Auxiliary consumption & transmission losses</td><td>5%</td></tr>
<tr><td>O&M cost</td><td>60 million INR/yr</td></tr>
<tr><td>Insurance charges</td><td>6 million INR/yr</td></tr>
<tr><td>% escalation of O&M charges</td><td>5%</td></tr>
<tr><td>Power tariff (in first year)</td><td>INR 3.5/kwh</td></tr>
<tr><td>Tariff escalation</td><td>INR.0.15/year till 13 years</td></tr>
<tr><td>Income tax rate (inc. surcharge)</td><td>36.6 %</td></tr>
<tr><td>Tax holiday u/s 80IA available for</td><td>10 yrs</td></tr>
<tr><td>Working capital:
Debtors (no. of days)</td><td>
90 days</td></tr>
</table></td><td>The additionality check has crossed Step 2(c), and may proceed to Step 2(d)</td></tr>
</table>

<table>
<tr><th>Steps</th><th>Additionality Requirements</th><th>Status of Additionality Check</th></tr>
<tr><td></td><td>
<table>
<tr><td>Total project cost</td><td>3750 million INR</td></tr>
<tr><td>Fund:
Own source
Loan funds</td><td>
40 %
60 %</td></tr>
<tr><td>Interest rate on loans</td><td>10.5 %</td></tr>
</table>
The post tax ROE without considering CDM revenue for 20 years of cash flow calculation is 14.28%.

The ROE improves to 17.05% when CDM revenue is considered. (assumptions in this case are –
rate/CER is USD 10.00 and USD to INR rate is INR 45.00).

However, at low rate of CER the project is still economically unviable to the project proponent as, the internal expectation of return in 16.9%. Thus, following sensitivity analysis has been conducted on equity IRR to check the robustness of the financial attractiveness of the project with and without the CDM revenue.</td><td></td></tr>
<tr><td>Sub-step (2d): Sensitivity analysis</td><td>The effect of variation of the plant load factor (PLF) by ±5% from the base level of 20% (as assumed based on MERC Order) is given below:
<table>
<tr><th>Scenario</th><th>IRR without CDM revenue</th><th>IRR with CDM revenue</th></tr>
<tr><td>PLF- 15%</td><td>6.85%</td><td>8.44 %</td></tr>
<tr><td>PLF- 20%</td><td>14.28 %</td><td>17.05 %</td></tr>
<tr><td>PLF- 25%</td><td>21.82 %</td><td>26.60 %</td></tr>
</table>
The sensitivity analysis shows that only with higher PLF (more than 20%) the project is financially viable. However, the project has demonstrated average PLF of 19% (data includes performance throughout all seasons from April 05 to May 06). It was observed that after one year of wind mill’s operation, the electricity generation was approximately 25% less (at least in two instances) than what is guaranteed by the wind turbine manufacturer. The above cost- benefit analysis is based on the assurance / guarantee provided by the manufacturer based on wind mapping, wind availability etc. of that region. If this trend</td><td>The additionality check has crossed Step 2(d), and may proceed to Step 3</td></tr>
</table>

<table>
<tr><th>Steps</th><th>Additionality Requirements</th><th>Status of Additionality Check</th></tr>
<tr><td></td><td>
continues then the IRR of the project will reduce further and even with CDM revenue the project will not become attractive. This risk of lower generation compared to estimated generation is always
inherent in such projects

Furthermore, MNES, through Centre for Wind Energy Technology (C-WET), Chennai, mentioned in Draft New and Renewable Energy Policy Statement 2005, that, “wind electricity in the country has not reached the cost-competitiveness levels attained in the US and EU, especially when fiscal incentives are available”. It further indicates that it is expected that wind power in India is likely to be commercial viable only by 2010 with high capacity and more efficient system.

How the effect of lower PLF necessitates the requirement of sale of CER at high rate has been delineated below to show that the barrier to successfully operate the project increase with every drop in PLF which is not under the control of the project participant.

<table>
<tr><th>Scenario</th><th>IRR requirement</th><th>CER rate required</th><th>IRR with required rate of CER</th></tr>
<tr><td>Generation @ 15% PLF</td><td>16% - 16.9%</td><td>>35USD≈ >26Euro</td><td>17.36%</td></tr>
<tr><td>Generation @ 18% PLF</td><td>16% - 16.9%</td><td>>25USD≈ >19Euro</td><td>16.97%</td></tr>
<tr><td>Generation @ 20% PLF</td><td>16% - 16.9%</td><td>>13-<15USD≈ >11 - <12Euro</td><td>18.18%</td></tr>
</table>

The sensitivity analysis shows that only with higher CER rate of more than $USD 10.00 and PLF more than 20% the project is financially viable to EMIL. Further, wind energy based power generation being risky and is highly dependant on vagaries of nature and other external uncontrollable factors, such as marginal cost of borrowing.

Thus, overall investment analysis clearly indicates that the project is definitely financially unattractive and CDM revenue can help to cross this barrier to some extent.[6]
</td><td></td></tr>
</table>

Steps	Additionality Requirements	Status of Additionality Check
Step 3. Barrier analysis		
Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity *Sub-step 3b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)*	The project developer has taken higher investment risks compared to the alternatives, which is demonstrated below: ▪ The project activity tariff structure is a single-part tariff structure as compared to utility scale fossil fuel and hydro projects, which have two-part tariff structure. This implies that project activity carries a higher investment risk than the utility scale fossil fuel and hydro projects where the investment recovery is decoupled from the level of actual generation achieved by the project due to variations in off-take. Thus, transmission unavailability, back-down of generation or part-load operations, which are beyond the control of the investors are likely to affect the project activity more severely and therefore the project activity investors would require higher rate of return to compensate them for these risks. ▪ The tariff is specified *ex ante* for the project activity. In case of utility scale fossil fuel and hydro projects, these are usually by reference to cost-plus approach whereby the projects recover their full investment cost including a post-tax return on equity if they are able to reach specified level of plant availability. Thus the utility scale fossil fuel and hydro projects are ensured of equity returns from the first year of operation. This increases the investment risks in the project activity compared to the alternatives. **Other Barrier: -** As mentioned in the power purchase agreement with MERC, the government will take revenue from the carbon credits. Although project proponent has demonstrated the IRR with CDM will be 17.05% but it didn't include the funds to be given to Government. It is clear that the wind project is not attractive without the CDM funds and in the light of Government policy the post CDM IRR will also be reduced.	The additionality check has crossed Step 3, and may proceed to Step 4.

<table>
<tr><th>Steps</th><th>Additionality Requirements</th><th>Status of Additionality Check</th></tr>
<tr><td>Step 4. Common practice analysis</td><td></td><td></td></tr>
<tr><td>Sub-step 4a. Analyze other activities similar to the proposed project activity.

Sub-step 4b. Discuss any similar options that are occurring.</td><td>Wind energy is not a popular energy resource for power generation in the country and also in the state. Even with several promotional offers by the central and state Government, the penetration level of this power source has not improved beyond 0.7%[7] in Maharashtra, which is not as high as 7.5% in Tamil Nadu and 2.04 in Karnataka as presented below:
<table>
<tr><th rowspan="2">State</th><th colspan="2">install capacity (MW)</th><th>%age</th></tr>
<tr><th>wind</th><th>total</th><th>penetration</th></tr>
<tr><td>Andhra pradesh</td><td>160</td><td>37305</td><td>0.43</td></tr>
<tr><td>Gujarat</td><td>350</td><td>44230</td><td>0.79</td></tr>
<tr><td>Karnataka</td><td>480</td><td>23515</td><td>2.04</td></tr>
<tr><td>Maharashtra</td><td>495</td><td>67078</td><td>0.74</td></tr>
<tr><td>Rajasthan</td><td>331</td><td>20965</td><td>1.58</td></tr>
<tr><td>Tamil Nadu</td><td>2426</td><td>32229</td><td>7.53</td></tr>
</table>
Out of 3020 MW technical potential power generation from wind in Maharashtra, only 495 MW of wind power has been installed till 31st March 2005.

Among these 495MW many of the windmill owners are from the Satara region. The wind density assessed by C-WET for different regions in the country shows that Satara has high wind density ranging from 250 to 300W/m2 whereas the project regions have been assessed with a range of 200-250W/m2.

It is obvious from these statistics that wind in not a common practice in this region of the country and the existing investors are depending on CDM revenue for making their project viable.

Change in circumstances:
The promotional policies adopted by the Maharashtra Government during the 1999-2000 encouraged the investors to invest in the wind energy. Later, in September 2003, they withdrew the sales tax benefit being awarded to the project promoters. EMIL had put up the project in 2005 when the promotional benefits were withdrawn and thus their projects became financially weaker than those commissioned before 31st March 2003.</td><td>The additionality check has crossed Step 4, and may proceed to Step 5.</td></tr>
</table>

[7] Table 3.4 General Review report, CEA, India

Steps	Additionality Requirements	Status of Additionality Check
Step 5. Impact of CDM registration	The approval and registration of the project activity as a CDM activity would result in the following benefits: ✓ encourage other similar industries to invest in wind projects ✓ Improve the returns of the project and make it financially attractive.	Since Step 5 is satisfied, the project activity is not a baseline scenario, and hence is additional.

Description of Baseline Emission Scenario

As explained earlier under section B.2, the baseline scenario is the generation of equal amount of electricity by the operation of grid- connected power plants and/or by the addition of new generation sources.

Description of Project Emission Scenario

There will be no project emission since wind mills convert wind energy to electricity. Hence, the total project emission is zero.

Justification of Emission Reductions

In the absence of the project activity, equal amount of electricity would have been generated from the plants connected to the grid. The western region grid generate >90% of their power from fossil fuel based plants. Hence displacing the grid power by wind power is actually saving equivalent amount of GHG emission which can be estimated based on the grid emission factor.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO2 equ.):

As mentioned earlier under section B.4, a combined margin approach has been used to calculate the baseline emissions for the various electricity grids considered. The emission factor is calculated as follows:

$$\mathbf{BE_y = EG_y * EF_y} \quad \text{.....(1)}$$

Where:

BE_y = Baseline emissions of the project activity in the year y (tCO_2/y)

EG_y = Net electricity supplied to grid in year y (MWh/y)

EF_y = CO_2 emission factor of the grid (tCO_2/MWh)

Net electricity supply is calculated as:

$$\mathbf{EG_y = EG_{GEN,y} - EG_{AUX,y}} \quad \text{.....(2)}$$

Where:

EG_{GEN}- = Total electricity generation in Wind mills (MWh/y)

EG_{AUX} = Auxiliary consumption of the windmills from grid (MWh/y)

And CO_2 emission factor of grid is calculated as:

$EF_y=(0.75EF_{OM,y}+0.25EF_{BM,y})$……..…… (3)

Where:

$EF_{OM,y}$ = Operating margin of the western regional grid calculated *ex ante* using three year's vintage data (2002-2003, 2003-2004, 2004-2005) obtained from CEA database on CO2 baseline for Indian Power Sector.

$EF_{BM,y}$ = Build margin of the western regional grid calculated *ex ante* using western regional grid contributing 20% of grid generation during 2004-05 obtained from CEA database on CO2 baseline for Indian Power Sector.

Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO2 equ.):

The emission reduction (ERy) by the project activity during a given year y is the difference between the baseline emissions though substitution of electricity generation with fossil fuels (BEy) and project emissions (if any) (PEy), as follows. It should be noted that the project emission (that is due to auxiliary consumption of electricity from gird) has been taken care of while computing the net electricity replaced at the grid. Hence, there is no project emission; or PEy = 0:

ERy = BEy ……..(4)

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

(Copy this table for each data and parameter)

Data / Parameter:	**EG_y**
Data unit:	MWh/yr
Description:	Net Electricity supplied to MSEB facility
Source of data to be used:	Project site and at EMIL Corporate Office
Value applied	125,718MWh/yr
Justification of the choice of data or description of measurement methods and procedures actually applied :	Continuous measurement and monthly recording. The monitoring of $EG_{GEN,y}$ and $EG_{AUX,y}$ provided as per the details on payment invoices of electricity sold by the project to MSEB and based on monthly Joint Meter Reading Reports.
Any comment:	EMIL has outsourced the operations and monitoring the performances of the WTGs to Suzlon Energy who sends daily and monthly performance records (meter readings) to EMIL. Records to be archived for 12years from the start of the crediting period either on paper or in electronic media.

Data / Parameter:	**EFOM,y**
Data unit:	tCO2/MWh
Description:	Operating Margin emission factor for western regional grid
Source of data to be used:	Computed from data sourced from Website of Central Electricity Authority of India
Value applied	0.99tCO2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as per ACM0002 with 3years vintage (2002-2003, 2003-2004, 2004-2005) data obtained from CEA database on CO2 baseline for Indian Power Sector. Computed once during PDD finalization (ex-ante).
Any comment:	Records to be archived for 12years from the start of the crediting period either on paper or in electronic media.

Data / Parameter:	**EFBM,y**
Data unit:	tCO2/MWh
Description:	Build Margin emission factor for western regional grid
Source of data to be used:	Computed from data sourced from Website of Central Electricity Authority of India
Value applied	0.78tCO2/MWh
Justification of the	Calculated as per ACM0002 with vintage (2004-2005) data obtained from CEA

choice of data or description of measurement methods and procedures actually applied :	database on CO2 baseline for Indian Power Sector. Computed once during PDD finalization (ex-ante).
Any comment:	Records to be archived for 12years from the start of the crediting period either on paper or in electronic media.

Data / Parameter:	**EFy**
Data unit:	tCO2/MWh
Description:	Combine Margin CO2 emission factor for western regional grid
Source of data to be used:	Estimated figure based on 75% of OM and 25% of BM values calculated using data obtained from CEA database on CO2 baseline emission factor for Indian Power Sector.
Value applied	0.940tCO2/MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	Calculated as per ACM0002 with 3years vintage data and option of ex ante calculation based on "75% of OM and 25% of BM values approach". Computed once during PDD finalization. (ex-ante)
Any comment:	Records to be archived for 12years from the start of the crediting period either on paper or in electronic media.

B.6.3 Ex-ante calculation of emission reductions:

>>

Particulars	Units	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
EF	tCO_2/MWh	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940	0.940
$EG_{GEN,y}$	MWh	126,532	126,532	126,532	126,532	126,532	126,532	126,532	126,532	126,532	126,532
$EG_{AUX,y}$	MWh	814	814	814	814	814	814	814	814	814	814
EG_y	MWh	125,718	125,718	125,718	125,718	125,718	125,718	125,718	125,718	125,718	125,718
BE,y	tCO_2	118,203	118,203	118,203	118,203	118,203	118,203	118,203	118,203	118,203	118,203

Parameter/ Variable	**tCO2/MWh**
OM Western Region (3 yrs average 2002-2003, 2003-2004, 2004-2005)	0.99
BM (2004-2005)	0.78
75% of OM	0.75
25% of BM	0.19
CM for Western Region	**0.94**

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

>>

Year	Estimation of project activity emissions (tonnes of CO_{2e})	Estimation of baseline emissions (tonnes of CO_{2e})	Estimation of leakage (tonnes of CO_{2e})	Estimation of emission reductions (tonnes of CO_{2e})
1st Year*	0	118203	0	118203
2nd Year	0	118203	0	118203
3rd Year	0	118203	0	118203
4th Year	0	118203	0	118203
5th Year	0	118203	0	118203
6th Year	0	118203	0	118203
7th Year	0	118203	0	118203
8th Year	0	118203	0	118203
9th Year	0	118203	0	118203
10th Year	0	118203	0	118203
Total (tonnes of CO_{2e})				1182029

* 1st year begins from the date of registration, and each year extends for 12 months

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

B.7.1 Data and parameters monitored:

(Copy this table for each data and parameter)

Data / Parameter:	EG_y
Data unit:	MWh/yr
Description:	Net Electricity supplied to MSEB facility
Source of data to be used:	Project site and at EMIL Corporate Office
Value of data applied for the purpose of calculating expected emission reductions in section B.5	125718 MWh/yr
Description of measurement methods and procedures to be applied:	Continuous measurement and monthly recording. The monitoring of $EG_{GEN,y}$ and $EG_{AUX,y}$ would be as per the details provided in the Article 11 of the Power Purchase Agreement signed between the MSEB and EMIL, which clearly identifies the following:

	Metering and recording process of power generation and consumption data ***Calibration of metering instruments*** ***Validation of data both the parties*** ***Recording and approval form authorise personnel***
QA/QC procedures to be applied:	Uncertainty level of data: Low; This data can be cross referred with the invoices raised to MSEB by EMIL and payment against the invoice.
Any comment:	EMIL has outsourced the operations and monitoring the performances of the WTGs to Suzlon Windfarm Services Limited who sends daily and monthly performance records to EMIL. Records to be archived for 12years from the start of the crediting period either on paper or in electronic media.

B.7.2 Description of the monitoring plan:

>>

As per the applied monitoring methodology to the project, the project participants need to monitor the following parameters on continuous basis to measure the net electricity $\mathbf{EG_y}$ supplied from the project activity:

EG_{GEN}- = Total electricity generation by the wind turbines (MWh/y)
EG_{AUX} = Auxiliary consumption of the power plant (MWh/y)

The net electricity supply is measured and/or calculated as
$\mathbf{EG_y = EG_{GEN,y} - EG_{AUX,y}}$

The monitoring of $EG_{GEN,y}$ and $EG_{AUX,y}$ would be as per the details provided in the Article 11 of the Power Purchase Agreement signed between the MSEB and EMIL, which clearly identifies the following:

Metering and recording process of power generation and consumption data
Calibration of metering instruments
Validation of data
Recording and approving authority

EMIL has outsourced the operations and monitoring the performances of the WTGs to Suzlon Windfar Services Limited who sends daily and monthly performance records to EMIL. All the WTGs at the site are connected to a Central Monitoring Station of Suzlon being operated from Pune wherein data are directly captured through digital system. The captured data are then directly uploaded to the CRM (customer relationship management) system, an Oracle based database. From CRM the daily generation reports are directly sent to EMIL on a daily basis. A CRM manager deputed by Suzlon, is responsible for the monitoring of the WTGs. EMIL has daily communication CRM manager. As regards the data for wind speed, there are anemometer installed for calculating the wind speed at regular basis. Similarly wind-vane is installed for wind direction detection.

The electricity generation reports on joint meter reading are generated by MSEDCL and send to EMIL through Suzlon (O&M service provider) on monthly basis. Upon receipt of reports, EMIL generates

invoices on sale of electricity and sends to MSEDCL via Suzlon. Thereafter, MSEDCL makes payments against the invoices within 3 months directly to EMIL.

The EMIL management is overall responsible for storing and archiving the data as well as preparation of monitoring report and communicate with EB of UNFCCC for project performance, registration and verification of the CDM project.

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)

>>

The PDD with baseline study was completed on 20/04/2007.

PricewaterhouseCoopers (P) Limited is assisting the project sponsor in structuring the CDM project activity. PwC is not a project participant.

Sustainable Business Solutions, PricewaterhouseCoopers
Contact Number: +91 33 24748523/ 24752910/ 24760420;
URL: www.pwc.com

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
The project started in December 2004 when EMIL management decided to invest in the windmill project.

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:

>> Not chosen.

C.2.1.2. Length of the first crediting period:

>> Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> To start from the date of registration.
Tentative starting date – 09/11/2007

C.2.2.2. Length:

>> 10 years

SECTION D. Environmental impacts

>>

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

>>

A detail environmental impact assessment study is not required by the project as wind projects do not fall in the category of projects that require EIA as per the EIA Notification of the MoEF. The projects have followed the guidelines of the Ministry of Non-conventional energy and Suzlon's standard protocols during design, construction, commissioning and operation of the wind machines that include mitigation measures and management plans. The wind farms, wherein the project's WTGs are being operated, has been identified by the central and the state government after detailed assessment of wind density and possible environmental and social impacts of the concerned areas. However, as a good corporate citizen and for the purpose of CDM, EMIL has conducted an environmental impact assessment of the study of the area along with stakeholder feedback on the commissioning and performance of the project.

The project has achieved all necessary environmental clearance from the state and central government for the project and is being successfully operated. There is no transboundary impacts from the project.

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:

>>

No significant impacts have been noted by the state and central government while granting project clearance. Also, the EIA report does not identify any significant environmental impacts.

SECTION E. Stakeholders' comments

>>

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

>>

EMIL identifies the following local stakeholders to be associated with the project activities, directly or indirectly. The typical groups of the stakeholders identified are employees, contractual labours, contractors (Suzlon), the Panchayt Pramukh (village head), the Nagar Sevak, and the villagers. All the stakeholders were informed about the agenda, venue and date of the meeting through notices issued 15days prior to the meeting. Further, a project concept note, which gives a clear idea on the project activity including the measures taken under the project and the benefits achieved by the project, was also issued along with the notices as information to the concern stakeholder.

There were two consultation meeting conducted by EMIL on 30th October 2006; one at the site of the wind farm and the other at the Kolkata Corporate office for off-the field employees only.

The stakeholder consultation meeting at the wind farm site was attended by 20 participants representing various groups of the stakeholder (as mentioned above), details on the participants has been recorded. The meeting was chaired by Mr. Raju Nakaram Sindhi (Municipal Councillor).

The meeting started with a brief presentation on Clean Development Mechanism under Kyoto Protocol by Mr. Debasish Saha (Dy. GM) and Mr. Abhay Kumar Rout (Officer) from EMIL. There after it was explained to the stakeholder as how the wind farm project by EMIL has lead to significant reduction in emissions of greenhouse gases either directly or indirectly and hence helps in contribute to the global efforts towards combating global warming. EMIL further explained the other sustainable development benefits associated with the project.

The stakeholders viewed EMIL as a reputed company contributing to local socio-economy. Overall there was unanimous agreement that the proposed project was a beneficial project from sustainability view-point. Specific concerns and questions and the answers are delineated below.

In similar line the meeting in Kolkata office was conducted and the employees wished EMIL success in the new venture which in turn will ensure their growth in professional field as well.

E.2. Summary of the comments received:

>>

Concern and Reponses as recorded during the meeting at the site of the wind farm area:

Specific concerns and questions and the answers are delineated below.

Concern (Query raised by village Panchayat Pramukh)

1. Does operation of the wind mills likely to reduce ground water availability?

Response

- No, the wind mills use wind as the resource to generate power and does not require water in its operation and hence there will be no effect on the ground water.

Concern (Query raised by farmers)

2. Does the rotation of wind mills have any effect on rainfall?

Response

- No, the wind mill does not have any effect on the rainfall due to its rotation; also it does not lead to any type of pollution.

Concern (Query raised by Maharashtra State Electricity Board Engineer)

3. Does the temperature of the surroundings increase due to the wind mills?

Response

- Wind mills are non-polluting and do not lead to any temperature increase in the atmosphere as there is no GHG emission or thermal pollution due to its rotation.

Concern (Query raised by Contractor Labourer)

4. Why is the foundation depth of the towers 4 meters?

Response

- It is so because this depth is adequate for bearing the load of the tower.

Concern (Query raised by village farmers)

5. Will the erection of the wind mills and subsequent earth work will affect cultivation?

Response

- No, it does not affect cultivation.

Concern (Query raised by village farmers)

6. Why consider only the skilled labours for employment at wind farm?

Response

- EMIL also requires unskilled labours on contractual basis. Some of the employs are also trained as. However, for maintenance job only skilled labours are employed as it involves safe and efficient operations of the wind mills.
-

Concern (Query raised by village Panchayat member)

7. Is agriculture possible in the surrounding of the wind farm area?

Response

- Yes it is possible.

There were no other issues raised by the stakeholders.

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

>>

As above.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Essel Mining & Industries Limited
Street/P.O.Box:	10, Camac Street
Building:	Industry House,
City:	Kolkata
State/Region:	West Bengal
Postfix/ZIP:	700 017
Country:	India
Telephone:	+91-33-22828339
FAX:	+91-33-22824998
E-Mail:	http://www.esselmining.com/
URL:	
Represented by:	
Title:	VP (Projects)
Salutation:	Mr.
Last Name:	Kedia
Middle Name:	
First Name:	Arun
Department:	Project
Mobile:	+91-9830261703
Direct FAX:	
Direct tel:	
Personal E-Mail:	arun.kedia@adityabirla.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

Project does not include any public funding for project implementation or operation.

Annex 3
BASELINE INFORMATION

Source: CEA Data, Database_06122_for_publishing.xls									
Simple Operating Margin (tCO2/MWh) (incl. Imports)									
	2000-01	2001-02	2002-03	2003-04	2004-05				
North	0.98	0.98	1.00	0.99	0.98	Using approach (c) on p. 4 of ACM0002 / Ver 06			
East	1.22	1.19	1.17	1.20	1.17	Using approach (c) on p. 4 of ACM0002 / Ver 06			
South	1.03	1.00	1.00	1.01	1.00	Using approach (c) on p. 4 of ACM0002 / Ver 06			
West	0.98	1.01	0.98	0.99	1.01	Using approach (c) on p. 4 of ACM0002 / Ver 06			
North-East	0.67	0.66	0.68	0.62	0.81	Using approach (d) on p. 4 of ACM0002 / Ver 06			
India	1.01	1.02	1.01	1.02	1.02				
Build Margin (tCO2/MWh) (not adjusted for imports)									
	2000-01	2001-02	2002-03	2003-04	2004-05				
North					0.53				
East					0.90				
South					0.72				
West					0.78				
North-East					0.10				
India					0.70				

Interstate Transfer Percentage for last five years by Western Regional Grid					
To ER / From	Year 2000-2001	Year 2001-2002	Year 2002-2003	Year 2003-2004	Year 2004-2005
Northern	524.2	388.0	1,081.2	962.4	-320.4
Eastern	0.0	0.0	257.2	0.0	120.4
Southern	-203.0	-562.1	-541.3	0.0	305.3
Western					
North-Eastern	0.0	0.0	0.0	0.0	179.5
Bhutan	0.0	0.0	0.0	0.0	0.0
Nepal	0.0	0.0	0.0	0.0	0.0
Net imports	321.2	-174.1	797.1	962.4	284.8
Total Imports	524.2	388.0	1,338.4	962.4	605.2
Total Generation	74,404.8	77,449.5	82,802.1	80,433.0	100,574.0
% of Total Generation	**0.70**	**0.50**	**1.62**	**1.20**	**0.60**
Cross border transfer % of Total Generation	**0.70**	**0.50**	**1.62**	**1.20**	**0.60**

Emission factor calculation:

Annex 4

MONITORING INFORMATION

Refer to Section B.7.2

- - - - -