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:

>> 19.27 MW Grid connected wind electricity generation project by KPR Mills in Tamil Nadu.
Version 03
Date- 26/03/2007

A.2. Description of the project activity:

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Description of the project activity

Over the last 25 years, considerable progress has been made in wind energy technology and its application for grid power generation. Consequently significant progress has been made to harness wind for electricity generation in different parts of the world.

The proposed project activity involves the establishment of a wind farm of 19.27 MW installed capacity enabling generation of electricity by state-of-the-art 1.25 MW Wind Electricity Generators (WEGs) (One of the best available technologies in the country developed by Suzlon Energy Limited), 0.600 MW WEGs (supplied by Enercon) and 0.230 MW (supplied by Enercon), in Tirunelveli and Coimbatore districts in the state of Tamil Nadu in southern India. The project locations at Tirunelveli and Coimbatore are included in the 40 potential wind sites identified by Ministry of Non Conventional Energy Sources (MNES, now called MNRE – Ministry of New and Renewable Energy), Government of India, having wind power density of 388 W/m^2 and 398 W/m^2 respectively at 50 m height.

Table 1: Ownership details of the companies

Name of the Company	Number of WEGs	Total Installed Capacity	Location
KPR Mill Private Limited	4 x 0.230 MW	0.92 MW	Bogampatti
KPR Mill Private Limited	3 x 1.25 MW	3.75 MW	Dhanakkarkulam
KPR Spinning Mill Private Limited	4 x 1.25 MW	5.00 MW	Dhanakkarkulam
KPR Cotton Mills Private Limited	16 x 0.600 MW	9.60 MW	Irrukandurai
Total	**27**	**19.27 MW**	

The electricity generated from the project will be initially fed into a 33 kV grid, and will then be further stepped up to 110 and 230 kV grid lines.

The electricity generation from this wind park will contribute to annual GHG reductions estimated at 34674 tCO_2e (tonnes of carbon dioxide equivalent). Although the project life is envisaged as 20 years, it is proposed that the project activity needs to mitigate the risks involved in Renewable Energy Technology for the first 10 years. During the proposed 10 years crediting period, the project is expected to reduce approximately 346740 tCO_2e, thereby generating equivalent amount of Certified Emission Reductions ("CERs").

Purpose of the project activity
The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, to utilise the generated output for meeting the captive energy demand and to contribute to climate change mitigation efforts. This renewable energy will partially substitute the electricity currently provided to the KPR Industries by the Tamil Nadu Electricity Board through the regional electricity grid.
Apart from generation of renewable electricity, the project has also been conceived for the following:

- To enhance the propagation of commercialisation of wind turbines in the region
- To contribute to the sustainable development of the region, socially, environmentally and economically
- To reduce the prevalent regulatory risks for this wind park through revenues from the CDM

View of the project participants on the contribution of the project activity to sustainable development

Ministry of Environment and Forests, Govt. of India has stipulated the following indicators for sustainable development in the interim approval guidelines for CDM projects:

a > Social well being – *The CDM project activity should lead to alleviation of poverty by generating additional employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people.*
The proposed project activity leads to alleviation of poverty by establishing direct and indirect employment benefits accruing out of ancillary units for manufacturing lattice towers for erecting the WEGs and for maintenance during operation of the project activity. The infrastructure in and around the project area will also improve due to project activity. This includes development of road network and improvement of electricity quality, frequency and availability as the electricity is fed into a deficit grid.

b >Economic well being - The CDM project activity should bring in additional investment consistent with the needs of the people.
The project activity leads to an investment of about INR 945 million to a developing region which otherwise would not have happened in the absence of project activity. The generated electricity is fed into the Southern regional grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub-urban habitants) which will provide new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development. The project activity also leads to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

c > Environmental well being - *This should include a discussion of impact of the project activity on resource sustainability and resource degradation, if any, due to proposed activity; bio-diversity friendliness; impact on human health; reduction of levels of pollution in general.*
The project utilizes wind energy for generating electricity which otherwise would have been generated through alternate fuels (most likely - fossil fuel) based power plants, contributing to reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions. As wind power projects produce no end products in the form of solid waste (ash etc.), they address the problem of solid waste disposal encountered by most other sources of power. Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus the project causes minimal negative impact on the surrounding environment contributing to environmental well-being.

d >Technological well being - *The CDM project activity should lead to transfer of environmentally safe and sound technologies with a priority to the renewables sector or energy efficiency projects that are comparable to best practices in order to assist in upgradation of technological base*.
The project activity leads to the promotion of Wind Electricity Generators (WEGs) into the region, demonstrating the success of small, medium and large sized wind turbines, which feed the generated power into the nearest sub-station, thus increasing energy availability and improving quality of power under the service area of the substation. Hence the project leads to technological well being.

A.3. Project participants:

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Table 2: Project Participants

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 Country)	KPR Spinning Mill Pvt Ltd KPR Mill Pvt. Limited KPR Cotton Mills Pvt. Ltd. } Represented by KPR Mill Pvt. Ltd.	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the party (ies) involved is required.		
Note: When the PDD is filled in support of a proposed new methodology (forms CDM-NBM and CDM-NMM), at least the host Party (ies) and any known project participant (e.g. those proposing a new methodology) shall be identified.		

A.4. Technical description of the project activity:

A.4.1. Location of the project activity:

A.4.1.1. Host Party(ies):

>> Government of India

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

>> State – Tamil Nadu
District – Tirunelveli and Coimbatore

A.4.1.3. City/Town/Community etc:

>> District - Tirunelveli and Coimbatore
Village – Village Dhanakkarkulam and Irrukandurai in Tirunelveli and village Bogampatti in Coimbatore.

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 activity is located in Village Dhanakkarkulam and Village Irrukandurai, which fall in the south-eastern part of Tirunelveli district of the state of Tamil Nadu and in Village Bogampatti which falls in Coimbatore. The wind data at the proposed sites is adequately promising. According to the MNES survey the mean annual wind speed at Tirunelveli has been observed as 23.4 kmph (at 30 m height) and at Coimbatore (Bogampatti) it has been observed as 23.8 kmph (at 30 m height). The mean annual wind power densities at the sites have been observed as 388 W/m^2 and 398 W/m^2 respectively at Tirunelveli site and Coimbatore site. The geographical details of the location are given below:

Table 3: Geographic details of the location

Location	District	Latitude N		Longitude E		Elevation
		Deg.	Min	Deg.	Min	Above mean sea level
Dhannakarkulam Irrukandurai	Tirunelveli	08	12	77	40	28
Bogampatti	Coimbatore	10	55	77	07	445

The specific location of the WEGs is furnished in Annex 7.

Figure 1: Location of Tamil Nadu in India

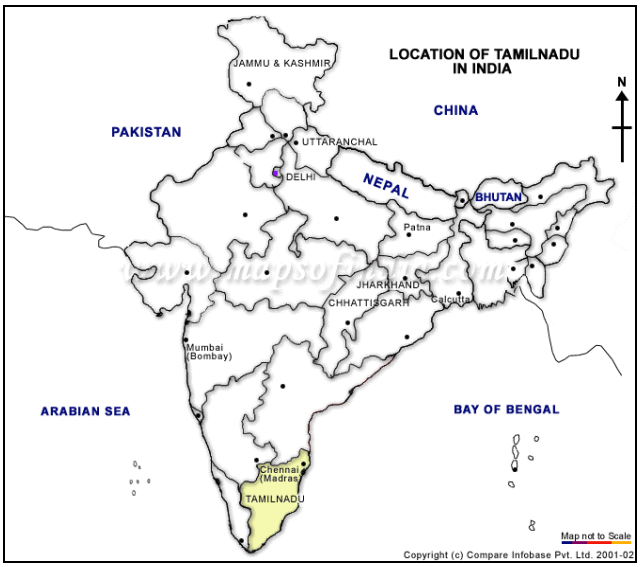


Figure 2: State Map of Tamil Nadu

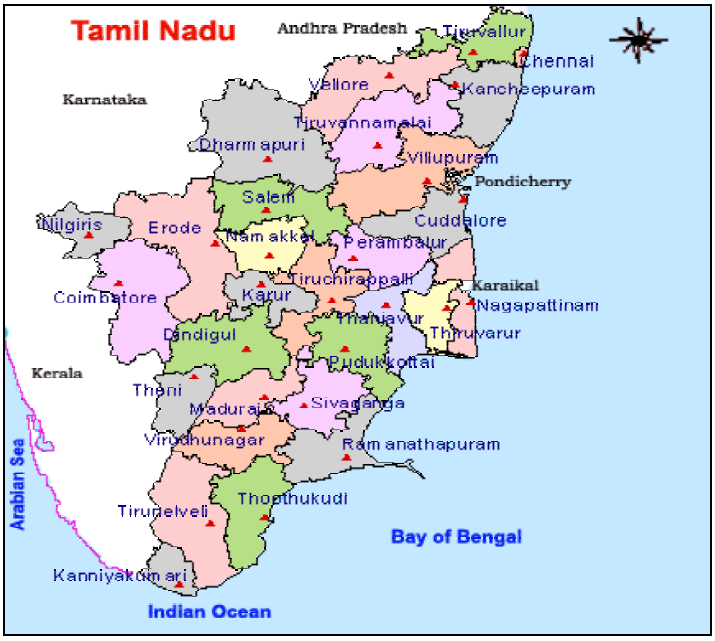


Figure 3: District Map of Tirunelveli

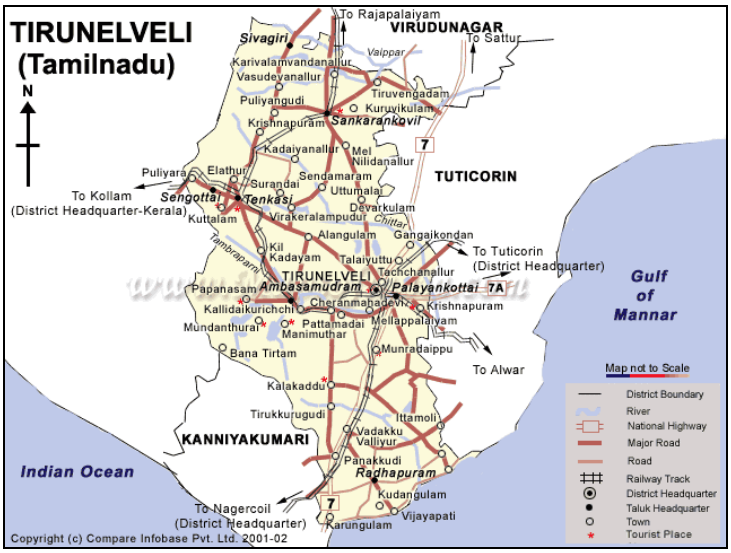
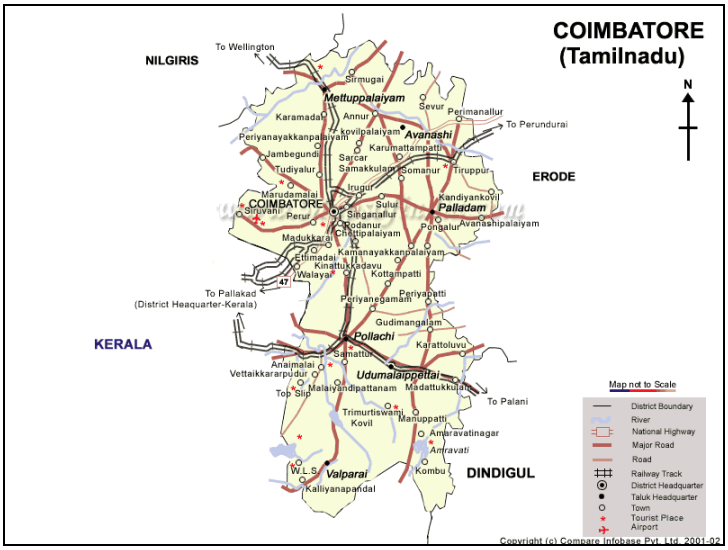


Figure 4: District Map of Coimbatore



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

>> The project activity is electricity generation from wind energy which is a renewable resource the generated electricity is then wheeled through the grid. The project hence can be considered under "Grid-connected electricity generation from renewable sources". The project activity has a capacity more than 15 MW (limit for small scale project). Therefore as per the scope of the project activities enlisted in the list of sectoral scopes and related approved baseline and monitoring methodologies, the project activity is a large scale project and 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:

>> In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind blowing at high speeds, has considerable amount of kinetic energy. When this kinetic energy passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The technology is a clean technology since there are no GHG emissions associated with the electricity generation. The project installs Suzlon make WEGs of individual capacity 1.25 MW and Enercon WEGs of 0.23 MW and 0.6 MW.

The technical specifications of 0.230 MW WEGs are as under:

The Enercon make E-30 (0.230 MW) WEG consists of the following parts-

1. Type Designation : E-30
2. Rotor with Pitch Control
    a. Type: Upwind rotor with active pitch control
    b. Direction of rotation: Clockwise
    c. No. of Blades: 3
    d. Rotor Dimension: 30m
    e. Swept Area: 707 sq. m
    f. Blade material: GRP/Epoxy Resin

   g. Profiling: ENERCON Profile
   h. Rated Speed: Variable- 18-50 rpm
   i. Cone Angle: "0" degrees
   j. Rotor axle angle: 3 degrees
   k. Pitch Control: Three synchronised regulating systems with individual blade adjustment
   l. Lightning protection for Blades also: For each rotor blade one integrated ENERCON lightning conductor system
3. Generator:
   a. Ring Generator: No (Synchronous type)
   b. Rated Output: 230 kW
   c. Voltage: 2 x 460 V
   d. Frequency: Variable
   e. Class insulation: F (155°C)
   f. Weight: 5440 kgs
   g. Winding of Generator: Rotor & Stator is joint less copper winding & we use Vacuum Impregnation Process and special resin for impregnation like the one for high-tension generators.
4. Mounting
   The generator and rotor (having three blades is mounted on the same shaft without any Gear Box)
5. Drive Train with Generator
   a. Hub: Rigid
   b. Generator: ENERCON Ring Generator (Synchronous type)
   c. Brake System: Three Independent Pitch Control systems
   d. Yaw Control: Active via adjusting gears, damped via friction bearing
6. Wind Velocities
   a. Start-up wind V1: 2.5 m/s
   b. Rated wind VR: 13 m/s
   c. Shutdown wind VO(10 min): 25 m/s
   d. Temporary shutdown wind VA (peak): 30 m/s
7. Electrical connection
   a. Grid voltage: 11kv/22kv/33kv through step up transformer
   b. Grid frequency: Variable
   c. Permissible band for trouble free operation: 45 HZ to 55 HZ
8. Controls
   a. Converter: Double stage output 640 V, 250 kW
   b. Inverter: DC/AC 400 V, 250 kW (controlled by pulse code modulation with the help of microprocessor)
9. Transformer: 300 KVA, 400 V/HT – 1 No. WEC outdoor type having L.V. cable box & H.V. Bare Bushings
10. Power factor: At al the outputs it will be nearing unity without the use of capacitors
11. Tower
   a. Height (M): 48 m
   b. Type: Tubular, conical
   c. Material: Steel
   d. No. of sections: 3
   e. Assembling: At site
   f. Ladder type: with integrated climbing protection
   g. Safety System: System DIN 32770

h. Surface treatment: painted with epoxy
i. Diameter at bottom: 2152 mm
j. Thickness (Bottom): 20 mm
k. Diameter (top):1000 mm
l. Thickness (top): 10 mm

12. Weight of WEG
    a. Rotor head with blades: 45000 kgs
    b. Nacelle including generator shaft and machine carrier: 11000 kgs
    c. Tower: 31000 kgs
    d. Total weight of WEG: 46500 kgs

The technical specifications of 0.600 MW WEGs are as under:

The WEG E-40 (0.600 MW) has features of variable speed and active pitch control. The generator is flanged directly to the hub.

1.	Turbine Model	: Enercon E-40
2.	Rated Power	: 600 kW
3.	Rotor Diameter	: M
4.	hub height	: 56.85 m
5.	Turbine type	: Gearless horizontal axis wind turbine with variable rotor speed.
6.	Power regulation	: Independent electromechanical pitch system for each blade
7.	Design lifetime	: 20 years
8.	Cut in wind speed	: 3.0 m/s
9.	Rated wind speed	: 11.6 m/s
10.	Cut out wind speed	: 25 m/s
11.	Extreme wind speed	: 57.6 m/s
12.	Rated rotational speed	: 32.5 rpm
13.	Operating range rot. Speed	: 18.0 to 33.0 rpm
14.	Orientation	: Upwind
15.	No. of Blades	: 3
16.	Blade Material	: Glass fibre reinforced Epoxy
17.	Gear box type	: Gearless
18.	Generator type	: Synchronous generator
19.	Braking	: Aerodynamic
20.	Output Voltage	: 400 V
21.	Yaw System	: Active yawing with 4 electric yaw drives with brake monitor and friction bearing
22.	Tower	: 56m in 5 sections
23.	Weights (Approx.):	
	a. Rotor Head	: 2500 Kg
	b. Blades (set of 3)	: 3 900 Kg
	c. Nacelle including generator shaft and machine carrier	: 6 000 Kg
	d. Tower	: 70 000 Kg

Total : 1 04 900 Kg

The salient features and technical details of the Suzlon 1.25 MW WEGs are as under:

A direct grid-connected high-speed generator, in combination with the multiple-stage combined spur/planetary gearbox of the Suzlon Megawatt Series, offers greater robustness and reliability than a low-speed generator connected to the electrical grid via AC-DC-AC-inverter systems. High-speed asynchronous generator with a multi-stage intelligent switching compensation system delivers power factor up to 0.99. The generated power is free from harmonics and is grid friendly.

Operating Data:

1. Rotor Height: 64 m
2. Hub Height: 65 m
3. Cut in Speed: 3 m/s
4. Rated Speed: 12 m/s
5. Cut out speed: 25 m/s
6. Survival Speed: 67 m/s

Rotor:

1. Blade: 3 Blade Horizontal Axis
2. Swept Area: 3217 m^2
3. Rotational Speed: 13.9 to 20.8 rpm
4. Regulation: Pitch Regulated

Generator:

1. Type: Asynchronous 4 / 6 Poles
2. Rated Output: 250 / 1250 kW
3. Rotational Speed: 1006 / 1506 rpm
4. Frequency: 50 Hz

Gear Box:

1. Type: Integrated (1 Planetary & 2 Helical)
2. Ratio: 74.971:1

Yaw System:

1. Drive: 4 electrically driven planetary gearbox
2. Bearings: Polyamide slide bearings

Braking System:

1. Aerodynamic Brake: 3 independent systems with blade pitching
2. Mechanical Brake: Hydraulic fail safe disc braking system

Control Unit:

1. Type: Programmable microprocessor based; high speed data communication, active multilevel security, sophisticated operating software, advance data collection remote monitoring & control option, UPS backup, Real time operating indication.

Figure 5: Technical description of technology used

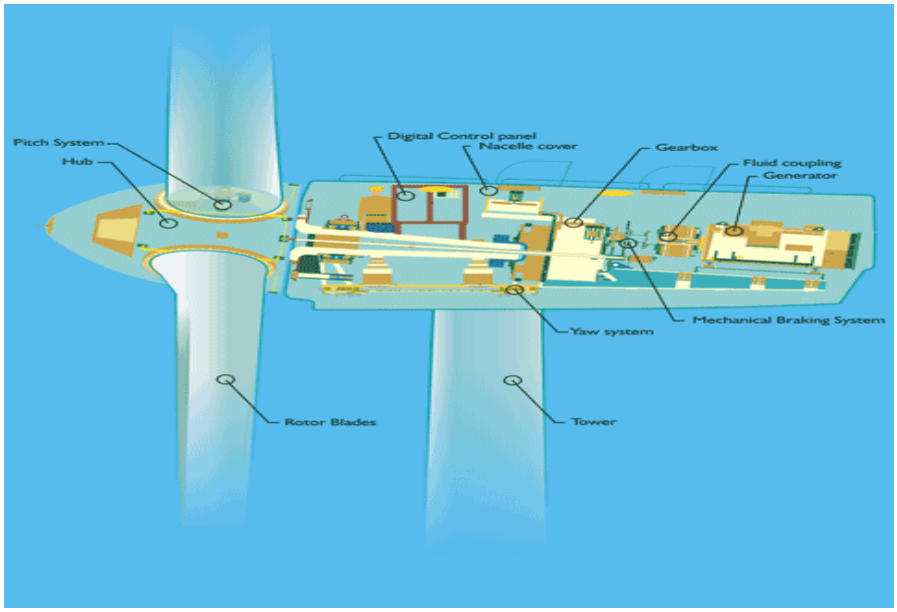
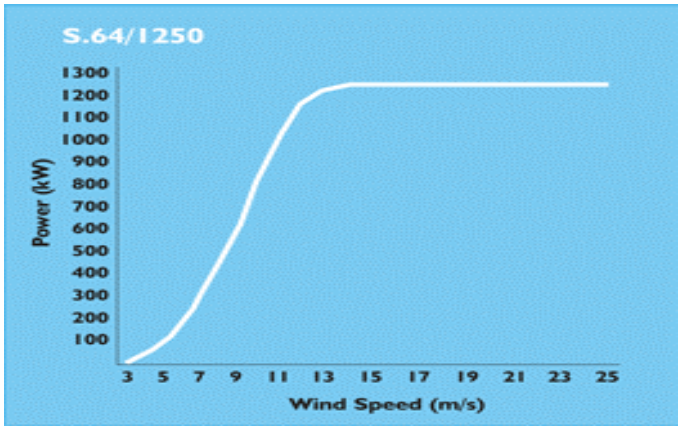


Figure 6: Power Curve



All the turbines installed in the wind farm are technologically advanced and latest of their kind with higher efficiency and suitability.

Technology transfer
There is no technology transfer involved in the project activity.

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

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Table 4: Estimated amount of Emission Reductions

Years	Annual Estimation of Emission Reduction in tonnes of CO_2e
01/02/2005 – 31/01/2006	34674
01/02/2006 – 31/01/2007	34674
01/02/2007 – 31/01/2008	34674
01/02/2008 – 31/01/2009	34674
01/02/2009 – 31/01/2010	34674
01/02/2010 – 31/01/2011	34674
01/02/2011 – 31/01/2012	34674
01/02/2012– 31/01/2013	34674
01/02/2013– 31/01/2014	34674
01/02/2014– 31/01/2015	34674
Total estimated reductions (tonnes of CO_2e)	346740
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO2 e)	34674

A.4.5. Public funding of the project activity:

>> There is no public funding involved in the 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 project activity uses the approved consolidated baseline methodology ACM0002 – Version 06 (19th May, 2006), Sectoral scope: 1.

Baseline Methodology - "Consolidated Baseline Methodology for grid connected electricity generation from renewable sources"
Monitoring Methodology – "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources"
It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM website (http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html).

The additionality of the project has been justified using the UNFCCC approved, "Tool for the demonstration and assessment of additionality" version 02, 28th November 2005.

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

>> Grid connected electricity generation from renewable source has been considered as the project activity because:

- The project activity involves generation of electricity from a renewable source i.e. wind.
- The generated electricity is connected to the grid as the electricity generated from the WEGs is wheeled through the grid.
- The geographic and system boundaries for the relevant grid (Southern) can be clearly defined and information on the characteristics of the grid are also available.
- The project activity does not involve switching from fossil fuels to renewable energy at the site of the project activity.

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

>> The project boundary is defined as the notional margin around a project within which the project's impact (in terms of GHG reduction) will be assessed. According to ACM0002 the spatial extent of this project activity includes the project site and all the power plants connected physically to the electricity system that the CDM power project is connected to. This project supplies electricity to the southern regional grid and hence the project boundary encompasses the WEG installations and all the power plants feeding into the Southern Regional Grid.

Table 5: Main Emission Sources

	Source	Gas		Justification / Explanation
Baseline	Grid electricity generation	CO_2	Included	Main emission source
		CH4	Excluded	Excluded for simplification. This is conservative.
		N2O	Excluded	Excluded for simplification. This is conservative.
Project	On-site fossil fuel consumption due to	CO_2	Excluded	This source is not required to be estimated under ACM0002 for wind energy projects.

	the implementation of the project	CH4	Excluded	Estimates not required
		N2O	Excluded	Estimates not required

There are three choices available for choosing the grid system for the project activity, viz. national grid, regional grid or state grid. In India, electricity is a concurrent subject between the State and the Central Governments. The perspective planning, monitoring of implementation of power projects is the responsibility of Ministry of Power, Government of India. At the state level the state utilities or State Electricity Boards (SEBs) are responsible for generation, transmission, and distribution of power. With power sector reforms there have been unbundling and privatisation of this sector in many states. Many of the state utilities are engaged in power generation also. In addition, there are different central / public sector organizations involved in generation like National Thermal Power Corporation (NTPC), National Hydro Power Corporation (NHPC), etc. in transmission e.g. Power Grid Corporation of India Ltd. (PGCIL) and in financing e.g. Power Finance Corporation Ltd. (PFC).

Description of the project boundary:
There are five regional grids: Northern, Western, Southern, Eastern and North-Eastern. Different states are connected to one of the five regional grids as shown in the Table below:-

Table 6: States connected to different regional grids

Regional grid	***Northern***	***Western***	***Southern***	***Eastern***	***North Eastern***
States	Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttar Pradesh, Uttaranchal, Delhi	Gujarat, Madhya Pradesh, Maharashtra, Goa, Chattisgarh	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu,	Bihar, Orissa, West Bengal, Jharkhand	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura

The management of generation and supply of power within the state and regional grid is undertaken by the state load dispatch centres (SLDC) and regional load dispatch centres (RLDC). Different states within the regional grids meet the demand from their own generation facilities plus generation by power plants owned by the central sector i.e. NTPC and NHPC etc. Specific quota is allocated to different states from the Central sector power plants. Depending on the demand and generation there are exports and imports of power within different states in the regional grid. Thus there is an exchange of power among states in the regional grid. Similarly there exists imports and export of power between regional grids.

The proposed project falls under the Southern Grid in the state of Tamil Nadu, which is currently facing huge Demand Supply deficit. Since the CDM project would be supplying electricity to the Southern regional grid this regional grid has been taken as project boundary.

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

>> Identification of Baseline Scenario

The project category is renewable electricity generation for a grid system, which is also fed by both fossil fuel fired generating plants (using fossil fuels such as coal, natural gas, diesel, naphtha etc.) and non-fossil fuel based generating plants (such as hydro, nuclear, biomass and wind). According to ACM0002, for project activities that do not modify or retrofit an existing electricity generation facility, in the absence of the CDM project activity, the electricity that is being delivered to the grid by the CDM project would have been generated by the operation of grid-connected power plants and by the additions of new generation sources, as reflected in the combined margin calculations.

Baseline Scenario
The baseline scenario as explained above is that the electricity supplied by the CDM project activity would have been supplied by the operation of the power plants connected to the grid and by addition of new generation sources. These generation sources will be depicted in OM and BM calculations as part of the combined margin method for calculation of the baseline emission factor. The calculation of the baseline emission factor using the combined margin methodology has been detailed in Section B.6.

Grid System for the project activity
The Southern Region of India comprises of four states and one Union Territory (UT) namely Tamil Nadu, Kerala, Karnataka, Andhra Pradesh and Pondicherry (UT). Pondicherry has only one combined cycle gas power generating station (32.50 MW) and hence receives power from the states in the Southern Region, through allocations and also imports power from Western and Eastern Regions[1].

The total installed capacity in the southern regional grid, to which the proposed project would be feeding electricity, is 31730.95MW as on March 31, 2005[2]. The major source of power generation in the grid is thermal which constitutes approximately 55.32% of the total installed capacity. The installed capacity in MW of thermal, hydro, nuclear, wind and renewable energy sources (RES) in the southern grid as on March 31, 2005 was 17552.22, 13892.5, 830, 2056.7 and 619.79 respectively. The total energy generated during the year 2004-2005 was 145395 MU[3].

The power sector in India including the southern region is driven by thermal power stations (as shown by the figures above). A list of future capacity additions based on the energy demand has been planned by Central Electricity Authority (CEA) and these plans are revised from time to time based on demand projections. Detailed projections are available for the tenth plan period, i.e. 2003 till 2007. To bridge India's power shortages of 13-15% and average shortages of 8-10%, in the business as usual scenario, nearly 100,000 MW of fresh capacity addition would be required by 2012, more than 75%of which is likely to be coal based[4].

The proposed project activity evacuates approximately 37.2 Million Units of clean electricity per year using wind turbines. Taking into account energy shortages and current trend of investment in fossil fuel based energy generation in the region, in absence of the candidate project activity, an equivalent amount of electricity would have been generated using fossil fuel based power plants. Thus the generation from the candidate project activity displaces the energy generated using fossil fuel fired power plant and leads to an emission reduction of 34674 tCO_2e annually over the ten-year crediting period.

[1] Source: Southern Regional Electricity Board Annual Report/ 2002-2003
[2] http://cea.nic.in/exe_summ/ march/6.pdf
[3] http://cea.nic.in/exe_summ/march /20.pdf
[4] Power on Demand by 2012: Perspective Plan Studies, CEA, GOI

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):

>> A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered project activity. According to the selected methodology ACM0002, the project developer is required to establish that the GHG emission reductions due to the project activity are additional to those that would have occurred in the absence of the current project activity as per the "tool for the demonstration and assessment of additionality" (Version 02, 28th November 2005)

Step 0 – Preliminary screening based on the starting date of the project activity		
a) Provide evidence that the starting date of the CDM project activity falls between 1 January 2000 and the date of the registration of a first CDM project activity, bearing in mind that only CDM project activities submitted for registration before 31 December 2005 may claim for a crediting period starting before the date of registration;	The project activity started its operations in 29th March 2001 (Bogampatti WEGs), which falls between 1st Jan 2000 and the date of the registration of the first CDM project activity. Documentary evidence of the same is available and has been provided to DOE during validation. Further the project was submitted for validation prior to 31st December 2005 and hence is claiming retroactive credits.	Ok
b) Provide evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.	The company was aware that electricity generation from wind energy carries some inherent risks and considered the possible additional revenue through CDM prior to the implementation of the projects / investment in the project, and the same is clearly mentioned in the minutes of board meetings of all the three group companies.	Ok
Step 1. Identification of alternatives to the project activity consistent with current laws and regulations Define realistic and credible alternatives to the project activity(s) that can be (part of) the baseline scenario through the following sub-steps:		
Sub-step 1a. Define alternatives to the project activity:	The following alternatives were available to the project proponents: 1. Continuing with the available grid connection and meeting the electrical demand through existing grid. 2. Installation of captive thermal unit within the industrial premises for meeting the electrical demand 3. Investing in wind energy, but not as a CDM	All the alternatives available to the project proponent will provide the same end product (electricity) and they are permitted under the prevailing laws of India

	project activity.	
Sub-step 1b. Enforcement of applicable laws and regulations:	1. Usage of grid electricity – Permitted 2. Fossil fuel based captive electricity generation - Permitted 3. Renewable energy based installation – Permitted	All the available options were open for the project proponents, and none of them are mandatory according to the State or Union Government of India.
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 *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).*	The project generates financial benefits other than CDM revenue also (in terms of HT tariff avoided due to use of electricity generated from windmills) therefore option I cannot be used. Hence, a benchmark analysis (Option III) is being used.	
Sub-step 2b – Option III. Apply benchmark analysis	The central electricity regulatory commission (CERC) has fixed the tariff for the power sold to electricity board by IPPs on the basis of 16% post-tax Return on Equity[5]. Hence, 16% post tax return on equity (or equity IRR) is used as a benchmark for projects in public or private sector. (Source: Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2004 dated 26th March 2004).	
Sub-step 2c. Calculation and comparison of financial indicators (only applicable to options II and III):	Prior to investment in the project the proponents carried out an analysis of the project based on the minimum prevailing PLF in Tamilnadu. The proponents considered a PLF of 21.5% as the minimum prevailing PLF in Tamil Nadu at the time of	

[5] Reference: Central Electricity Regulatory Commission, petition no 67/2003, order hearing dated 12.11.2003, in matter of determination of terms and conditions of tariff.

<table>
<tr>
<td></td>
<td>investment. This data can be cross checked by TNERC data on annual electricity generation from the wind mills in TamilNadu which shows that the minimum achievable PLF in the state is approximately 21.22%. The financial analysis using a 21.5% PLF yielded the following results for the project:
Post tax Equity IRR without CDM = 12.42%
Post tax Equity IRR with CDM = 15.09%
Further, the proponents also carried out a sensitivity analysis, with electricity generation as the variable parameter. The results of the sensitivity analysis are as follows:
<table>
<tr><th>Increase in electricity generation</th><th>Equity IRR</th></tr>
<tr><td>0% (21.5 PLF)</td><td>12.42</td></tr>
<tr><td>1%</td><td>12.83</td></tr>
<tr><td>2%</td><td>13.23</td></tr>
<tr><td>3%</td><td>13.64</td></tr>
<tr><td>4%</td><td>14.05</td></tr>
<tr><td>5%</td><td>14.46</td></tr>
<tr><td>6%</td><td>14.87</td></tr>
<tr><td>7%</td><td>15.28</td></tr>
<tr><td>8%</td><td>15.69</td></tr>
<tr><td>9%</td><td>16.10</td></tr>
</table>
The sensitivity analysis clearly indicates that, the equity IRR remains below the benchmark of IRR even with an 8% increase in electricity generation. The proponents hence considered CDM revenue as an extra income stream to increase the financial attractiveness of the project.
A detailed IRR calculation spreadsheet including all the assumptions taken for the analysis has been provided as Appendix 1 to this document.

Further to this a financial analysis was also carried out using actual</td>
<td>The analysis shows that the actual equity IRR for the project is in line with what was estimated during the time of investment.</td>
</tr>
</table>

<table>
<tr><td></td><td>was also carried out using actual data on project performance for the years 2001-02 to 2005-06. The post-tax equity IRR using actual values, is 12.36% without CDM revenue and 14.95% with CDM revenue.</td><td>The equity IRR in both cases is less than the benchmark of 16% and hence the CDM project is not financially attractive. The additional CDM revenue will help mitigate some of the risks to the project and increase the financial attractiveness of the project.</td></tr>
<tr><td>Sub-step 2d. Sensitivity analysis (only applicable to options II and III)</td><td>A sensitivity analysis was also carried out for the equity IRR (based on actual data) of the project for an increase or decrease in electricity generation from the project and the following were the results of the analysis:

<table><tr><th>Electricity generation</th><th>Equity IRR</th></tr><tr><td>+ 5%</td><td>13.64%</td></tr><tr><td>+ 10%</td><td>14.85%</td></tr><tr><td>- 5%</td><td>11.01%</td></tr><tr><td>-10%</td><td>9.56%</td></tr></table>
The analysis shows that even with a 10% increase in generation the IRR is still less than the benchmark IRR.</td><td>The sensitivity analysis shows that the project is financially unattractive without CDM revenue and is robust to reasonable variations in the critical assumption and the CDM revenue could help mitigate some of the barriers to the project activity and help sustain the project activity.</td></tr>
<tr><td colspan="3">Step 3: Barrier Analysis</td></tr>
<tr><td>Sub-step 3a: Identify the barriers that would prevent the implementation of type of the proposed project activity</td><td colspan="2">The WEG installations have a lower PLF as compared to conventional generation methods (Hydro, Thermal etc), and the per MW installation cost is comparable/higher as compared to the conventional generation methods. Additionally the electricity policy of the state of Tamil Nadu has brought in significant changes for captive use from wind installations which have brought in additional risks for the investors. It has been observed that private investment in a sector is greatly affected by the governing public policy; a non-conducive, stagnant policy in the state brought the investments at a standstill in the state for five consecutive years (1997 – 2002). The policy status therefore needs attention while arguing about the additionality of the project, the same is briefly indicated below:

January 1993 – May 1994:</td></tr>
</table>

	The captive investors were permitted to wheel the electricity by paying 2% wheeling charges and at 2% of energy banked with the power utility. The wind energy generated every month can be wheeled and consumed within three successive billing months.	(Source: Clause (x) and (xi), Page 3, (Permanent) B.P. (Ch) No.4 dated 6.1.1993)
	May 1994 – December 1995: For captive same as the previous policy, whereas for promotion sale to EB investors, the procurement price was improved from INR 1.25 /kWh to INR 2.00 /kWh	(Source: Para (2), Page 1, Permanent B.P. (FB) No. 127 dated 6.5.1994)
	December 1995 – April 2000: For captive same as the previous policy, whereas for promotion sale to EB investors, the procurement price was further improved INR 2.00 /kWh to INR 2.25 /kWh	(Source: Para 2-3, Page 1, (Permanent) B.P. (FB) No. 450 dated 26.12.1995).
	April 2000 – March 2001: For captive same as the previous policy, whereas for promotion sale to EB investors, the procurement price was further improved INR 2.25 /kWh to INR 2.70 /kWh	(Source: Para (1)- (10), Page 2-3, (Permanent) B.P. (FB) No.63 dated 12.4.2000).
	March 2001- September 2001: For captive same as the previous policy, whereas for sale to EB investors, the procurement price was reduced from INR 2.70 /kWh to INR 2.25 /kWh	(Source: Clauses (i)-(vi), Page 2-3, Permanent B.P. (FB) No. 26 dated 3.3.2001)
	September 2001- March 2002: Steep increase (by 150%) in the wheeling charges from 2% to 5%, whereas the banking charges were kept as per the previous policy.	(Source: Clauses (i) - (viii), Page 2-3, Permanent B.P. (FB) No. 99 dated 27.9.2001)
	March 2002- Onwards: The banking charges were also raised to 5%. Thus the investors with captive installations have to shell out 10% of the generated energy and	(Source: Clauses (i)- (ii), Page 1-2, Permanent B.P. (FB). No. 20 dated

	only 90% of the energy was available for consumption.	1.3.2002).
Sub-step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):	The main barriers have been identified in Sub-step 3 a. The available alternatives to the project proponents as presented in Sub-step 1a are: 1. Continuing with the available grid connection and meeting the electrical demand through existing grid. 2. Investing in wind energy, but not as a CDM project activity. 3. Installation of captive thermal unit within the industrial premises for meeting the electrical demand. The TUF (Technology Up gradation Fund) is available for captive installations for power generation in Tamil Nadu. *Under this TUF scheme an interest subsidy is available for upgrading technologies including setting up Captive Power Plants.* (http://www.txcindia.com/html/about_TUFS.htm). The aforesaid scheme is available for textile & jute industries from April 1, 1999 until the end of the 10th Five-Year Plan i.e. March 31, 2007. Under TUF scheme, the project proponent could have invested in captive thermal installation within its industrial premises and would have benefited in following manner: • Saving in wheeling and banking charges and avoiding dealing with state electricity utility for the complete project life. • Saving on connected load charges (fixed charges) • Saving on capital expenditure, because the PLF of a thermal installation is higher than wind installations • Firm availability of power	None of the barriers is applicable if the project proponent draws electricity from grid. Additionally, the project proponent would have benefited because the requirement of dealing with state electricity utility would have been reduced to paying the bills against electricity drawn from the grid. Captive installations for generation of electricity through any of the available means were allowed for availing TUF benefits. A captive thermal installation would not have been affected by the barriers mentioned in Step 3 a. Moreover, the proponents would have enjoyed certain benefits if they had invested in a thermal installation.
Step 4. Common practice analysis		

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

The table below gives the captive installations carried out in the state of Tamilnadu until the year 1999-2000. The data clearly indicates that the state witnessed more than 1000 MW of captive installations, whereas investment in renewable energy technologies was minimal (hydro – nil).

State	**Captive Capacity (MW)**	**Fuel-wise breakup of installed capacity in different states**			
		Steam	**Diesel**	**Gas / Naphtha**	**Hydro**
Andhra Pradesh	1241	622	572	45	2
Gujarat	1851	519	256	1076	0
Karnataka	1258	552	696	0	10
Madhya Pradesh	1495	804	680	11	0
Maharashtra	707	105	272	330	0
Tamilnadu	**1217**	**209**	**1008**	**0**	**0**
West Bengal	803	361	421	21	0
Total	**13483**	**6256**	**5280**	**1923**	**24**

Source: www.infraline.com

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

The wind energy penetration trend of Tamil Nadu is detailed below:

Year	Annual Installation MW	Remarks
Till 1992	22.3	Starting of implementation of WEG
1992- 1993	11.1	The market picked up with an assumption that the installation of WEGs can be viable without any external support
1993 –1994	50.5	
1994 – 1995	190.9	
1995 – 1996	281.7	
1996 – 1997	119.8	The installation / market penetration declined after actual performance of the installed WEGs have shown critical reductions in cash flows and financials.
1997 – 1998	31.1	
1998 – 1999	17.8	
1999 – 2000	45.6	
2000 – 2001	41.9	

Source: Indian Wind Power Director (Edition 5, 2005) Article 5.2

Here it can be clearly seen that from 1999 till 2002, the market penetration of wind electricity generation was almost stagnant, whereas the TUF benefit was still available to the project proponents. In fact, the annual installations had reduced considerably in this period as compared to the earlier years. It is during this **lean period** that K.P.R Mills took the decision to invest in the WEGs. The proponent decided to invest in the project keeping in mind the expected ratification of Kyoto Protocol by India that added to the possibility of mitigating the associated risks with RE technologies through additional benefits.

From the above, it can be inferred that the project activity at the time of investment, was not a common practice in India.

Step 5. Impact of CDM registration

The project registration will result in following impacts

	1. More investment in wind / other renewable energy technologies.	At present, the captive investors are investing in wind keeping in mind that any excess generation would lapse if not consumed within the banking period. Thus the net generation from wind is always less than the demand of the industrial investor. This practice is followed to minimize the loss of revenue in case of over generation. The investors might decide to invest in further generation from wind turbines, because CDM revenue available to the investors will assist in taking additional risk.
	2. Help mitigate risks	The revenue will help mitigate the risks associated with wind farm activity, which is essentially the investment risk (lower than benchmark IRR for the project), regulatory risk (wheeling and banking charges and its

		variation during the life of the project) and the generation risk (controlled by nature).

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Calculation of Emission Reductions

The emission reductions by the project activity during a given year y is the difference between Baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y).

$ERy = BE_y – PE_y – L_y$

- Project Emissions by sources of GHGs due to the project activity within the project boundary are zero since wind power is a GHG emission free source of energy as per ACM0002.
- Leakage calculations are not required as per ACM0002.

Total project activity emissions, including leakage are zero for the project activity.

Therefore, Net anthropogenic emission reductions due to the proposed project are equal to the baseline emissions on a yearly basis.

According to ACM0002 the baseline emissions is calculated as the kWh produced by the renewable generating unit multiplied by an emission factor (measured in kgCO2/kWh) calculated in a transparent and conservative manner.

$$\mathbf{BE_y = EG_y * EF_y}$$

Where
BE_y = Baseline emissions in year *y* (tCO_2).
EG_y = Electricity generation by the project in year *y* (MWh).
EF_y = Combined margin emissions factor (Baseline emission factor) for the year *y* (tCO_2/MWh).

Calculation of Baseline Emission Factor

The baseline emission factor EF_y is calculated as a combined margin consisting of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

$$\mathbf{EF_y = w_{OM}\, EF_{OM,y} + w_{BM}\, .EF_{BM,y}}$$

Where the weights w_{OM} and w_{BM} are 75% and 25% respectively, and $EF_{OM,y}$ and $EF_{BM,y}$ are calculated and are expressed in tCO_2/MWh.

For wind and solar projects, the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature).

Calculation of the Operating Margin emission factor ($EF_{OM,y}$)

According to ACM0002, Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors. ACM0002 also provides four

options for calculating the operating margin, and guidance for how to choose which options for the corresponding project activity. The options are:

a) Simple OM, or
b) Simple adjusted OM, or
c) Dispatch Data Analysis OM, or
d) Average OM.

The methodology (ACM0002) relies on Dispatch data analysis as its first methodological choice, this method is based on the data on the amount of power (MWh) that is dispatched from all plants in the system during each hour that the project activity is operating. This however is not possible due to lack of availability of this activity data to the project developers.

The choice of other options for calculating the operating margin emission factor depend on the generation of electricity from low cost/must run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

Share of Low Cost / Must-Run (% of Net Generation)

Share of Must-Run (% of Net Generation)					
	2000-01	**2001-02**	**2002-03**	**2003-04**	**2004-05**
North	25.9%	25.7%	26.1%	28.1%	26.8%
East	10.8%	13.4%	7.5%	10.3%	10.5%
South	28.1%	25.5%	18.3%	16.2%	21.6%
West	8.2%	8.5%	8.2%	9.1%	8.8%
North-East	42.3%	42.1%	45.8%	41.8%	55.4%
India	19.2%	18.9%	16.3%	17.1%	18.0%

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

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of five most recent years) for the southern regional grid is less than 50 % of the total generation.

Thus the average emission rate method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation. Also detailed data to apply Simple adjusted OM is not available.

Hence, the **Simple Operating Margin** can be used for the proposed project activity because low-cost/must run resources constitute less than 50% of total generation.

The operating margin emission factor has been calculated (*ex-ante*) using the full generation-weighted average for the most recent 3 years for which data are available at the time of PDD submission.
The OM is calculated using 3 year data calculated by Central Electricity Authority (CEA) in their CO_2 baseline database.

Calculation of the Build Margin Emission Factor $EF_{BM,Y}$
The Build margin emission factor has been calculated *ex-ante* based on the most recent information available on plants already built for sample group *m* at the time of PDD submission. The sample group *m* consists of the power plant capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently as this sample group comprises larger annual

generation than the generation of the sample group *m* consisting of the five power plants that have been built most recently.
The value for BM is taken from Central Electricity Authority (CEA) CO_2 baseline database.

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

a) EGy

Data / Parameter:	EG_y
Data unit:	kWh / MWh
Description:	Net electricity supplied to the grid by the project
Source of data to be used:	JMR Sheets/measurement records of the EPC contractor.
Value Applied:	37.2 Million units (1 unit = 1 kWh)
Justification of the choice of data or description of measurement methods and procedures actually applied :	- Electricity measured is used in calculation of emission reductions. - The electricity is measured with the help of electronic meters both by the operator and the grid representative. - The data is measured hourly and recorded monthly - 100% of the data is monitored - The data will be archived electronically
Any comment:	

b) EFy

Data / Parameter:	EF_y
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of the grid
Source of data to be used:	CEA : 'The CO2 Baseline Database for the Indian Power Sector' Version 1.1, 21st December 2006
Value Applied:	0.9321
Justification of the choice of data or description of measurement methods and procedures actually applied :	- Emission factor is used in the calculation of baseline emissions. - The emission factor is calculated. - This is calculated ex ante at the time of PDD submission.
Any comment:	Calculated as a combination of the OM and BM emission factors as indicated in ACM002.

c) $EF_{OM,y}$

Data / Parameter:	$EF_{OM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 Operating margin emission factor of the grid
Source of data to be used:	CEA : 'The CO2 Baseline Database for the Indian Power Sector' Version 1.1, 21st December 2006
Value Applied:	1.00349

Justification of the choice of data or description of measurement methods and procedures actually applied :	- Emission factor is used in the calculation of baseline emissions. - The emission factor is calculated. - This is calculated ex ante at the time of PDD submission.
Any comment:	Calculated as indicated in ACM0002

d) $EF_{BM,y}$

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 Build margin emission factor of the grid
Source of data to be used:	CEA : 'The CO2 Baseline Database for the Indian Power Sector' Version 1.1, 21st December 2006
Value Applied:	0.71799
Justification of the choice of data or description of measurement methods and procedures actually applied :	- Emission factor is used in the calculation of baseline emissions. - The emission factor is calculated. - This is calculated ex ante at the time of PDD submission.
Any comment:	Calculated as indicated in ACM0002.

e) CEA Baseline database

Data / Parameter:	CEA Baseline database
Data unit:	-
Description:	Database prepared by CEA for calculation of Baseline Emission factor for different grids of India
Source of data to be used:	CEA : 'The CO2 Baseline Database for the Indian Power Sector' Version 1.1, 21st December 2006
Value Applied:	-
Justification of the choice of data or description of measurement methods and procedures actually applied :	- The database details all the formulae, equations and other data used for its calculation of the baseline emission factor. - The database consist of details of data on electricity generation, fuel emission factors, power plants considered for OM and BM, etc. - This emission factor has been calculated by CEA as per methods given in the UNFCCC approved methodology ACM0002.
Any comment:	The database is available in public domain at http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

B.6.3 Ex-ante calculation of emission reductions:

>> The emission reductions from the project activity are calculated in the following steps:

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

According to ACM0002, Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin (OM) and build margin (BM) factors.
The operating margin emission factor has been calculated using 3 year data calculated by Central Electricity Authority (CEA) in their CO_2 baseline database.
The $EF_{OM,Y}$ is estimated to be:
For the year 2002-2003 the $EF_{OM,Y}$ is 0.9975tCO_2/MWh
For the year 2003-2004 the $EF_{OM,Y}$ is 1.0094tCO_2/MWh
For the year 2004-2005 the $EF_{OM,Y}$ is 1.0035 tCO_2/MWh

Thus the final $EF_{OM,Y}$ based on three years average is estimated to be **1.00349 tCO_2/MWh**.

Step 2: Calculation of the Build Margin Emission Factor $EF_{BM,Y}$

The $EF_{BM,y}$ is estimated as **0. 71799 tCO_2/MWh** (with sample group m constituting most recent capacity additions to the grid comprising 20% of the system generation) for the year 2004-05, as given by CEA.

Step 3:.Calculation of Baseline Emission Factor EF_y

Calculate the baseline emission factor EF_y as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

$$\mathbf{EF_y = w_{OM}\, EF_{OM,y} + w_{BM}\, .EF_{BM,y}}$$

Where the weights w_{OM} and w_{BM} are 75% and 25% respectively, and $EF_{OM,y}$ and $EF_{BM,y}$ are calculated as described in Steps 1 and 2 above and are expressed in tCO_2/MWh.

For wind and solar projects, the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature).

The Baseline Emission factor EF_y is estimated as **0.9321 tCO_2/MWh.**

Step 4: Calculation of Baseline Emissions (BE_y)
According to ACM0002 the baseline emissions is calculated as the kWh produced by the renewable generating unit multiplied by an emission factor (measured in kgCO2/kWh) calculated in a transparent and conservative manner.

$$\mathbf{BE_y = EG_y * EF_y}$$

Where
BE_y = Baseline emissions in year y (tCO_2).
EG_y = Electricity generation by the project in year y (MWh).
EF_y = Combined margin emissions factor (Baseline emission factor) for the year y (tCO_2/MWh).

Baseline Emissions = 34674 tCO2e/yr

Step5: Calculation of Emission Reductions (ER_y)
The emission reductions by the project activity during a given year y is the difference between Baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (L_y).

$ERy = BE_y – PE_y – L_y$

- Project Emissions by sources of GHGs due to the project activity within the project boundary are zero since wind power is a GHG emission free source of energy as per ACM002.
- Leakage calculations are not required as per ACM0002.

Total project activity emissions, including leakage are zero for the project activity.

Therefore, Net anthropogenic emission reductions due to the proposed project are equal to the baseline emissions on a yearly basis. The project activity will evacuate approximately 37.2 Million units of renewable power annually to the power deficit Southern Region Grid and the annual emissions reductions are equal to 34674 tCO2.

Details of Baseline data:
Data of Operating and Build Margin for the three financial years from 2002-03 to 2004-05 has been obtained from -
'The CO2 Baseline Database for the Indian Power Sector'
Ministry of Power: Central Electricity Authority (CEA)
Version 1.1
Dated: 21st December 2006
This database is prepared as per ACM0002 version 6 and details all the equations and data used for calculation of the baseline emission factor.
Key baseline information is furnished in Annex 3.

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

>>
Table 7: Emission Reductions

Year	Estimation of baseline emission reductions (tonnes of CO_2e)	Estimation of project activity emissions (tonnes of CO_2e)	Estimation of Leakage (tonnes of CO_2e)	Estimation of emission reductions (tonnes of CO_2e)
01/02/2005 – 31/01/2006	34674	0	0	34674
01/02/2006 – 31/01/2007	34674	0	0	34674
01/02/2007 – 31/01/2008	34674	0	0	34674
01/02/2008 – 31/01/2009	34674	0	0	34674
01/02/2009 – 31/01/2010	34674	0	0	34674
01/02/2010 – 31/01/2011	34674	0	0	34674
01/02/2011 – 31/01/2012	34674	0	0	34674
01/02/2012– 31/01/2013	34674	0	0	34674

01/02/2013– 31/01/2014	34674	0	0	34674
01/02/2014– 31/01/2015	34674	0	0	34674
Total (tonnes of CO_2e)	346740	0	0	346740

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

B.7.1 Data and parameters monitored:

According to ACM0002, for this project the only parameter that needs to be monitored is the electricity generation. The baseline emission factor is calculated ex ante hence needs no monitoring in the further years.

a) EGy

Data / Parameter:	EG_y
Data unit:	MWh/kWh
Description:	Net electricity supplied to the grid by the project
Source of data to be used:	JMR Sheets/measurement records of the EPC contractor.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	37.2 Million units
Description of measurement methods and procedures to be applied:	- The electricity is measured with the help of electronic meters both by the operator and the grid representative. - The data is measured hourly and recorded monthly - 100% of the data is monitored - The data will be archived electronically
QA/QC procedures to be applied:	The electricity meters record both export and import of electricity from the WEGs and the net electricity generated will be used for calculation of Emission reductions.
Any comment:	

B.7.2 Description of the monitoring plan:

>>

The investors have entered into Operation & Maintenance Agreement with the EPC contractors M/s Suzlon Windfarm Services Limited & Enercon India for carrying out the necessary maintenance of the installations during the designed life of the project. These respective agencies will be responsible for the operation and maintenance structure that will be implemented in order to monitor emission reductions generated by the project activity is as under:

1 Routine Maintenance Services

Routine Maintenance Labour Work involves making available suitable manpower for operation and maintenance of the Equipment and covers periodic preventive maintenance, cleaning and upkeep of the Equipment including -

a) Tower Torquing
b) Blade Cleaning
c) Nacelle Torquing and Cleaning
d) Transformer Oil Filtration
e) Control Panel & LT Panel Maintenance
f) Site and Transformer Yard Maintenance

2 Security Services

This service includes watch and ward and Security of the Wind Farm and the Equipment.

3 Management Services

a) Data logging in for power generation, grid availability, machine availability.
b) Preparation and submission of monthly performance report in agreed format.
c) Taking monthly meter reading jointly with SEB, of power generated at the Wind Farm and supplied to SEB Grid from the meter/s maintained by SEB for the purpose and co-ordinate to obtain necessary power credit report/ certificate.

4 Technical Services

a) Visual inspection of the WTG and all parts thereof.
b) Technical Assistance including checking of various technical, safety and operational parameters of the Equipment, trouble shooting and relevant technical services.

The responsibility of registration of the project has been assigned to

Mr. A. Sekar
KPR Mill Private Limited,
5, A.K.S. Nagar, Thadagam Road,
Coimbatore ,Tamil Nadu
641 001

Mr. A. Sekar, has been assigned overall supervision of the project performance including the following:

- Performance review of the WEG installations.
- Arranging for annual verification of the installations for issuance of CERs

The project activity essentially involves generation of electricity from wind, the employed WEGs convert wind energy into electrical energy and do not use any other input fuel for electricity generation. Thus no special ways and means are required to monitor leakage from the project activity.

Since the project activity does not involve any leakage and only measurement of generated electricity from wind farm installations will form the basis of annual GHG reduction by the project. The project management does not require any extensive training of personnel. The respective EPC contractors do the operation and maintenance of the installations and measurement of generated electricity is done by state electricity utility. The EPC contractors are ISO certified organizations and follow designated procedures

for the assigned tasks. One of the EPC contractors (Suzlon) has also implemented SAP3 for stringent management of project. The operation and maintenance structure for the project activity has been given in a flow chart in Annexure 6.

1. The proposed project activity requires evacuation facilities both for supply to the investors (for captive usage) and the evacuation facility is essentially maintained by the state power utility (TNEB).
2. The electricity generation measurements are required by the utility and the investors to assess electricity-wheeling charges.
3. The project activity has therefore envisaged two independent measurements of generated electricity from the wind turbines.
4. The primary recording of the electricity fed to the state utility grid will be carried out at the HT side of the step up transformer of the Transformer yard at each individual location.
5. The joint measurement will be carried out once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties will sign the recorded reading.
6. The secondary monitoring, which will provide a backup (fail-safe measure) in case the primary monitoring is not carried out, would be done at the individual WEGs. Each WEG is equipped with an integrated electronic meter. For the Suzlon windmills, these meters are connected to the Central Monitoring Station (CMS) of the entire wind farm through a wireless Radio Frequency (RF) network. The generation data of individual machine can be monitored as a real-time entity at CMS. The snapshot of generation on the last day of every calendar month will be kept as a record both in electronic as well as printed (paper) form.

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)

>>

Date of completion of the baseline study: 19/03/2007

Contact:

SenergyGlobal Private Limited (Not a Project Proponent)
9th Floor, Eros Corporate Tower,
Nehru Place
New Delhi – 110019
India
Tel: +91 11 4180 5501/02
Fax: +91 11 4180 5504

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:

>> 01/12/2000

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

>> 20 years 0 months

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:

>> A fixed crediting period is chosen hence this is not applicable.

C.2.1.2. Length of the first crediting period:

>> N/A

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>> 01/02/2005

C.2.2.2. Length:

>>10 years 0 months without renewal

SECTION D. Environmental impacts

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

>> As per the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated 14th September 2006, 8 Categories of project activities are required to undertake environmental impact assessment studies. The details of these activities are available at: http://envfor.nic.in/legis/eia/so1533.pdf

The proposed project doesn't fall under the list of activities requiring EIA as it will not involve any negative environmental impacts, as the WEGs installed for generation of power use wind (cleanest possible source of renewable energy), thus no EIA study was conducted.

Although an EIA is not required, the possible environmental impacts listed below were analysed:

- Energy generation and emission reduction
- Nature: presence of bird migration tracks, disturbance of breeding grounds (during construction and operation).
- Landscape: possible reflections, disturbance of the landscape
- Noise: acceptable noise levels for nearby living inhabitants, vulnerable nature areas, etc., by means of a global sound profile.
- Soil and water: possible emissions to soil and water, setting of the ground, hydrology
- Security/safety aspects
- Physical use of space of the wind farm, roads and transmission lines

The analysis concluded that there are no reasons and areas for concern. The wind park is located in a sparsely populated area with no vulnerable flora or fauna. The wind park results only in positive environmental impacts (lower emissions) and no negative impacts.

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:

>> The environmental impacts are not significant.

SECTION E. Stakeholders' comments

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

>> The land used for implementation of project was not used for agriculture or any other economic activities. The project promoter / their representatives have contacted the owners of the land for allotting the land for project development and detailed representations were made before the village elected governing councils for explaining the proposed usage of procured land. The agencies involved in the land acquisition also carried out meetings with the villagers (landowners and prominent people of villages) and apprised them about the proposed project activity.

The meetings were carried out with two motives

- Transparency in land acquisition price, so that all the stakeholders should get the same price for their land and open negotiations in front of prominent villagers can be carried out.
- If there are any issues related to end use of the land, the same may be resolved using the available public platform.

E.2. Summary of the comments received:

>> The villagers had no reservations towards selling of their land for implementation of wind turbines except the following

- The villagers should not be deprived of their right of way and boundary walls should not be constructed.
- Job opportunities, if available with proposed activity of electricity generation, should be open to villagers / local habitants.

Further, No Objection Certificates have been obtained from the villages certifying that the villagers along with the Gram Panchayat have no objection to the windmill installation in their village, and that the project activity has led to no significant negative impacts.

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

>> The demand submitted by villagers was agreed upon by the agencies involved and no boundary walls separating project site and village was made. Additionally job opportunities according to the requirement of operation and maintenance of the site and the qualifications of the local habitants were considered and considerable number of operation and maintenance staff was hired.

Abbreviations

CDM	Clean Development Mechanism
CEA	Central Electric Authority
CERC	Central Electricity Regulatory Commission
CMS	Central Monitoring System
EIA	Environment Impact Assessment
GHG	Greenhouse Gases
INR	Indian National Rupees
IPP	Independent Power Producer
MNES	Ministry of Non-Conventional Energy Sources
MoEF	Ministry of Environment & Forests
MoP	Ministry of Power
MW	Mega Watt
NHPC	National Hydro Power Corporation
NOC	No Objections Certificate
NTPC	National Thermal Power Corporation
O&M	Operations & Maintenance
PFC	Power Finance Corporation Ltd.
PGCIL	Power Grid Corporation of India Ltd.
RES	Renewable Energy Sources
RLDC	Regional Load Dispatch Centre
SERC	State Electricity Regulatory Commission
SLDC	State Load Dispatch Centre
TNEB	Tamil Nadu Electricity Board
TNERC	Tamil Nadu Electricity Regulatory Commission
WEG	Wind Electricity Generator

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	K.P.R MILL PRIVATE LIMITED
Street/P.O.Box:	5, A.K.S. NAGAR, THADAGAM ROAD,
Building:	--
City:	COIMBATORE
State/Region:	TAMIL NADU
Postfix/ZIP:	641 001
Country:	INDIA
Telephone:	0422 – 2479835 – 39 (5 LINES)
FAX:	0422 – 2470159
E-Mail:	kprsrt@eth.net
URL:	--
Represented by:	SEKAR
Title:	MR.
Salutation:	MR.
Last Name:	--
Middle Name:	--
First Name:	A.SEKAR
Department:	FINANCE
Mobile:	098423 04252
Direct FAX:	0422 – 2470159
Direct tel:	--
Personal E-Mail:	sekar@kprmill.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding involved in the project activity.

Annex 3

BASELINE INFORMATION

CENTRAL ELECTRICITY AUTHORITY: CO2 BASELINE DATABASE

VERSION	**1.1**
DATE	**21 Dec 2006**
BASELINE METHODOLOGY	**ACM0002 / Ver 06**

EMISSION FACTORS

Weighted Average Emission Rate (tCO2/MWh) (excl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.72	0.73	0.74	0.71	0.71
East	1.09	1.06	1.11	1.10	1.08
South	0.73	0.75	0.82	0.85	0.79
West	0.90	0.92	0.90	0.90	0.92
North-East	0.39	0.38	0.37	0.36	0.30
India	0.82	0.83	0.85	0.85	0.84

Weighted Average Emission Rate (tCO2/MWh) (incl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.72	0.73	0.74	0.71	0.72
East	1.09	1.03	1.09	1.08	1.05
South	0.74	0.75	0.82	0.85	0.79
West	0.90	0.92	0.90	0.90	0.92
North-East	0.39	0.38	0.37	0.36	0.46
India	0.82	0.83	0.85	0.85	0.84

Simple Operating Margin (tCO2/MWh) (excl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.98	0.98	1.00	0.99	0.97
East	1.22	1.22	1.20	1.23	1.20
South	1.02	1.00	1.00	1.01	1.00
West	0.98	1.01	0.98	0.99	1.01
North-East	0.67	0.66	0.68	0.62	0.66
India	1.02	1.02	1.02	1.03	1.03

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
East	1.22	1.19	1.17	1.20	1.17
South	1.03	1.00	1.00	1.01	1.00
West	0.98	1.01	0.98	0.99	1.01
North-East	0.67	0.66	0.68	0.62	0.81
India	1.01	1.02	1.01	1.02	1.02

Build Margin (tCO2/MWh) (excl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North					0.53

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

East	0.90
South	0.72
West	0.78
North-East	0.10
India	0.70

Combined Margin (tCO2/MWh) (excl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.76	0.76	0.77	0.76	0.75
East	1.06	1.06	1.05	1.07	1.05
South	0.87	0.86	0.86	0.86	0.86
West	0.88	0.89	0.88	0.88	0.90
North-East	0.39	0.38	0.39	0.36	0.38
India	0.86	0.86	0.86	0.86	0.86

Combined Margin in tCO2/MWh (incl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.76	0.76	0.77	0.76	0.75
East	1.06	1.05	1.04	1.05	1.04
South	0.87	0.86	0.86	0.86	0.86
West	0.88	0.89	0.88	0.88	0.89
North-East	0.39	0.38	0.39	0.36	0.45
India	0.86	0.86	0.86	0.86	0.86

GENERATION DATA

EMISSION DATA

Gross Generation Total (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	144,292	151,185	155,385	165,735	168,438
East	58,936	64,048	66,257	75,374	85,776
South	128,983	131,902	136,916	138,299	144,086
West	162,329	165,805	177,399	172,682	183,955
North-East	5,314	5,292	5,811	5,880	7,904
India	499,854	518,231	541,766	557,970	590,158

Absolute Emissions Total (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	97,863,848	102,743,113	106,777,065	109,980,786	112,199,697
East	58,025,890	61,436,757	66,595,529	75,515,998	83,956,860
South	88,728,956	92,484,478	104,180,940	108,406,007	105,960,087
West	135,147,507	141,597,621	148,313,340	144,127,175	157,781,065
North-East	2,009,681	1,976,535	2,090,087	2,088,985	2,294,430
India	381,775,882	400,238,503	427,956,961	440,118,951	462,192,140

Net Generation Total (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	135,230	141,415	144,741	155,043	157,290
East	53,350	58,097	59,841	68,428	77,968
South	121,144	123,612	127,780	128,165	134,691
West	150,412	153,125	164,448	159,780	170,726
North-East	5,185	5,169	5,669	5,758	7,776
India	465,321	481,417	502,480	517,174	548,451

Absolute Emissions OM (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	97,863,848	102,743,113	106,777,065	109,980,786	112,199,697
East	58,025,890	61,436,757	66,595,529	75,515,998	83,956,860
South	88,728,956	92,484,478	104,180,940	108,406,007	105,960,087
West	135,147,507	141,597,621	148,313,340	144,127,175	157,781,065
North-East	2,009,681	1,976,535	2,090,087	2,088,985	2,294,430
India	381,775,882	400,238,503	427,956,961	440,118,951	462,192,140

20% of Net Generation (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05

Absolute Emissions BM (tCO2)

	2000-01	2001-02	2002-03	2003-04	2004-05

North	27,046	28,283	28,948	31,009	31,458
East	10,670	11,619	11,968	13,686	15,594
South	24,229	24,722	25,556	25,633	26,938
West	30,082	30,625	32,890	31,956	34,145
North-East	1,037	1,034	1,134	1,152	1,555
India	93,064	96,283	100,496	103,435	109,690

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	25.9%	25.7%	26.1%	28.1%	26.8%
East	10.8%	13.4%	7.5%	10.3%	10.5%
South	28.1%	25.5%	18.3%	16.2%	21.6%
West	8.2%	8.5%	8.2%	9.1%	8.8%
North-East	42.3%	42.1%	45.8%	41.8%	55.4%
India	19.2%	18.9%	16.3%	17.1%	18.0%

Net Generation in Operating Margin (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	100,189	105,076	106,940	111,449	115,151
East	47,570	50,308	55,377	61,378	69,746
South	87,100	92,085	104,441	107,396	105,584
West	138,071	140,173	150,889	145,264	155,731
North-East	2,992	2,995	3,071	3,350	3,469
India	375,923	390,638	420,718	428,838	449,681

Net Generation in Build Margin (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North					32,067
East					15,818
South					27,195
West					34,587
North-East					2,052
India					111,718

20% of Gross Generation (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	28,858	30,237	31,077	33,147	33,688

North	17,108,583
East	14,303,611
South	19,525,581
West	26,881,491
North-East	206,514
India	78,025,780

IMPORT DATA

Net Imports (GWh) - Net exporting grids are set to zero

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0	0	0	0	3,616
East	489	555	357	1,689	0
South	1,162	1,357	518	0	0
West	321	0	797	962	285
North-East	0	0	0	0	2,099

Share of Net Imports (% of Net Generation)

	2000-01	2001-02	2002-03	2003-04	2004-05
North	0.0%	0.0%	0.0%	0.0%	2.3%
East	0.9%	1.0%	0.6%	2.5%	0.0%
South	1.0%	1.1%	0.4%	0.0%	0.0%
West	0.2%	0.0%	0.5%	0.6%	0.2%
North-East	0.0%	0.0%	0.0%	0.0%	27.0%

East	11,787	12,810	13,251	15,075	17,155
South	25,797	26,380	27,383	27,660	28,817
West	32,466	33,161	35,480	34,536	36,791
North-East	1,063	1,058	1,162	1,176	1,581
India	99,971	103,646	108,353	111,594	118,032

Gross Generation in Build Margin (GWh)

	2000-01	2001-02	2002-03	2003-04	2004-05
North					34,034
East					17,239
South					29,052
West					36,831
North-East					2,067
India					119,222

Annex 4

MONITORING INFORMATION

The project activity essentially involves generation of electricity from wind, the employed WEG can only convert wind energy into electrical energy and cannot use any other input fuel for electricity generation. Thus no special ways and means are required to monitor leakage from the project activity.

- The proposed project activity requires evacuation facilities both for supply to the investors (for captive usage) and the evacuation facility is essentially maintained by the state power utility (TNEB).
- The electricity generation measurements are required by the utility and the investors to assess electricity-wheeling charges.
- The project activity has therefore envisaged two independent measurements of generated electricity from the wind turbines.
- The primary recording of the electricity fed to the state utility grid will be carried out at the HT side of the step up transformer of the Transformer yard at each individual location.
- The joint measurement will be carried out once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties will sign the recorded reading.
- The secondary monitoring, which will provide a backup (fail-safe measure) in case the primary monitoring is not carried out, would be done at the individual WEGs. Each WEG is equipped with an integrated electronic meter. For the Suzlon windmills, these meters are connected to the Central Monitoring Station (CMS) of the entire wind farm through a wireless Radio Frequency (RF) network. The generation data of individual machine can be monitored as a real-time entity at CMS. The snapshot of generation on the last day of every calendar month will be kept as a record both in electronic as well as printed (paper) form.

Annex 5

TECHNICAL SPECIFICATIONS of WEGs

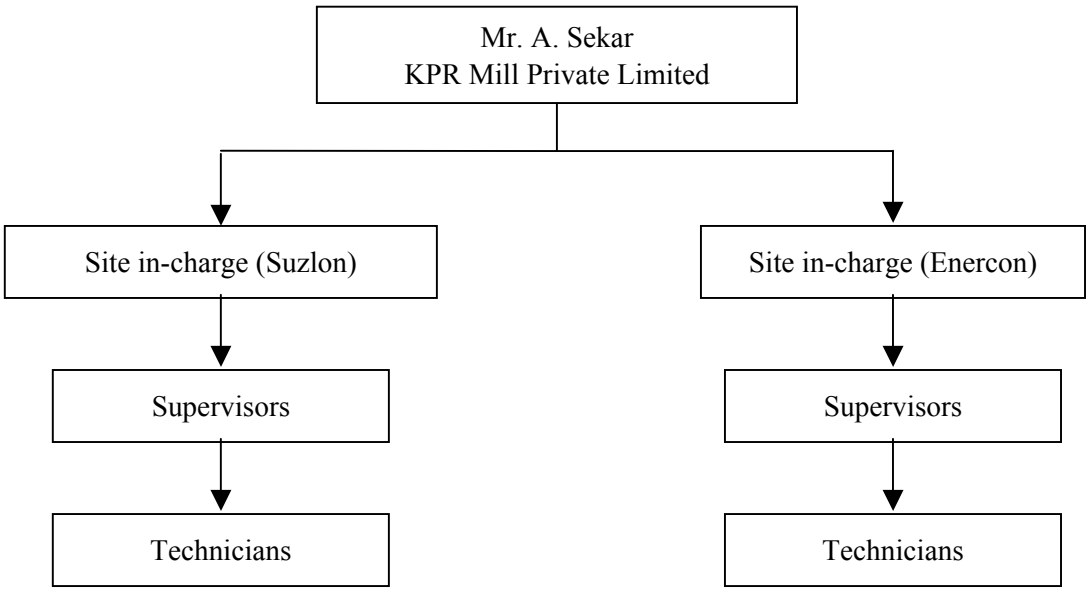
Technical Specifications of various models of SUZLON 1.25 MW WEG

Operating Data		**Models**			
	S.60/1250	**S.64/1250 (50 Hz)**	**S.64/1250 (60 Hz)**	**S.66/1250 (50 Hz)**	**S.66/1250 (60 Hz)**
Rotor diameter	60 m	64 m	64 m	66 m	66 m
Hub height	65 m (variable as per requirements)				
Installed elec. Output	1250 kW				
Cut-in wind speed	3 m/s				
Rated wind speed m/s	14	12	12	12	12
Cut-out wind speed m/s	25				
Survival wind speed m/s	67				
Rotor					
Blade	3 bladed horizontal axis				
Swept area m^2	2828	3217	3421	3421	3421
Rotational Speed	13.9 / 20.8 rpm				
Regulation	Pitch regulated				
Generator					
Type	Asynchronous 4/6 poles				
Rated output	250 / 1250 kW				
Rotational speed	1006/1506 rpm	1006/1506 rpm	1208/1506 rpm	1006/1506 rpm	1208/1506 rpm
Frequency	50 Hz	50 Hz	60 Hz	50 Hz	60 Hz
Gear Box					
Type	Integrated (1 planetary & 2 helical)				
Ratio	74.917:1	74.917:1	89.229:1	74.917:1	89.229:1
Yaw System					
Drive	4 electrically driven planetary gearbox				

Bearings	Polyamide slide bearings
Braking System	
Aerodynamic brake	3 independent systems with blade pitching
Mechanical brake	Hydraulic fail safe disc brake system
Control Unit type	Programmable microprocessor-based; high speed data communication, active multilevel security, sophisticated operating software, advance data collection remote monitoring & control option, UPS back up, Real time operation indication
Tower type	Lattice / Tubular, Hot Dip Galvanized, Epoxy / PU coated

Annex 6

Operation and Maintenance Structure for the CDM project



Annex 7

Specific location of the WEGS

Name of the Company	No. of WEGs	WEG HTSC No.	Date of Commissioning	S.F. No. and Village
KPR Mill Private Limited	1 x 0.23	218	29/03/2001	392 / 3 of Bogampatti
	1 x 0.23	218	29/03/2001	392 / 4 of Bogampatti
	1 x 0.23	219	29/03/2001	365 / 2 of Bogampatti
	1 x 0.23	219	29/03/2001	365 / 4 of Bogampatti
KPR Mill Private Limited	1 x 1.25	495	21/03/2003	721 (Part) of Dhanakkarkulam
	1 x 1.25	507	24/03/2003	711 (Part) of Dhanakkarkulam
	1 x 1.25	855	29/07/2004	476 / 2 (Part) of Dhanakkarkulam
KPR Spinning Mill Private Limited	1 x 1.25	809	31/03/2004	627 / 2A (Part) of Dhanakkarkulam
	1 x 1.25	913	17/09/2004	954 / 3B of Dhanakkarkulam
	1 x 1.25	914	17/09/2004	132 / 7C1 (Part) of Dhanakkarkulam
	1 x 1.25	916	17/09/2004	169 / 6 (Part) of Dhanakkarkulam
KPR Cotton Mills Private Limited	1 x 0.6	939	27/09/2004	963 / 1 of Irrukandurai
	3 x 0.6	940	27/09/2004	967 / 3, 905 / 2C, 903 / 2 of Irrukandurai
	2 x 0.6	941	27/09/2004	898 / 3, 891 / 9 of Irrukandurai
	2 x 0.6	942	27/09/2004	841 / 1C, 843 / 4A of Irrukandurai
	1 x 0.6	942	28/10/2004	845 / 1 of Irrukandurai
	1 x 0.6	943	27/09/2004	838 / 3A of Irrukandurai
	3 x 0.6	1037	21/10/2004	960 / 1, 956 / 2C, 911 / 2 of Irrukandurai
	1 x 0.6	1038	21/10/2004	974 / 1E of Irrukandurai
	1 x 0.6	1039	21/10/2004	843 / 6 of Irrukandurai
	1 x 0.6	941	28/01/2005	908 / 1 of Irrukandurai