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

CONTENTS

Revision history of this document

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

SECTION A. General description of small-scale project activity

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

>> 15 MW grid-connected wind power project by MMTC in Karnataka

Version 04

Dated: 31/10/2008

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

>> The proposed wind based power generation is a small scale project activity with an installed capacity of 15 MW (0.6 MW X 25) at Gajendragad site, Gadag district, Karnataka, India. The technology envisaged for this project is 0.6 MW Wind Energy Generators (WEG) developed by Vestas RRB India Ltd. The project promoter is MMTC limited. MMTC is a major trading company in Asia. Not only does it trade in minerals, metals, fertilizers, and precious metals but also is a major operator in Agro, Coal and hydrocarbon sectors.

The electricity generation from the wind parks will contribute annual GHG reductions estimated at 21927.71 tCO2e (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. The project activity will evacuate approximately 30375 MWh of renewable power annually to the power deficit Southern Region Grid.

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 utilize the generated output for selling it to the State Electricity Board i.e. Hubli Electricity Supply Company (HESCOM) for meeting the energy shortages in the state and to contribute to climate change mitigation efforts. Apart from generation of renewable electricity, the project has also been conceived for the following:

- To enhance the propagation 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 proposed project activity leads to alleviation of poverty by establishing direct and indirect benefits through employment generation and improved economic activities by strengthening of local grid of the state electricity utility. The infrastructure in and around the project area has also improved 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 project activity leads to an investment of about INR 690 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.

C>Environmental well-being - The project utilizes wind energy for generating electricity which otherwise would have been generated through alternate 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 no negative impact on the surrounding environment contributing to environmental well-being.

D>Technological well being - The project activity leads to the promotion of 0.6 MW Vestas WEGs in the region, demonstrating the success of wind based renewable energy generation, which is fed into the nearest sub-station (part of the southern regional grid), thus increasing energy availability and improving quality of power under the service area of the substation. Hence the project leads to technological well being.
The project is an attempt to provide a renewable source of electricity and at the same time help bridge the gap between the ever-increasing power deficits in the Southern Grid.

A.3. 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)
India (Host Country)	MMTC Limited	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 small-scale project activity:

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

>>

A.4.1.1. Host Party (ies):

>> India

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

>> State: Karnataka
District: Gadag
Taluk: Rona

A.4.1.3. City/Town/Community etc:

>> Site: Gajendragarh

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

>> The wind farm is located at the Gajendragad site in Gadag district in the state of Karnataka. The machines can be well identified with the respective turbine numbers. The specific details of location of the WEGs have been furnished in Annexure 5. The latitude and longitude have been furnished in Annex 6.

Mean annual wind speed: 24.92 km/h at mast and 25.6 at 30m height
Mean annual wind power density: 311 W/m^2 at mast (25m) and 423 W/m^2 at 50m heights

Figure 1: Location of Karnataka in India

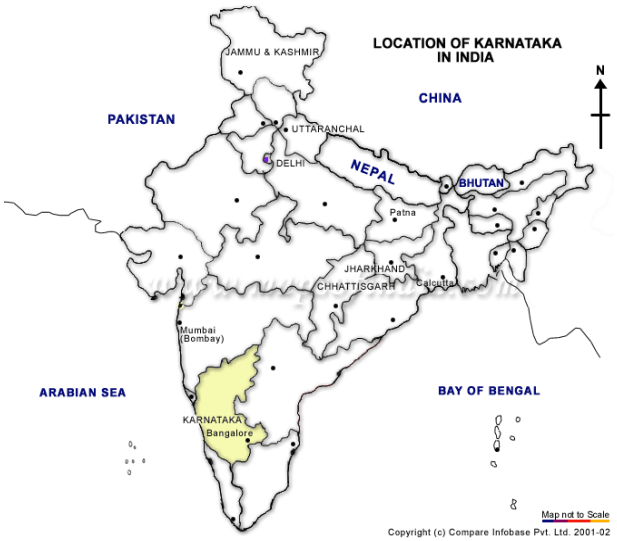
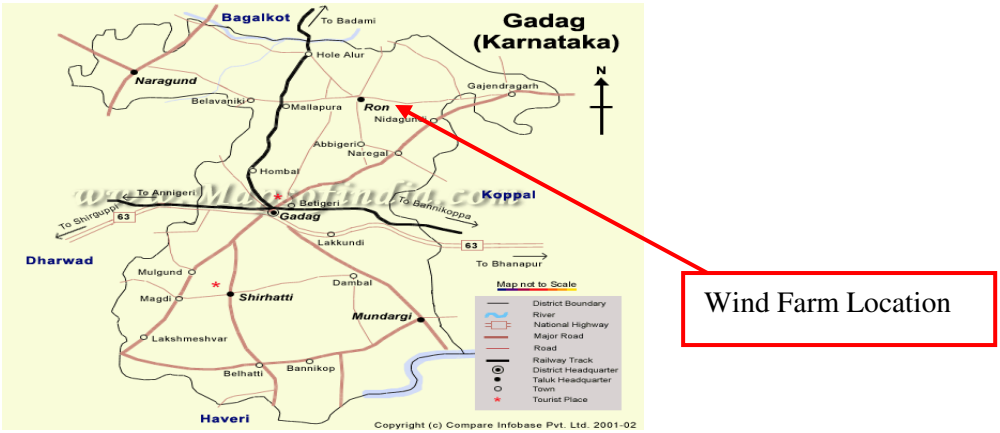


Figure 2: State Map of Karnataka showing District

Figure 3: District map of Gadag



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

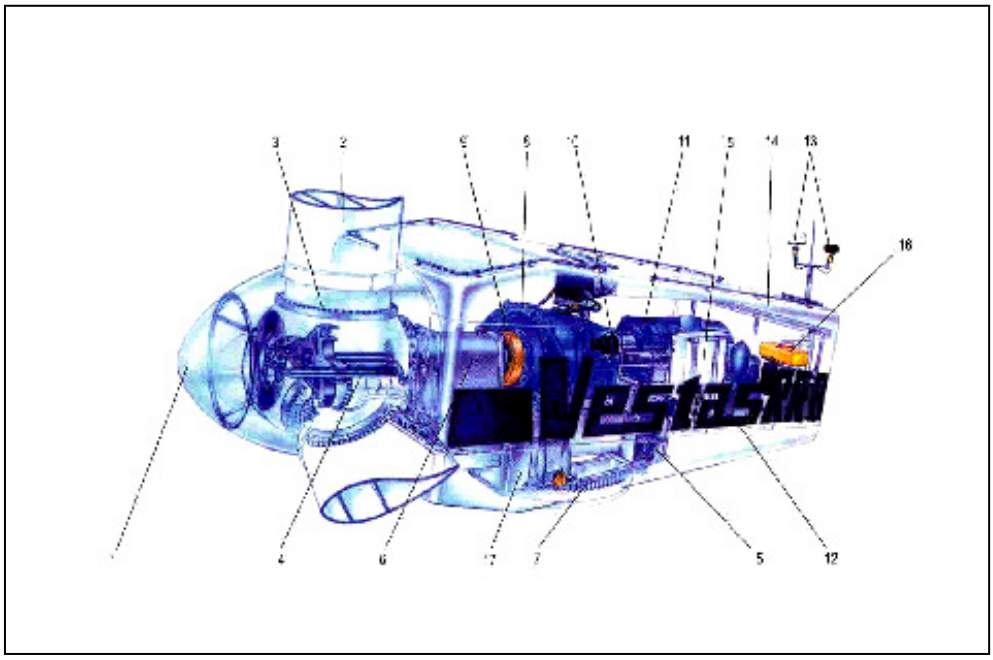
>> Type and Category

The project activity utilizes the wind potential for power generation and exports the generated electricity to the grid. According to small-scale CDM modalities the project activity falls under:

Sectoral Scope 1	**Energy industries (renewable / non renewable sources)**
Type – I	**Renewable Energy Projects**
Category I-D	**Grid connected renewable electricity generation**

Technology

In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. Wind blowing at high speeds has a 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 figure below shows a schematic diagram of a WEG. The present project installs 25 Vestas – make WEGs of individual capacity 0.6MW.



Structure of Machinery

1. Nose Cone
2. Rotor Blades
3. Blade Bearing
4. Traverse Connecting Rod
5. Yaw Gear
6. Shaft Arrangement
7. Yaw Top
8. Gear Box
9. Shrink Disc
10. Transmission Shaft
11. Generator
12. Hydraulic Unit
13. Windvane & Anemometer
14. Nacelle Cover

15. VMP Top Control Unit
16. Mini Crane (for 500KW, 600KW only)
17. Nacelle Frame

The salient features of the WEGs are:

1. Based on sturdy and proven design.
2. Specially suited for Indian climatic conditions.
3. Highly reliable components ensuring life time trouble free operation.
4. Pitch regulated rotor blades for high performance and for highly effective start and brake.
5. Integrated power transmission mechanism.
6. Carefully designed electrical system to withstand erratic grid conditions.
7. Microprocessor based fully automatic control system.
8. Assured quality.

Technical details of WEGs

Parameters	**Details**
Cut in wind speed	4 m/s
Cut out wind speed	25m/s
Survival wind speed	70 m/s
Tip Speed	64 m/s
Rotor Speed	26.2 rpm
Hub height	50 m
Nacelle tilt angle	5 degree
Regulation	Pitch
Voltage	690 V
Frequency (Hz)	50 Hz
Rated output	600 kW
Make of WEG	Pawan Shakthi
Gear Box	
Type	Planetary/Helical
Gear Ratio	1:58.2
No. of steps	3
Generator	
Rated power output	600 kW
Type (Dual wound/2 generators)	Asynchronous Single
Voltage	690 V
Revolutions	1527 rpm
Frequency	50 Hz

Tower	
Type	Lattice
Height	50 m
Material	Steel
Sections	6
Surface treatment	Hot dipgalvanised (150 Microns)
Rotor	
No. of Blades	3
Diameter	47m
Swept Area	1735 m^2
Brake System	
Aerodynamics	Full feathering blade
Mechanical	Disc Brake
Yaw system	Slowing system with gear motors yawing
Nacelle cover	Fiberglass Reinforced polyester
Power regulation	Pitch regulated
Controls	Microprocessor based

Technology transfer
No technology transfer from other countries is involved in this project activity.

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

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Years	Estimation of annual emission reductions in tonnes of CO2 e
2008-09	21927.71
2009-10	21927.71
2010-11	21927.71
2011-12	21927.71
2012-13	21927.71
2013-14	21927.71
2014-15	21927.71
2015-16	21927.71
2016-17	21927.71
2017-18	21927.71
Total estimated reductions (tonnes of CO_2e)	219277

Total number of crediting years	10
Annual average of the estimated reductions over the crediting period (tCO2 e)	21927.71

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

>> No public funding is involved in the project. The resources for implementation have been organized by the investor through in house equity

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

>> According to paragraph 2 of Appendix C to the Simplified Modalities and Procedures for Small-Scale CDM project activities (FCCC/CP/2002/7/Add.3), a small-scale project is considered a debundled component of a large project activity if there is a registered small-scale activity or an application to register another small-scale activity:

- With the same project participants
- In the same project category and technology
- Registered within the previous two years; and
- Whose project boundary is within 1km of the project boundary of the proposed small scale activity

The project promoters hereby confirm that there is no registered small scale project activity registered within the previous two years with them in the same project category and technology whose project boundary is within 1km of the project boundary of the proposed small scale activity. Thus the project is not a de-bundled component of any other large scale 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 small-scale project activity:

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Project Type:	I - Renewable energy project
Project Category:	I D - Grid connected renewable electricity generation
Version:	11, EB 31, effective from 18th May 2007
Reference:	Appendix B of the simplified M&P for small scale CDM project Activities.

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

>>

As per the, *Simplified modalities and procedures for small-scale CDM project activities*, Type (1) projects are defined by the "renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts (or an appropriate equivalent)". While the Appendix B of *Simplified modalities and procedures for small-scale CDM project activities*, defines project category 1.D as projects having renewable electricity generation for a grid:

The present project activity is characterised by the following:

- Generates renewable energy (wind)
- Installed capacity is 15 MW (will not exceed 15 MW)
- It is connected to the Southern Regional Grid

Therefore, the project falls under the project category of 1.D

B.3. Description of 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. As defined in the AMS ID, the project boundary for a small-scale wind farm project that provides electricity to a grid encompasses the physical, geographical site of the renewable energy generation source.

The project boundary is thus composed of the Wind Energy Generators, the metering equipment for each generator and substation, and the grid which is used to transmit the generated electricity.

The project is supplying the generated electricity to the Southern Region Grid, thus the Southern grid has been chosen as the grid system for the baseline calculation.

Grid System of the proposed project activity:

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).

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-

States/ UTs 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, Chandigarh	Gujarat, Madhya Pradesh, Maharashtra, Goa, Chattisgarh, Daman and Diu, Dadar	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Puducherry	Bihar, Orissa, West Bengal, Jharkhand, Sikkim	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura

and Nagar Haveli

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.

Since the CDM project would be supplying electricity to the Southern regional grid it is preferable to take the regional grid as project boundary than the state boundary. It also minimizes the effect of inter state power transactions, which are dynamic and vary widely. Considering free flow of electricity among the member states and the union territory through the Southern Region Load Dispatch Centre (SRLDC), the entire southern grid is considered as a single entity for estimation of baseline.

B.4. Description of baseline and its development:

>> The approach adopted for selecting the baseline scenario for the project is based on the existing actual emissions. The project generates electricity and supplies it to the Southern regional grid. In the absence of the CDM project, the grid would have continued to draw electricity from the current sources of generation.

The Indicative simplified baseline and monitoring methodologies for selected small scale CDM, type 1.D (grid connected renewable electricity generation) (Reference: AMS 1.D., Version 11, EB 31) defines the baseline as the kWh produced by the renewable energy generating energy unit multiplied by the emission co-efficient calculated in a transparent and conservative manner. The methodology gives two options for the calculation of the emission co-efficient. They are:

a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology ACM0002. Any of the four procedures to calculate the operating margin can be chosen, but the restrictions to use the Simple OM and the Average OM calculations must be considered.

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

As per the *Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories* and baseline methodology AMS 1D, the baseline should be calculated in a conservative and transparent manner.

Below is a comparison of the Emission Co-efficient from the two methods mentioned above. The more conservative of two emission co-efficient would be used for the calculation of emission reductions.

Combined Margin Emission Co-efficient:

Step 1: Calculation of Operating Margin Emission Factor
The operating margin emission factor has been calculated using a 3 year data vintage:
The $EF_{OM,Y}$ is estimated to be:
For the year 2004-2005 the $EF_{OM,Y}$ is 1.0008 tCO_2/MWh
For the year 2005-2006 the $EF_{OM,Y}$ is 1.0078 tCO_2/MWh
For the year 2006-2007 the $EF_{OM,Y}$ is 1.0030 tCO_2/MWh

Thus the final $EF_{OM,Y}$ based on three years average is estimated to be 1.0038 tCO_2/MWh.

Step 2: Calculation of the Build Margin Emission Factor $EF_{BM,Y}$
The $EF_{BM,y}$ is estimated as 0.7054 tCO_2/MWh (with sample group m constituting most recent capacity additions to the grid comprising 20% of the system generation).

Step 3: Calculation of Baseline Emission Factor EF_y
The baseline emission factor EF_y is calculated as the weighted average of the Operating Margin emission factor ($EF_{OM,y}$) and the Build Margin emission factor ($EF_{BM,y}$):

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

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.

Baseline Emission factor: **0.9291 tCO_2/MWh**

Weighted Average Emission Co-efficient:

The weighted emission rate for the current generation mix as per the CEA CO2 Baseline database is **0.7219 tCO_2/MWh**

As calculated from the CEA published baseline data of the Indian power sector in the above section, the Weighted Average Emission Rate gives a more conservative emission co-efficient than the Combined Margin (CM) baseline. Thus, approach (b) the Weighted Average Emissions (in tCO_2eq/MWh) of the current generation mix has been taken for the calculation of baseline.

Moreover, the *Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories* also specifies that the applicable emission co-efficient data should be as per the year in which project generation occurs. The actual emission reductions will then be calculated in each year of the crediting period (ex-post) based on the observed net generation and the weighted average emission factor for the respective year.

Details of Baseline data:

Data for Weighted Average Emission Rate (tco2/MWh) has been obtained from the following:
'The CO2 Baseline Database for the Indian Power Sector'
http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm)
Ministry of Power: Central Electricity Authority (CEA)
Version 3
Dated: 15th December, 2007
(The version of the data used is the latest data available)

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

>>
UNFCCC simplified modalities seek to establish additionality of the project activity as per Attachment A to Appendix B, which listed various barriers, out of which, at least one barrier shall be identified due to which the project would not have occurred any way. Project participants identified the following barriers for the proposed project activity:

Background

Power projects in India (Conventional and renewable) are governed by the Electricity Act (EA), 2003. Prior to this there were no specific provisions that would promote renewable sources of energy. The EA, 2003 has radically changed the legal and regulatory framework for the power sector. As a result beyond EA 2003, the entire power sector is going through a massive change during which old institutions are getting crumbled and new institutions like power pools and exchanges are taking shape (Joshi, 2006)[1]. The Act is helping to develop a competitive environment in India's power sector.

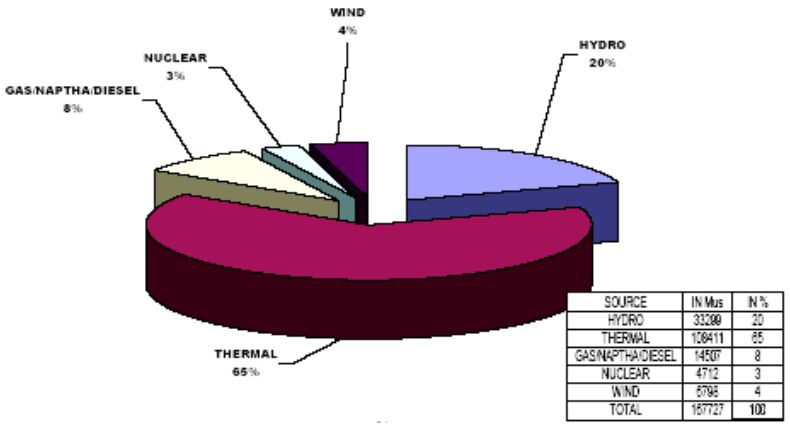
Existing circumstances

In India, it is the conventional sources of energy which dominates the power sector scenario. The power supply to all the grids in India is thus carbon intensive. In the future, the government plans to implement a capacity of 100,000 MW in the future to meet the demand of electricity of the country with the help of thermal power projects, out of which 47000 MW would be implemented in the 11th plan. (http://powermin.nic.in/reports/pdf/ar05_06.pdf, Pg 7)

Thermal power plants are the greatest contributor to the Southern grid also. Though there is a healthy contribution from other energy sources as well in terms of installed capacity, the actual energy generated by them is much lower (Fig.9)

[1] Joshi. B. 2006. Wind Power Development in India, Pg 357-382

Fig 9: Source-wise contribution to energy generated during 2005-06

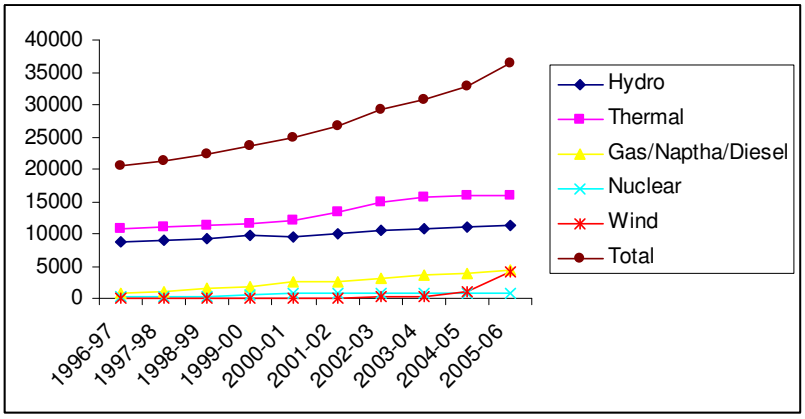


SOURCE	IN Mus	IN %
HYDRO	33299	20
THERMAL	106411	65
GAS/NAPTHA/DIESEL	14507	8
NUCLEAR	4712	3
WIND	6798	4
TOTAL	167727	100

(Source: http://www.srldc.org/var/ftp/reports/yearlyrep/2005-06-year.pdf)

Temporally, as the figure below shows, it is the thermal sources which have been the highest contributors to the southern grid. Sources like wind, nuclear and other renewable sources of energy have not been properly tapped (Fig. 10).

Fig 10: Contribution of various sources in the past ten years in the southern grid



(Source: http://www.srldc.org/var/ftp/reports/yearlyrep/2005-06-year.pdf, Pg 41)

Given the above background, the baseline scenario would comprise of emissions mainly from conventional power plants with a small proportion from other relatively clean sources of energy. Thus installation of this small scale project will help in addition of clean energy to the energy deficient southern grid.

The section below describes the barriers faced by the project activity:

Investment Barrier

To determine the returns to the project, a comprehensive investment analysis was carried out. The assumptions and parameters used to calculate Equity IRR for the project are given below.

ASSUMPTIONS

Sr. No.	Parameter	UNIT	Pawan Shakti 600
1	Project Size	MW	15
2	WTG Rating	kW	600
3	Total Number of Machines	Nos.	25
	Price / WTG		
4	Cost of Land	Rs in Lacs	11.4
5	Cost of WTG	Rs in Lacs	240.85
6	Erection & Commissioning Charge	Rs in Lacs	23.75
7.	Preliminary & Preoperative cost	Rs in Lacs	1
8.	Total Cost Per WTG	Rs in Lacs	276
9.	**Total Project Cost**	**Rs in Lacs**	**6900**
10	Cost per MW	Rs in Lacs	460.00
11	Gross Generation	Lakh Units	15
	Total Losses	**%**	**19.0%**
12	Machine Non Availability	%	5%
13	Grid Non Availability	%	5%
14	Transmission	%	5%
15	Auxilary Consumption	%	1.0%
16	Uncertainities Viz: Modelling Error,Instrumenattion Error etc	%	3%
17	Net Generation	LU	12.15
18	**Annual Costs**		
19	O & M (Price)	Rs in Lacs	3
20	Escalation	%	5.0%
21	Free O & M (yr.)	Yrs	2

22	General Insurance	%	0.17%
23	Administrative charges	Rs. In lacs	33.60
24	Inflation	%	5.00%
25	**Tariff**		
26	Tariff (i)	Rs.	3.40
27	Tariff Escalation	Rs.	0.00
28	Tariff (ii) after 10 yrs	Rs.	3.40
29	Carbon Credit	Rs./kWh	0.29
30	**Working Capital Details**		
31	Receivables(days)	Days	60
32	O&M Expenses(days)	Days	30
33	Working Capital Interest Rate	%	12.50%
	FINANCIAL ANALYSIS	**UNIT**	**Pawan Shakti 600**
36	PLF	%	23.12
37	Equity IRR without CDM	%	13.77
38	Equity IRR with CDM	%	15.24

It was found that the Equity IRR of the project is 13.77% without considering the CDM revenue. This was much lower than the KERC set benchmark of 16%[2] in the state. Thus, investing into this wind energy project by the project proponent was not at all a viable option. However, after considering the CDM revenues, the returns to the project were found to be improving with the equity IRR increasing up to 15.24%

Financial incentives to the project

When the present wind power project in Karnataka was conceptualized by MMTC (A Govt. of India Undertaking), it resulted in two types of tax benefits:

- 80% accelerated depreciation under section 32 (rule 5) of the Income Tax Act
- Income tax holiday of 10 years under section 80IA of the Income Tax Act

Details about the policies, implemented by the Government of India, which result in such fiscal incentives, are given below:

Accelerated Depreciation: Wind power projects in India have been given the benefit of accelerated depreciation as per the section 32 of the Income Tax Act since 1993. At the onset of this policy, wind power projects were eligible for 100% accelerated depreciation. However, through a notification in

[2] KERC order on January 18, 2005; In the matter of Determination of Tariff in respect of Renewable Sources of Energy. The same has been submitted to the DOE.

February 2002[3] (applicable 1.04.2003 onwards) and a further notification in February 2005[4] (applicable 2.04.2005 onwards), the incentive was reduced to 80% accelerated depreciation.

Tax Holiday: From 1993 onwards, the wind power projects in India were also eligible for tax holidays within fifteen years from start of the wind power project. Over the years, the length of the tax holiday has been varying from five years to ten years. Till date, wind power projects are eligible for a ten year tax holiday as per the section 80 IA[5] and this can be availed for any ten consecutive years, at the option of the PP, out of fifteen years beginning from the year of commissioning of the project.

Both the above policies were introduced prior to November 2001 and are still applicable to wind power projects, although at different rates.

In line with the requirement of EB, the IRR calculation takes into account these tax benefits. The Income tax depreciation benefits have been taken into account as an inflow to the project activity (Row no. 21 of the "IRR calc" worksheet). The 10 year tax holiday has been taken into account while calculating the Total tax income liability for the project (Row no. 55 of the "IRR calc" worksheet).

Thus, the equity IRR of 13.77%, calculated for the project, is inclusive of all the tax benefits/incentives for which the project is eligible. To assess the viability of the project, the benchmark considered was the Return on Equity (ROE) of 16%, as stipulated by the Karnataka state Electricity Regulatory Commission (KERC)[6] in its Tariff order for wind projects dated 18th January 2005. The value of 16% ROE is the minimum return on equity the project is expected to yield. This benchmark was considered appropriate as it was the most conservative of all the other benchmarks available to the PP. The other benchmarks available were 19.52% as per CRISIL Advisory Services Report on Power Sector and 16.88% Cost of Equity calculated by the PP.

Clearly the return to the present project activity, even after considering all the fiscal incentives available, does not match upto the above mentioned benchmark. Thus, the project is truly additional.

Sensitivity Analysis:

a) Based on generation:

Variation in wind power generation	(-) 10%	(-) 5%	0.00%	(+) 5%	(+) 10%
Equity IRR	11.86%	12.83%	**13.77%**	14.69%	15.61%
Equity IRR (with CR)	13.25%	14.26%	**15.24%**	16.20%	17.14%

[3] Appendix 4: GOI Notification No. 291/2002

[4] Appendix 5: GOI Notification No. 67/2005

[5] Appendix 6: Extracts of the section 80IA of the Income Tax Act

[6] It is to be noted that 16% ROE has been referred from a Sate Electricity Regulatory Commission and not a Central Electricity Regulatory Commission as discussed in EB 40 (Para 40) Guidance regarding benchmark.

The site for the project activity being relatively new and considering the inherent nature of wind power, sufficient amount of uncertainty existed in the wind power generation in the area. A tour was conducted by experts in MMTC of the wind farms around Sodi and Harihar wind sites (Bellary and Davanagere districts in Karnataka) which are in the vicinity the site of the project activity[7]. Therefore, a sensitivity analysis was carried out to see the effect of wind variation on the returns to the project. It was found that even with 10% increase in the wind power generation, the equity IRR remained below the benchmark at 15.61%, while with a decrease of 10%, the equity IRR went down to 11.86% .

The CDM revenue helps improving the returns to a great deal especially during wind power variation. It was found that when the wind power varied negatively, it helped in providing a cushion to the decreasing returns. On the other hand, CDM revenue helped in meeting the benchmark, even with a 5% increase in the wind power generation. Thus, CDM revenue is indeed necessary to make the project financially viable.

b) Based on Uncertainty related to tariff rate

The buy back rate set by the HESCOM for the present project is Rs. 3.40 per kilowatt- hour without any escalation for the first ten years of the commercial operation date. However, the project life term is that of 20 years. According to the PPA, from the 11th year onwards, the tariff rate applicable would be determined by the commission. Thus, a great deal of uncertainty lies in the tariff rate for the rest ten years of the project. For being on the conservative side, the financial returns of the project by the project proponent have been calculated at the present rate i.e. Rs. 3.40 for the entire project period. However, with the government's policy to increase competition among power generators and several other factors like cost recovery of the projects, poor financial health of the state utilities make the probability of increase in the tariff rates after ten years very bleak. To judge the effect of the changes in the tariff rates after the tenth year on the returns of the project, a sensitivity analysis has been carried out. The following table highlights the effects of the changes of tariff rates after the tenth year:

Tariff Variation (after the 10th year)	**(-)20%**	**(-)10%**	**0.00%**	**(+)10%**	**(+)20%**
Tariff rate(Rs/ unit_)	2.72	3.06	3.4	3.74	4.08
Equity IRR	12.73%	13.27%	13.77%	14.24%	14.68%

It was found that a variation of 10%-20% in the tariff rates at which the electricity produced will be sold after the tenth year will lead to a change in the returns to the project by a significant amount. Thus, tariff rates indeed play a very important role in the determining the returns to the project. Since the returns to the project is already below the benchmark suggested by the government, uncertainty in tariff rates after the tenth year makes the project further unviable.

[7] The tour report has been furnished to the DOE.

Prevailing practice barrier:

India is dominated by thermal power as the main source of electricity. In the financial year 2005-06 (during year when the investment decision was taken), the total installed capacity of thermal power plants in India constituted 64% of the total installed generating capacity, while the total capacity of all renewable sources of energy was only 5%[8]. The prevailing practice in the country can also be judged by looking at the governments plans to increase the installed capacity of different sources of energy. During the tenth five year plan (2002-2007), the government targeted to install thermal power plants of capacity equivalent to 25417 MW[9], while, the target in case of wind power plants was 2000 MW [10]only. By end of the year 2004-05, the addition of installed capacity from thermal sources was approximately 2933.92 MW while from the wind power the addition of installed capacity was only 491.57 MW[11]. Thus, clearly, investing into thermal power plants is indeed the prevailing practice in the country. Moreover, since the main purpose of investing into wind energy for the project proponent is primarily diversification from their present business, the prevailing practice in the country was indeed a barrier for them.

Further, in the year 2005-06, very few central sector PSU's invested into renewable energy sources[12] and especially wind. MMTC being a Public Sector Undertaking (PSU) regulated by the Central Government was one of the very few PSUs to invest into wind power projects.

Regulatory barriers

The policies followed by the regulatory bodies of Karnataka determine the investment environment for wind power promoter. The uncertainty related to tariff rates after the tenth year of the project activity has direct implication on the returns of the project activity. This has been shown with the help of a sensitivity analysis in the investment barrier. Moreover, the PPA also has stated that at the end of the ten years HESCOM may also not be ready to buy power from this project anymore. The provision that the PPA gives in a situation like this is as per the following:

"*..the company shall be permitted to sell energy to third parties and enter into a Wheeling and Banking Agreement with HESCOM/Corporation to sell power for which it shall pay transmission and other charges to the HESCOM/Corporation at the rates applicable from time to time as approved by the commission.*"

Such a provision however gives space for the utilities to act according to their convenience. It is not likely to help the project greatly as the project proponents would have to settle in for whatever buy back rates the third party negotiates for. Besides, the additional charges of wheeling and banking would also add to the cost of the project. Thus, with so much uncertainty in the financial inflows of the project, the option of investing into wind power projects for the investors is not at all a lucrative one.

[8] http://powermin.nic.in/reports/pdf/ar05_06.pdf , pg 170

[9] http://planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_ch8_2.pdf, pg 13

[10] http://planningcommission.nic.in/plans/planrel/fiveyr/10th/volume2/v2_ch7_3.pdf, pg 6

[11] http://www.cea.nic.in/power_sec_reports/general_review/0405/ch2.pdf

[12] Annual report 2005-06, Ministry of Power, Pg 170.

Role of CDM benefits

Scenario like the above, make the viability of wind power projects doubtful. The promoter has felt encouraged to go ahead with this project even in the presence of such barriers because of the expected CDM benefits to the project. CDM benefits act as additional source of revenue apart from the usual financial inflow to the project. Thus, it helps in giving a monetary cushion to the project which will help the investors' deal with the above outlined barriers. For instance, even during a condition of non payment by the utility, the CDM benefits would help in bearing the annual expenses. Moreover, MMTC plans to invest further into wind power project, thus, the returns to the project would serve as an example to the upcoming projects. Thus, CDM benefits are absolutely essential for the project to become viable and get implemented.

Prior consideration of CDM

~~In light of t~~The new start date of the project is 15th December 2006, The Minutes of Meeting held on the 12th of December, 2006 by the Investment Committee of Directors of MMTC and the letter of acceptance of the LOI received from RRB Vestas serve~~s~~ as the evidence for prior consideration of CDM.

Detailed discussion regarding change of the start date of the project activity has been given in the paragraph below[13]. Related documents including the document for evidence of prior consideration of CDM has been given in Appendix 7.

When the project was submitted for registration with the CDM Executive Board (EB) (9th April, 2008), version 03 of CDM glossary of terms was applicable. As per this, the start date of a project activity was defined as:

"Starting date of a CDM project activity (P - SSC)
The starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins. Project activities starting between 1 January 2000 and the date of the registration of a first clean development mechanism project have to provide documentation, at the time of registration, showing that the starting date fell within this period, if the project activity is submitted for registration before 31 December 2005."

Since project was stalled due to the change in the proposed project site, soon after the Letter of Intent (LOI) was placed by MMTC, the date of LOI could not be considered as the start date of the project. The next milestone in terms of implementation, construction or real action was considered as the commissioning of the project. Therefore, we considered it appropriate to assume the date of commissioning of the project (24th March 2007) as the start date of the project activity in the PDD.

However, in the 41st meeting, the start date of the project has been redefined as (CDM glossary of terms version 04):

"The start date shall be considered to be the date on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity. This, for example, can be the date on which contracts have been signed for equipment or construction/operation

[13] The discussion was submitted as a response to the CDM request for review queries.

services required for the project activity. Minor pre-project expenses, e.g. the contracting of services /payment of fees for feasibility studies or preliminary surveys, should not be considered in the determination of the start date as they do not necessarily indicate the commencement of implementation of the project. For those project activities which do not require construction or significant pre-project implementation (e.g. light bulb replacement) the start date is to be considered the date when real action occurs. In the context of the above definition, pre-project planning is not considered "real action". The Board further noted that there may be circumstances in which an investment decision is taken and the project activity implementation is subsequently ceased. If such project activities are restarted due to consideration of the benefits of the CDM the cessation of project implementation must be demonstrated by means of credible evidence such as cancellation of contracts or revocation of government permits. Any investment analysis used to demonstrate additionality shall comply with the requirements of paragraph 7 of the "Guidance on the assessment of investment analysis" (version 02)."

In light of the above , major milestones in the implementation of the project is given in the table below to arrive at the appropriate start date of the CDM project activity:

Date	Milestones	Document
25-09-2006	Letter Of Intent to RRB Vestas	Letter of Intent to Vestas RRB
19-10-2006	Supplier's Letter to intimate about change in location of the project. Project put on hold	Letter from Vestas RRB
12-12-2006	Approval for the project with alternate site by ICOD[14] (CDM revenues sought)	Agenda dated 11/12/06 and Minutes of meeting of ICOD
12-12-2006	Acceptance letter to Vestas RRB	Letter from MMTC
15-12-2006	Acceptance letter by Vestas RRB	Letter from Vestas RRB
24-03-2007	Commissioning of first turbine	Certificate already submitted to DOE
31-03-2007	Commissioning of the complete project.	-do-

On the 25th September, 2006, MMTC placed the Letter of Intent to Vestas RRB for a 15 MW wind power plant at Mudipirra, Mangalore District, Karnataka. However, Vestas RRB vide their letter 19th of October 2006, informed MMTC that the proposed project site at Mudipirra could not be allotted to MMTC for their project, as the Government of Karnataka planned to acquire the land for Special Economic Zone (SEZ) for upcoming ONGC project. The new site that was offered to them was Gajendragarh in Gadag District, Karnataka. Thus, Vestas RRB did not give its acceptance to the LOI of MMTC and requested MMTC to give its approval to the alternate site.

On the 12th of December 2006, the Investment Committee of Directors (ICOD) of MMTC after carrying out an analysis of the impact of change in the project location found that the project can become viable only if CDM revenues are received by them. Accordingly, the ICOD gave its approval for acceptance of the new site. Accordingly, a letter of acceptance was sent by MMTC to the suppliers giving its approval for the project at the new location. The same was accepted by Vestas RRB through its letter dated 15th December 2006. They also submitted an activity chart, which showed the sequence of activities to be carried out for setting up the project at the new site.

[14] Investment Committee of Directors of MMTC (PP)

Hence, based on the agreement and commitment by both the parties on 15th of December 2006, the project activity commenced and the project was finally commissioned the 24th and 31st March 2007.

In the context of the above, PP's commitment to the implementation of the project is considered when MMTC's letter of approval along with other terms and conditions was accepted by Vestas RRB through their letter on the 15th of December 2006. The activity chart attached with this letter further proves that implementation of the project started on the same day. Thus, 15th December 2006 has been considered as the start date of the project activity in line with the new guidelines.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>> 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). Hence, the applicable baseline, AMS 1D, Version 11, EB 31 is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kgCO2/kWh) calculated in a transparent and conservative manner.

Appendix B to the simplified Modalities and Procedures for Small-Scale CDM project activities (FCCC/CP/2002/7/ADD.3) gives two options for calculating the baseline for a Type I D project:

(a) The average of the "approximate operating margin" and the "built margin"
OR
(b) The weighted average emissions (in $kgCO_2$ equ/kWh) of the current generation mix.

As per the Indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity categories the baseline should be calculated in a conservative and transparent manner. Since according to the baseline data published by the Central Electricity Authority (CEA), the weighted average emission rate gives a more conservative emission co-efficient, baseline approach (b) the weighted average emissions (in $kgCO_2$ e/kWh) of the current generation mix has been taken for the calculation of baseline.

The equations used for calculation of Emission Reductions are the following:

Baseline Emissions: $BE_y = EG_y . EF_y$

Where,
EG_y = Net electricity supplied to the grid by the project in the year Y
EF_y = Weighted Average Emission Rate in the year Y

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.
- Leakage is not applicable as the renewable energy technology used is not equipment transferred from another activity. Therefore, as per the simplified procedures for SSC project activities, no leakage calculation is required.

Therefore, ERy = BE_y

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

Data / Parameter:	**Nil**
Data unit:	
Description:	
Source of data to be used:	
Value Applied:	
Justification of the choice of data or description of measurement methods and procedures actually applied :	-
Any comment:	Baseline has been calculated as per the Weighted Average Emission Factor which has to be calculated annually (ex-post). Therefore, this parameter has been added in the section B.7.1.

B.6.3 Ex-ante calculation of emission reductions:

>> The baseline is calculated using the weighted average emission rate approach. The baseline emission factor is calculated in the following steps:

Step 1: Calculation of Weighted Average Emission Rate (tCO2/MWh) (incl. Imports)

The weighted emission rate for the current generation mix as per the CEA CO2 Baseline database (version 3) is 0.7219 tCO_2/MWh (EF_y)

Step 2: Calculation of Baseline Emissions (BE_y)
Baseline emissions due to displacement of grid electricity are the product of the baseline Weighted Average Emission Rate (tCO2/MWh), times the net electricity supplied by the project activity to the grid (EG_y), over the crediting period.

$BE_y = EG_y . EF_y$

Where the net electricity supplied (EG_y) to the grid by the project is approximately 30375 MWh

Baseline Emissions = 30375 MWh * 0.7219 tCO_2/MWh = 21927.71 tCO2e/yr

Step 3: 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.
- Leakage is not applicable as the renewable energy technology used is not equipment transferred from another activity. Therefore, as per the simplified procedures for SSC project activities, no leakage calculation is required.

Thus,
$ERy = BE_y$ i.e.
ER_y = 21927.71 tCO2e/yr

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 30375 MWh of renewable power annually to the power deficit Southern Region Grid and the annual emissions reductions are equal to 21927.71 tCO2.

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 overall emission reductions (tonnes of CO_2e)**
2008-09	0	21927.71	0	21927.71
2009-10	0	21927.71	0	21927.71
2010-11	0	21927.71	0	21927.71
2011-12	0	21927.71	0	21927.71
2012-13	0	21927.71	0	21927.71
2013-14	0	21927.71	0	21927.71
2014-15	0	21927.71	0	21927.71
2015-16	0	21927.71	0	21927.71
2016-17	0	21927.71	0	21927.71
2017-18	0	21927.71	0	21927.71
Total (tonnes of CO_2e)	0	219277	0	219277

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

B.7.1 Data and parameters monitored:

According to AMS I D, for this project the parameters that needs to be monitored is the electricity generation and the baseline emission factor which is calculated ex post.

a) EGy

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Net Electricity supplied to the grid by the WEG project in year *y* (MWh).
Source of data to be used:	JMR Sheets/measurement records of the EPC (Engineering, Procurement, and Construction) contractor.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	30375 MWh
Description of measurement methods and procedures to be applied:	- The electricity is measured with the help of electronic meters of accuracy class 0.2 both by the operator and the grid representative. - Calculated from the measured readings, in case of WEGs with common meters - 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. The two meters (main and check) would be checked for accuracy and calibrated annually.
Any comment:	

b) EGy (import)

Data / Parameter:	$EG_{y(import)}$
Data unit:	MWh
Description:	Electricity imported by the project in year *y* (MWh).
Source of data to be used:	JMR Sheets/measurement records of the EPC (Engineering, Procurement, and Construction) contractor.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Nil

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. - Calculated from the measured readings, in case of WEGs with common meters - 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 two meters (main and check) would be checked for accuracy and calibrated annually.
Any comment:	Used to calculate net electricity supplied to the grid by the project

b) EGy (export)

Data / Parameter:	$EG_{y(export)}$
Data unit:	MWh
Description:	Electricity exported by the project in year *y* (MWh).
Source of data to be used:	JMR Sheets/measurement records of the EPC (Engineering, Procurement, and Construction) contractor.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Nil
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. - Calculated from the measured readings, in case of WEGs with common meters - 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 two meters (main and check) would be checked for accuracy and calibrated annually.
Any comment:	Used to calculate net electricity supplied to the grid by the project

b) EFy

Data / Parameter:	EF_y
Data unit:	tCO_2/MWh
Description:	Emission factor of the existing generation mix for Southern Grid
Source of data to be used:	CEA : 'The CO2 Baseline Database for the Indian Power Sector' http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm
Value of data applied for the purpose of calculating expected emission reductions in section B.5	0.7219 tCO_2/MWh
Description of measurement methods and procedures to be applied:	The methods for measuring EF_y can be found in the User Guide for The CO2 Baseline Database for the Indian Power Sector by CEA. The URL is as below: http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver3.pdf
QA/QC procedures to be applied:	The data for the EF_y would be calculated by the Central Electricity Authority of India every year. Thus, the data would reflect the updated existing generation mix for the southern grid and used ex-post.
Any comment:	Used to calculate emission reductions

B.7.2 Description of the monitoring plan:

>>

For the purpose of monitoring, the project participant has entered into an operation and maintenance agreement with the supplier of the machines Vestas RRB India Ltd. for a period of twenty years from the date of commissioning.

Training of engineers of MMTC at site and two engineers at works where assembly and testing of complete WEG are carried out has been done by the Vestas RRB India Ltd. (the Contractor); the training course is carried out at site.

RRB Vestas has a separate service department headed by Vice President supported by General Managers, Managers, and Assistant Managers and Supervisory Staff. Assistant Managers are posted at the project site along with requisite numbers of supervisory staff for carrying out operation and maintenance. The supervisory staff and maintenance are provided in adequate number for maintaining adequate strength at all the time. The operation and maintenance structure with respect to the implementation of the project has been given in Annex 4.The operators also record monthly energy output of each WEG and prepare reports on the performance of wind farm indicating turbine wise production.

The contractor shall draw the preventive maintenance schedules and attend to the breakdowns keeping in view that machine availability would be minimum 95%.

There are three metering points for each WEG in the project. The first being at the Controller end, completely controlled and maintained by the RRB Vestas. The WEGs are then connected to the Main Receiving Stations (MRS) managed by HESCOM. All the WEGs for the project have been specifically identified to avoid any confusion regarding the generation by each WEG. The MRS (1&2) is then

connected to the Main meter at the nearest Substation handled by KPTCL. In case, more than one project WEG's are jointly metered at the Main meter, the electricity generated is apportioned on the basis of the readings at the MRS. A check meter is also provided at the Substation as a back up for any fault in the Main meter. The meters both at Substation and MRS would be calibrated regularly and in case of faulty meters, corrective action would be taken immediately.

On the first day of every month, readings are taken from the Main meter at the Substation on the basis of which invoices are raised to the HESCOM. The annual emission reductions would also be calculated on the basis of the same readings. A double check of the measurements can be done with the help of the sale receipts from the HESCOM. The data would be collected regularly by project proponent and archived in both electronic and paper for minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

The responsibility of registration of the project has been assigned to

Mr. Ved Prakash
General Manager
MMTC
Core-1, "Scope Complex", 7 Institutional Area, Lodhi Road, New Delhi – 110003, India
Mr. Ved Prakash has been assigned overall supervision of the project performance including the following:
- Performance review of WEG installations
- Arranging for annual verification of the installations for issuance of CERs.

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

>>
Date of completing the baseline and monitoring section: 12.02.2008

Contact:
Senergy Global Private Limited (Not a Project Participant)
Ground Floor Eros Plaza, Eros Corporate Tower,
Nehru Place
New Delhi – 110019
India
Tel: +91 11 4650 5501
Fax: +91 11 4650 5555
mail@senergyglobal.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:

>> 15/12/2006 (date of letter of acceptance from supplier. Refer section B.5)

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:

>> N.A.

C.2.1.2. Length of the first crediting period:

>> N.A.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>
1/06/2008 (but not before the date of registration)

C.2.2.2. Length:

>> 10 years 0 months

SECTION D. Environmental impacts

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

>> 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.

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:

>> Following are the potential stakeholders for the present project:

- **The State Electricity Utility**: The project supplies electricity to HESCOM at the rate of 3.40 Rs. /unit. Thus it can be considered as a major stakeholder. The project proponent has achieved the consent of the utility (Hubli Electricity Supply Company Limited) by signing a Power Purchase Agreement (PPA) for a period of twenty years on the 23rd May, 2007 (Proof provided to the DOE).

- **The State Revenue Department:** The land used for the project has been leased from the state Revenue Department by M/s Shah Agency which would be transferred in the name of KREDL (Karnataka Renewable Energy Development Limited) who will in turn sub-lease it in the name of MMTC Limited. The state revenue department is therefore also considered a stakeholder. The organisation released the allotment order of the land to M/s Shah Agency on the 23rd June, 2006 (Document submitted to the DOE).

- **Karnataka Renewable Energy Development Agency (KREDL):** The KREDL is the nodal agency responsible for the non conventional energy projects in the state. The KREDL has entered into a sub-lease deed of the land required for the present project activity with MMTC on the 10th of January, 2008.

The above stated stakeholders were involved in the project through formal individual meetings of relevant officials from both the parties (project proponent and each stakeholder). The project was discussed in detail with them. Their consent was received in different forms and has been briefed below in the section E.2.

Furthermore, the allotment order given by the State Revenue Department of the Government of Karnataka clearly states that the lands are situated in high altitude place and belongs to the government property and are not fit for agricultural purposes but suitable for development of wind energy. The present project activity also does not have any human habitation in the vicinity. Thus, the implementation of project activity does not affect any community. Sample photographs have been attached (Annexure 7) with this PDD as a proof of the same. Further proofs have been submitted to the DOE.

E.2. Summary of the comments received:

>>

The state electricity utility: The Agreement consists of all the terms and conditions put forward by the utility which the project proponent has agreed upon. The copy of the PPA will be submitted to the DOE.

The state revenue department: The allotment order consisting of the consent from Tahsildar of Rona Taluk (Taluk in which the project is situated) has been given by the Revenue Department of Government of Karnataka serves as the proof for the consent of the Revenue Department.

Karnataka Renewable Energy Development Agency (KREDL): Comments by KREDL have been incorporated as terms and conditions in the Sub- lease deed.

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

>>

All the necessary term and conditions put forward by the stakeholders were taken account of by the project promoter and promised to abide by them by signing the necessary agreements. Proofs have been submitted to the DOE.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	MMTC Limited
Street/P.O.Box:	Core – 1, "Scope complex"
Building:	7, Institutional Area, Lodhi Road
City:	New Delhi
State/Region:	Delhi
Postfix/ZIP:	110003
Country:	India
Telephone:	011 – 24362200 / 1303
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E-Mail:	vp@mmtclimited.com
URL:	www.mmtclimited.com
Represented by:	
Title:	General Manager
Salutation:	Mr.
Last Name:	Prakash
Middle Name:	
First Name:	Ved
Department:	
Mobile:	+91 9871292477
Direct FAX:	
Direct tel:	011 – 24362159
Personal E-Mail:	vp@mmtclimited.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	**3.0**
DATE	**15 December 2007**
BASELINE METHODOLOGY	**ACM0002 / Ver 07**

EMISSION FACTORS

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.72	0.73	0.74	0.71	0.71	0.71	0.72
East	1.09	1.06	1.11	1.10	1.08	1.08	1.03
South	0.73	0.75	0.82	0.84	0.78	0.74	0.72
West	0.90	0.92	0.90	0.90	0.92	0.87	0.85
North-East	0.42	0.41	0.40	0.43	0.32	0.33	0.39
India	0.82	0.83	0.85	0.85	0.84	0.82	0.80

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006
North	0.72	0.73	0.74	0.71	0.72	0.73	0
East	1.06	1.03	1.09	1.08	1.05	1.05	1
South	0.74	0.75	0.82	0.84	0.79	0.74	0
West	0.90	0.92	0.90	0.90	0.92	0.89	0
North-East	0.42	0.41	0.40	0.43	0.52	0.33	0
India	0.82	0.83	0.85	0.85	0.84	0.81	0

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.98	0.98	1.00	0.99	0.97	0.99	0.99
East	1.22	1.22	1.20	1.23	1.20	1.16	1.13
South	1.02	1.00	1.01	1.00	1.00	1.01	1.00
West	0.98	1.01	0.98	0.99	1.01	0.99	0.99
North-East	0.74	0.71	0.74	0.74	0.71	0.70	0.69
India	1.02	1.02	1.02	1.03	1.03	1.02	1.01

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006
North	0.98	0.98	1.00	0.99	0.98	1.00	1
East	1.22	1.19	1.17	1.20	1.17	1.13	1
South	1.02	1.00	1.01	1.00	1.00	1.01	1
West	0.98	1.01	0.99	0.99	1.01	1.00	0
North-East	0.74	0.71	0.74	0.74	0.90	0.70	0
India	1.01	1.02	1.02	1.02	1.02	1.02	1

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North					0.53	0.60	0.63
East					0.90	0.97	0.93
South					0.70	0.71	0.71
West					0.77	0.63	0.59
North-East					0.15	0.15	0.23
India					0.69	0.68	0.68

Build Margin (tCO2/MWh) (not adjusted for imports)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006
North					0.53	0.60	0
East					0.90	0.97	0
South					0.70	0.71	0
West					0.77	0.63	0
North-East					0.15	0.15	0
India					0.69	0.68	0

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

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
North	0.76	0.76	0.77	0.76	0.75	0.80	0.81
East	1.06	1.06	1.05	1.07	1.05	1.06	1.03
South	0.86	0.85	0.86	0.85	0.85	0.86	0.85
West	0.87	0.89	0.88	0.88	0.89	0.81	0.79
North-East	0.44	0.43	0.44	0.44	0.43	0.42	0.46
India	0.86	0.86	0.86	0.86	0.86	0.85	0.85

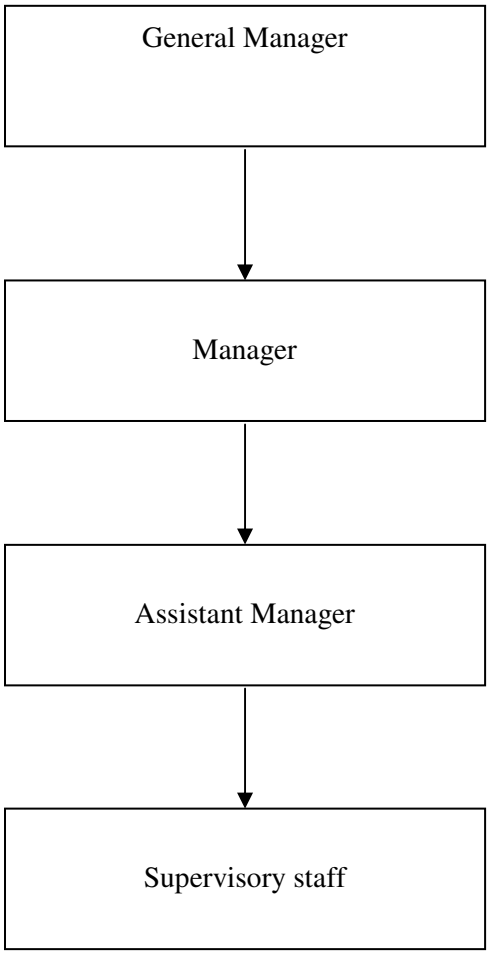
Combined Margin in tCO2/MWh (incl. Imports)

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006
North	0.76	0.76	0.77	0.76	0.76	0.80	0
East	1.06	1.05	1.04	1.05	1.04	1.05	1
South	0.86	0.85	0.86	0.85	0.85	0.86	0
West	0.87	0.89	0.88	0.88	0.89	0.82	0
North-East	0.44	0.43	0.44	0.44	0.52	0.42	0
India	0.85	0.86	0.86	0.86	0.86	0.85	0

Annex 4

Monitoring Information

Operation and Maintenance Structure for the wind energy project



Annex 5

Location details of the WEG's

District	Taluk	Village	WEG No.	Capacity	Survey No.
Gadag	Rona	Gowdagere	45	600 kW	5/1A
Gadag	Rona	Unachagere	21	600 kW	96/1
Gadag	Rona	Unachagere	44	600 kW	70/2
Gadag	Rona	Unachagere	29	600 kW	71/1
Gadag	Rona	Unachagere	37	600 kW	71/1.
Gadag	Rona	Vadegola	20	600 kW	21
Gadag	Rona	Vadegola	27	600 kW	21
Gadag	Rona	Vadegola	28	600 kW	21
Gadag	Rona	Vadegola	10	600 kW	42
Gadag	Rona	Vadegola	16	600 kW	42
Gadag	Rona	Rajur	6	600 kW	57
Gadag	Rona	Rajur	15	600 kW	106
Gadag	Rona	Rajur	24	600 kW	106
Gadag	Rona	Unachagere	9	600 kW	69/1,106
Gadag	Rona	Unachagere	13	600 kW	69/1,106
Gadag	Rona	Unachagere	14	600 kW	69/1,106
Gadag	Rona	Unachagere	34	600 kW	69/1,106
Gadag	Rona	Unachagere	22	600 kW	69/1,106
Gadag	Rona	Unachagere	49	600 kW	69/1,106
Gadag	Rona	Unachagere	23	600 kW	70/2
Gadag	Rona	Rajur	30	600 kW	106
Gadag	Rona	Kuntaji	40	600 kW	34/1
Gadag	Rona	Kuntaji	41	600 kW	34/1
Gadag	Rona	Kuntaji	42	600 kW	34/1
Gadag	Rona	Kuntaji	48	600 kW	34/1

Annex 6

Latitude and Longitude details of the WEG's

WTG Number	Latitude	Longitude
6	15°45'28.854"	75°58'14.809"
9	15°44'36.670"	75°58'11'418"
10	15°45'16.523"	75°58'21'165"
13	15°44'40.872"	75°58'18'541"
14	15°44'45.737"	75°58'24.117"
15	15°44'43.085"	75°58'52.276"
16	15°45'16.503"	75°58'30.815"
20	15°45'47.037"	75°58'52.735"
23	15°44'51.830"	75°58'42.825"
24	15°45'02.667"	75°58'36.685"
27	15°45'32.924"	75°58'58.161"
28	15°45'38.967"	75°59'03.344"
29	15°44'45.005"	75°59'05.965"
30	15°44'58.377"	75°59'00.447"
40	15°45'07.561"	75°59'36.592"
41	15°45'17.542"	75°59'38.939"
42	15°45'21.146"	75°59'47.512"
45	15°44'42.271"	75°59'32.618"
34	15°44'34.673"	75°58'06.140"
49	15°44'43.085"	75°58'52.276"
21	15°44'34.530"	75°58'34.719"
22	15°44'48.384"	75°58'34.326"
37	15°45'25.005"	75°59'11.456"
48	15°45'28.854"	75°00'13.036"
44	15°45'28.854"	75°58'24.362"

Annex 7