Voluntary Carbon Standard
Project Description
19 November 2007

Date of VCS PD: 10 November 2009
Version: 04

[Table of Contents]

1 Description of Project:

1.1 Project title

8.35 MW wind power project at Guddarangavana Halli, District Chitradurga, State Karnataka in India

1.2 Type/Category of the project

The VCS program approved the use of "Clean Development Mechanism" (CDM) methodologies approved by the CDM Executive Board (CDM EB). Accordingly the proposed VCS project activity uses one of the baseline and monitoring methodologies approved by the CDM EB.

The methodology applicable to this project activity is "Grid connected Renewable Electricity Generation - AMS I.D.", Version 13, Scope 1 (14 December 2007)

According to small-scale CDM modalities & procedures this project activity falls under:
Type – I Renewable Energy Projects[1]
Category I-D Renewable Electricity Generation for a grid.[1]

As per the VCS 2007.1 page 6,"a project can be grouped when a number of projects and their related methodologies are included in a single VCS Project Description (VCS PD) at the time of the validation." The proposed project activity applies single approved methodology AMS I D. Thus, the proposed VCS project activity is not a grouped project.

1.3 Estimated amount of emission reductions over the crediting period including project size:

The proposed VCS project activity considers a total power generated of 18414.51 MWh per annum that is derived from the annual estimated power generation data from each machine, and after deduction of standard 5% of transmission and distribution in line losses. Taking the combined margin emission factor according to procedures prescribed in the 'Tool to calculate the emission factor for an electricity system', as 0.9269 tCO_2e/ MWh for the generation mix (as per the Central Electricity Authority "CO2 Baseline Database for the Indian Power Sector", Version 4.0, October 2008), the project activity is expected to reduce 17068 tonnes of CO2 annually.

Table below gives the estimated amount of emission reduction during the crediting period. These projections have been made considering that the project will get registered in the year 2009 and the first crediting period of ten years will start retroactively from 28th March 2006 onwards as described in the table below:

Years	Estimation of annual emission reductions in tonnes

[1] Type and category of the project is according to small scale CDM modalities and procedures taken from the UNFCCC website-- http://cdm.unfccc.int/Reference/COPMOP/08a01.pdf#page=52

	of CO2 e
28th March 2006-27th March 2007	17068
28th March 2007-27th March 2008	17068
28th March 2008-27th March 2009	17068
28th March 2009- 27th March 2010	17068
28th March 2010-27th March 2011	17068
28th March 2011-27th March 2012	17068
28th March 2012-27th March 2013	17068
28th March 2013-27th March 2014	17068
28th March 2014-27th March 2015	17068
28th March 2015-27th March 2016	17068
Total Estimated Emission Reductions (tonnes of CO2e)	**170680**
Total Number of crediting years	**10 years (renewable twice)**
Annual Average of the estimated emission reductions over the first crediting period of ten years (tonnes of CO2e)	**17068**

As per the VCS program guidelines 2007.1 dated November 2008, VCS projects are divided into three groups:

The proposed VCS project activity is reducing emissions of 17068 tCO2e per year and is therefore categorized as "**Projects"**.

1.4 A brief description of the project:

MSPL Limited (MSPL) and one of its sister companies, Ramgad Minerals and Mining Private Limited (RMMPL) has set up 9 WEGs for generating power. Details of these wind energy generators are given in Table 1.

Table 1
Details of the WEGs installed under the proposed CDM project

S. No.	**Name of Investor**	**WEG Capacity (kW)**	**Unique Identification No for WEG (Turbine ID.)**	**WEG Make**	**WEG Locations**	**Date of Power Purchase Agreement**	**Commissioning Date**
1	MSPL	1x950	MSPL 1-67456	Vestas Wind Technology	Guddadarangavana Halli, Chitradurga District	07.08.2003	21.03.2003
2	MSPL	5x950	MSPL 2- 67903 MSPL 3- 67910 MSPL 4- 67907 MSPL 5- 67904 MSPL 6- 67906	Vestas Wind Technology	Guddadarangavana Halli, Chitradurga District	11.02.2004	30.09.2003
3	RMMPL	2x950	Ramgad 1- 67902 Ramgad 2- 67905	Vestas Wind Technology	Guddadarangavana Halli & Chikkappana Halli, Chitradurga District	11.02.2004	30.09.2003

4	RMMPL	1x750	Ramgad 3-68751	Vestas Wind Technology	Gonur Village, Chitradurga District	05.03.2005	19.05.2004

The proposed VCS project activity comprises of installation and operation of eight 950 kW Wind Electricity Generators (WEGs) and one 750 kW WEG having a combined wind power generation capacity of 8.35 MW in Guddarangavana (GR) Halli of Chitradurga District in Karnataka, India. The annual estimated guaranteed power generation for each of the 950 kW WEG is 22,05,330 units and for the 750 KW WEG, the same is 17,41,050 units as per the 26.5% PLF recommended in the Karnataka Electricity Regulatory Commission (KERC) Tariff Order dated 18 January 2005.

1.5 Project location including geographic and physical information allowing the unique identification and delineation of the specific extent of the project:

The proposed VCS project activity is located in the villages Guddarangavana Halli, Chikkappana Halli, and Gonur, in District Chitradurga in the state of Karnataka in India. The nearest railway station is Chitradurga and there are two airports with Bangalore Airport about 400 km away and the nearest airport being Bellary, about 190 kms away.

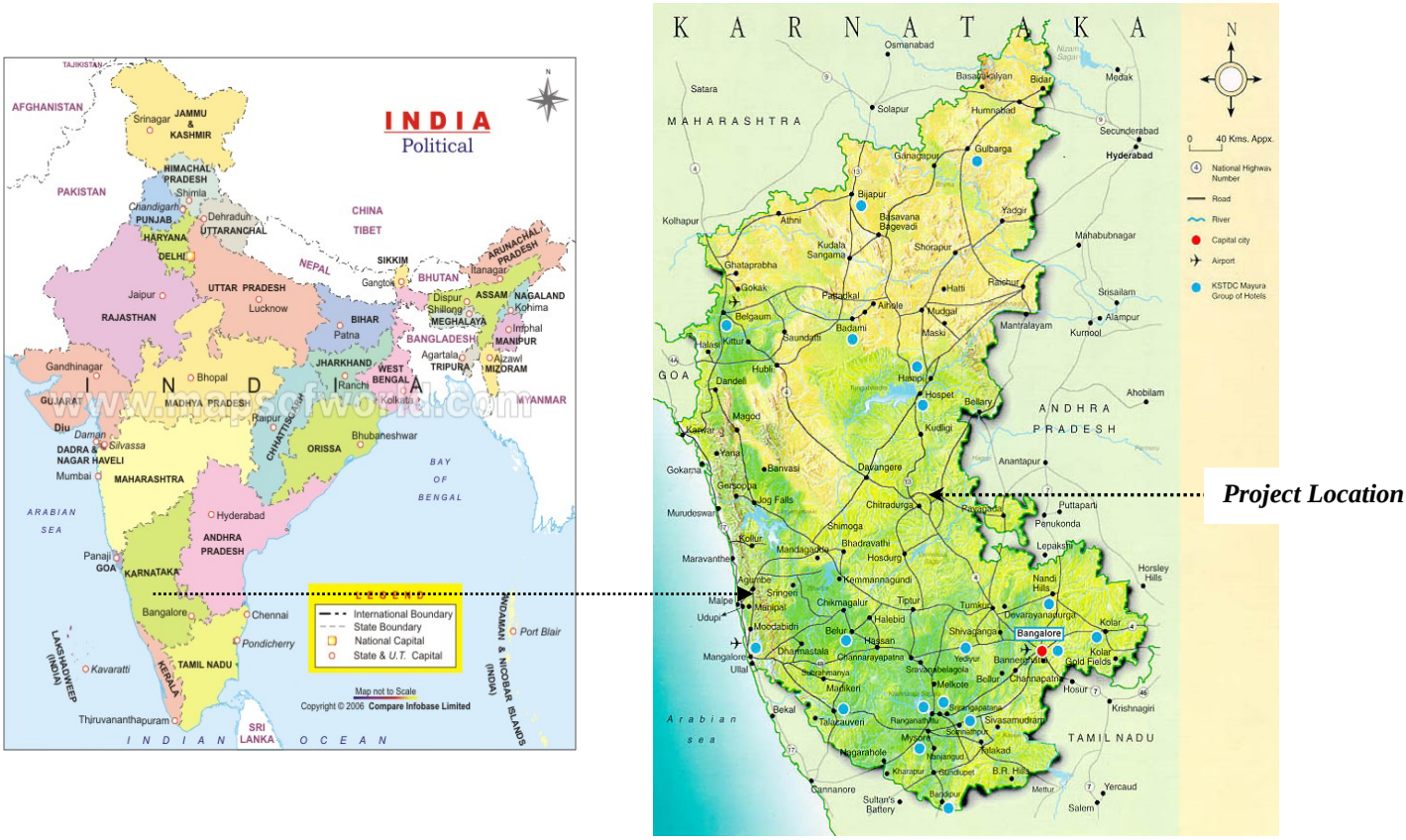

Figure 2: Location of proposed VCS project at Guddarangavana Halli, District Chitradurga, Karnataka State

The proposed VCS project activity is located at the following latitudes and longitudes in District Chitradurga in Karnataka.

Location	Machine No.	North	East

MSPL-01	GR-11	14˚18'04"	76˚ 23'39"
MSPL-02	GR-1	14˚18'58"	76˚ 23'30"
MSPL-03	GR-2	14˚18'53"	76˚ 23'33"
MSPL-04	GR-3	14˚18'44"	76˚ 23'34"
MSPL-05	GR-4	14˚18'42"	76˚ 23'34"
MSPL-06	GR-5	14˚18'36"	76˚ 23'34"
Ramgad-01	GR-6	14˚18'31"	76˚ 23'38"
Ramgad-02	GR-17	14˚19'38"	76˚ 22'23"
Ramgad-03	GON-4	14˚16'45"	76˚ 25'07"

1.6 Duration of the project activity/crediting period:

According to the policy announcement dated 10th September 2008 from the VCS Association, the project start date will be considered as the date the project activity began reducing or removing GHG emissions. The first WEG of the proposed VCS project activity was commissioned on 21/03/2003.

The VCS project crediting period is for a maximum of 10 years which may be renewed once in line with the project life of twenty years.

1.7 Conditions prior to project initiation:

Based upon the Central Electricity Authority (a Government of India organization) database, the region-wise installed capacity as on 31st March 2006 for various grids is shown in the Table below. As can be observed from the table that fossil fuels (mainly coal and gas) have a majority share in power generation, and accordingly influence the electricity generation system, via various grids in India, thereby the emissions generated from the same. Prior to the initiation of the project activity the said power would have been generated from the power plants connected to the Southern regional grid, which is still within the Southern grid, as described in the subsequent paragraphs.

Region wise installed capacity (MW) as on 31.3.2006

Region	Hydro	Thermal				Nuclear	Renew.	Total
		Coal	Gas	Diesel	Total			
Northern	11061.88	17592.50	3213.19	14.99	20820.68	1180.00	694.59	33757.15
Western	6681.33	20941.50	5080.72	17.48	26039.70	1300.00	1098.83	35119.86
Southern	10967.71	15992.50	3434.50	939.32	20366.32	880.00	4233.49	36447.52
Eastern	2496.53	13662.38	190.00	17.20	13869.58	0.00	111.67	16477.78
N. Eastern	1113.07	330.00	771.50	142.74	1244.24	0.00	46.86	2404.17
Islands	5.25	0.00	0.00	70.02	70.02	0.00	5.42	80.69
All India	32325.77	68518.88	12689.81	1201.75	82410.54	3360.00	6190.86	124287.17

Source: CO2 Baseline Database for the Indian Power Sector, Version 1.1, December 2006, Government of India, Ministry of Power, Central Electricity Authority

If the current sector wise installed capacity on a country wide basis is analyzed as per the Table below, the same scenario of heavy reliance on energy produced from fossil fuels emerges. Here again, fossil fuels form a major component of power generation units set up by the Central and various State governments.

India - Sector-wise installed capacity (MW) as on 31.03.2008

Sector	Hydro	Thermal				Nuclear	Renew.	Total
		Coal	Gas	Diesel	Total			
State	26086.76	42047.50	3834.22	604.61	46486.33	0.00	2200.04	74773.13
Central	8592.00	29010.00	6638.99	0.00	35648.99	4120.00	0.00	48360.99
Private	1230.00	4991.38	4183.00	597.14	9771.52	0.00	9994.53	20996.05
All India	35908.76	76048.88	14656.21	1201.75	91906.84	4120.00	12194.57	144130.17

Source: CO2 Baseline Database for the Indian Power Sector, Version 4, October 2008, Government of India, Ministry of Power, Central Electricity Authority

It can be observed that after analyzing the conditions prior to project initiation, as well as the current data, fossil fuels still contribute more than 50% of the total power generation capacity in the country, thus having major implications on the GHG emissions resulting out of the sector.

Due to the present low proportion of renewable energy as compared to the proportion of fossil fuel based grid power in India, the Government of India (GOI) under the Ministry of New and Renewable Energy (MNRE) has been recently proposing to increase the renewable power base within the country.

In the 11th five year plan (from 2007 – 2012), the GOI has proposed a physical target of 15,000 MW with an outlay of Rs. 3,925 crore (39,250 Million Rs.) for grid interactive/ distributed renewable power generation. The total investment required would be about Rs. 60,000 crore (600,000 Million Rs.), which amounts to leveraging 15.5 times the proposed budgetary support. This includes 1000 MW targeted from distributed renewable power systems (DRPS) with an outlay of Rs. 2,100 crore (21,000 Million Rs.), and Rs. 25 crore (250 Million Rs.) for performance testing. The detailed break-up is given below:

Table: Renewable Target and Outlay as per the Eleventh Five Year Plan

S.No	Programme Component	Physical Target(MW)	Proposed Outlay (Rs. in crore *OR* Rs. in 10 Million)
1	Wind power	10,500	75*
2	Small hydro	1,400	700
3	Co-Generation Biomass power	1200 500	600 200
4	Urban waste to energy	200	150
5	Industrial waste to energy	200	75
	Sub-total (A)	14,000	1,800
6	Solar power(grid-interactive/DRPS)	50	200**
7	DRPS(excluding Solar)	950	1,900
	Sub-Total (B)	1,000	2,100

8	Performance testing	-	25
	Grand Total	15,000	3,925
* For Demonstration projects in states where there is sizable potential but no commercial activity has commenced **Subsidy limited to Rs 50,000 per household			

Source: XIth Plan Proposals for New and Renewable Energy, MNRE, GOI, December 2006 http://74.125.47.132/search?q=cache:0RbZU66p0KAJ:planningcommission.nic.in/aboutus/committee/wrkgrp11/wg11_renewable.doc+XIth+Plan+Proposals+for+New+and+Renewable+Energy,+MNRE,+GOI,+December+2006&cd=1&hl=en&ct=clnk&gl=in (Please see section 3.9 of the HTML version of the report)

Thus, it is evident that by setting up such policies, the Government is trying to accelerate investment into the grid connected renewable energy generation sector and thereby decrease the high carbon intensive power generation within the country.

It is thus understood, that prior to the initiation of the proposed project activity, the electricity produced in the baseline of the Southern Grid was generated by burning of the fossil fuels in the fossil fuel fired power plants. The new wind electric generators installed in the proposed VCS project substitute the baseline consumption of electricity produced from fossil fuel operated power plants, with cleaner zero GHG emitting fuel (wind) to operate the wind power plant. Thus, more carbon intensive fossil fuels are substituted with zero carbon intensive fuels for the operation of the proposed VCS power plant.

1.8 A description of how the project will achieve GHG emission reductions and/or removal enhancements:

The proposed VCS project is a renewable power generation unit which uses wind as the source of energy supplementing the power needs of the grid with clean wind power which otherwise is fed by fossil fuel based power plants. Thus, the proposed VCS project displaces electricity by renewable means (through wind power) that would otherwise have been generated through fossil fuel sources.

As evident from the conditions prior to the project initiation, as well as conditions currently prevailing, the use of fossil fuels majorly contributes towards power generation in the country. The power generation is therefore a major source of GHG emissions in India.

The proposed VCS project activity uses wind energy for power generation. Wind energy is inexhaustible, infinitely renewable and has many environmental benefits. As an alternative to the fossil fuels, the technology to produce electricity from wind is receiving serious attention throughout the world. As temperature rises during the day, the air above the land surfaces gets heated, becomes lighter and moves upward creating a low air pressure zone. Comparatively colder air from sea surface rushes to low-pressure land area. In the night the process gets reversed. This continuous change in air pressure due to variation in temperature ensures continuous flow of air (wind) on surface of earth. The wind strikes the blade of the wind mill, which in turn rotates an electrical generator through a transmission mechanism. The whole system is termed as Wind Turbine Generator (WTG).

Wind based power generation facilities utilize wind turbines for the generation of power. As there is no combustion of fossil fuel to generate energy to drive the turbine, there are no emissions or any other forms of pollution. Therefore the wind energy is considered as one of the cleanest method for power generation, which implies, there are no GHG

emissions associated with the same, and thereby use of wind energy for power generation contributes significantly towards sustainable development and global efforts for climate change mitigation.

The project activity under consideration is installed in the state of Karnataka, which is under the coverage of the Southern grid, and therefore displaces the power which would have otherwise been generated from the grid, which is heavily reliant on fossil fuels. Thus, the project activity would displace the use of fossil fuels in an amount corresponding to the generation of power produced by the wind energy generators, and thus subsequently reduce the GHG emission associated with the combustion of fossil fuels for the power generated from the grid.

1.9 Project technologies, products, services and the expected level of activity:

As temperature rises during the day, the air above the land surfaces gets heated, becomes lighter and moves upward creating a low air pressure zone. Comparatively colder air from sea surface rushes to low-pressure land area. In the night the process gets reversed. This continuous change in air pressure due to variation in temperature ensures continuous flow of air on surface of earth. As an alternative to the fossil fuels, the technology to produce electricity from wind is receiving serious attention throughout the world. The wind strikes the blade, which in turn rotates an electrical generator through a transmission mechanism. The whole system is termed as Wind Electric Generator (WEG).

The wind speed is influenced by several geo-climatic features like weather conditions, plantation, topography of site etc. and consequently power produced by wind is seasonal, constantly variable and highly site specific.

Under the proposed VCS project activity, eight 950 KW and one 750 KW Wind Electric Generator machines from Vestas Wind Technology (formerly NEG Micon) have been installed. The NM 48/750 kW WEG with a rated output of 750 kW is one of the machines well known for its best performance. The NM 48/750 kW WEG is a stall regulated machine with a cut-in speed of 4 m/s and a cut-out speed of 25 m/s. The nominal wind speed requirement for this machine is 16 m/s. The NM 48/750 kW machine is type tested and certified by DNV, Denmark A/S.

The NM 54/950 kW Power Trim WEG with a rated output of 950 kW is a stall regulated machine with a cut-in speed of 3.5 m/s and a cut-out speed of 25 m/s. The NM 54/950 kW machine is type tested and certified by DNV, Denmark A/S. The computer based control system of Power – Trim gathers and processes information on wind speeds, air density (temperature/ pressure) and blade alignment. The information is correlated with the calculated power production at a given stall level and should the actual power production be less that the calculated power production, the system changes the pitch angle. This is achieved with the help of the Power-Trim hub.
The technical specifications of the WEGs are as mentioned in Table 2.

Table 2
Technical Specifications of project installed WEGs

S.No.	Parameter	WEG 750	WEG 950
	Operational parameters		

1	Nominal Output (KW)	750	950
2	Power Regulation	Stall	Stall
3	Cut – in (m/s)	4	3.5
4	Cut – out (m/s)	25	25
	Rotor		
5	Rotor diameter (m)	48.2	54.5
6	Rotor swept area (m2)	1824	2333
7	Number of blades	3	3
8	Rotor revolutions (rpm)	22/15	22/15
9	Rotor placing	Upwind Rotor	Upwind Rotor
	Brake System		
10	Blade Tip air brake	Hydraulic, fail safe	Hydraulic, fail safe
	Disk Brake	Hydraulic, fail safe	1 pcs. Hydraulic, fail safe
	Drive Train		
11	Gear Type	Planetary – parallel axle	Planetary – parallel axle
12	Ratio	1:67.5	1:67.5 (1:81.0 – 60 Hz)
13	Main shaft	Forged shaft and flange	Forged shaft and flange
14	Main bearing	Spherical roller bearing	Spherical roller bearing
15	Cooling	Heat exchanger with pump	Heat exchanger with pump
	Generator		
16	Type	Asynchronous, 4/6 pole	Asynchronous, 4/6 pole
17	Nominal Voltage (V)	690	690
18	Nominal Frequence (Hz)	50	50
19	Name plate rating (kW)	750/200	950/200
20	Cooling	Liquid cooled with pump	Liquid cooled with pump
	Yaw system		
21	Type	Ball bearing	Sliding bearing
22	Yaw brake	3 Friction brake/ motor brake	
23	Drive mechanism	4 electrical planetary gears	3 electrical planetary gears
	Tower		
24	Type	Conical, steel, painted	Conical, steel, painted
25	Hub Height	According to type approvals	According to type approvals
	Controller		
26	Type	Computer controlling	Computer controlling
27	Computer controlling	Soft by thyristors	Soft by thyristors
28	Capacitor bank	No – load compensated	Generator no load compensation
29	Remote Control	By modem	By modem
	Sensors		
30	RPM sensors	Rotor, generator, yaw system	Rotor, generator, yaw system
31	Temperature sensors	Gear, generator, controller	Gear, generator, controller, ambient
32	Thermal sensors/ warning	Main switch, engine protection	
33	Vibration sensor	Nacelle, rotor	Nacelle, rotor
34	Meteorology	Anemometer, wind vanes, thermometer	Anemometer, wind vanes
35	Hydraulic systems	Pressure sensitive switches, pressure transducer	Pressure transducer
	Lightning protection		
36	According to standard	IEC 1024	IEC 1024 Class 1
37	Blades	Receptor in the blade tips	Receptor in the blade tips
38	Nacelle	Arial	Air rod

Once the wind electricity is generated by the turbines described above, it is sent via transmission lines to the consumers via the existing grid transmission structure.

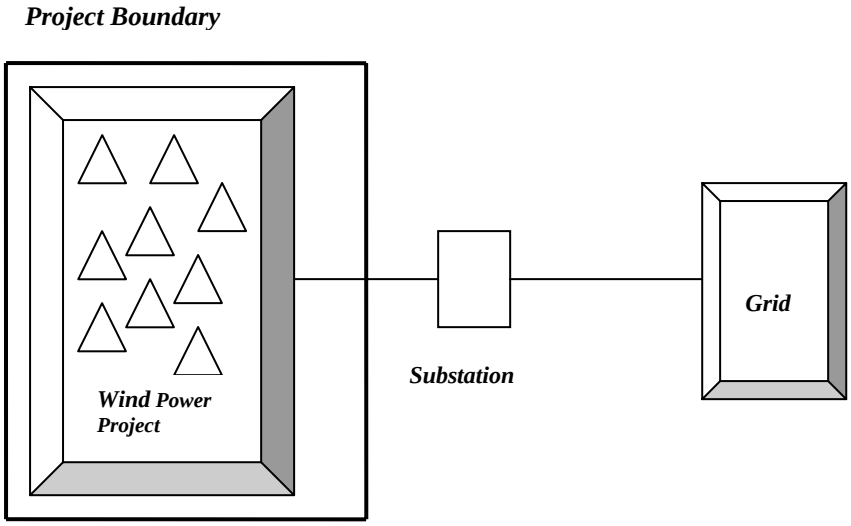

Diagram showing proposed VCS Project Boundary

1.10 Compliance with relevant local laws and regulations related to the project:

Renewable energy projects are not mandated in India by any enforced law or other regulatory framework. However, for guidance on voluntary wind energy based electricity generation, there are policies introduced/incentives declared by the state governments. These policies have been considered for the project activity and are available at http://www.windpowerindia.com/govtinc.html .

The project proponent has obtained all the statutory clearances required to set up the wind project in the state of Karnataka. The local law mandates that the project participant first obtains land, from private owners, for the installation. After this the nodal agency (KREDL-Karnataka Renewable Energy Development Limited) issues the infrastructure and commissioning clearances.
The Project proponent then enters into the long term power purchase agreement with the distribution utility (KPTCL: Karnataka Power Transmission Corporation Limited) for sale of Power.

.Thus. applicable laws fir setting up wind power projects in India and Karnataka state, in particular, apply to the project. The project has to meet compliance under the following applicable rules of the Government of India:

- Certificate from the Chief Electrical Inspector : Received and complied with by project activity
- Power Purchase Agreement (PPA) of the project proponent with the BESCOM : Signed and complied with by project activity
- Commissioning Certificates of each of the WEGs: Available and complied by project activity
- Calibration report of installed electricity meters: Available and complied by project activity
- Evacuation Agreement for the transmission and distribution of electricity generated from project with state transmission utility: Available and complied by project activity

1.11 Identification of risks that may substantially affect the project's GHG emission reductions or removal enhancements:

One major risk that can substantially affect the project's GHG emission reduction is the wind unreliability factor. Wind is intermittent and does not always blow when electricity is needed. Wind cannot be stored (although wind-generated electricity can be stored) and not all winds can be harnessed to meet the timing of electricity demands.

The wind turbine technology requires a higher initial investment than fossil-fuelled generators. Roughly 80% of the cost is the machinery, with the balance being site preparation and installation and the capital cost involved is much higher than other fossil fuel based power plants.

Renewable energy in the southern part of India, specially hydro and wind is heavily dependent on the monsoon situation. There are no perennial rivers for hydro power projects and the wind density is highest only during the monsoons. The lack of proper monsoon rainfall affects both the hydro and wind power projects severely. Continuous droughts over three years led to a drop in output from renewable energy projects in the entire southern region, including Karnataka. This affects the wind projects and reduces power generation that affects the projected income.

The extent of GHG mitigation due to the project activity is directly related to extent of power generated in the wind turbines. There is a possibility of lesser generation of power and hence the GHG emission mitigation due to any or a combination of the following reasons:

- Seasonal variations in the wind flow patterns
- Variations in the machine availability and machine down time
- Problems with the evacuation of the power generated due to non-availability of grid

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

The project activity involves installation of the wind turbine machinery for the generation of electricity by harnessing renewable source of energy, that is, wind power. Hence, there were no emissions at the onset of the project activity so the possibility of the subsequent removal or destruction is ruled out.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

The proposed VCS project activity has not created any other form of environmental credits. The proof of the same is being provided to the validator in the form of an undertaking by the project proponent.

1.14 Project rejected under other GHG programs (if applicable):

Not Applicable as project has neither applied nor been rejected by any other GHG program. The proof of the same is being provided to the validator in the form of an undertaking by the project proponent.

1.15 Project proponents roles and responsibilities, including contact information of the project proponent, other project participants:

The proposed VCS project activity has been implemented by MSPL Ltd. at the nine WEG locations at GR Halli, Chitradurga, in Karnataka. The VCS project will be looked after by the manager responsible for operation of the wind energy generating machines at the project site. Daily operations of the wind energy generating machines will be carried out by the staff responsible for the operation of the WEGs. As per the Operation and Maintenance Contract between MSPL, RMMPL and Vestas Wind Technology (earlier NEG Micon), the monitoring of the WEG and furnishing of monthly report of generation shall be the responsibility of Vestas. The Vestas personnel shall be responsible for monitoring the various parameters as explained in the Power Purchase Agreement.

The contact details of the project proponent are provided below:

Organization:	MSPL Limited
Street/P.O.Box:	Baldota Enclave, Abheraj Baldota Road
Building:	
City:	Hospet
State/Region:	Karnataka
Postfix/ZIP:	583203
Country:	India
Telephone:	+91 8394 232002, 232003
FAX:	+91 8394 232333, 232444
E-Mail:	manoj@mspllimited.com
URL:	www.mspllimited.com
Represented by:	Mr. Manoj Agrawal
Title:	Vice President
Salutation:	Mr.
Last Name:	Agrawal
Middle Name:	
First Name:	Manoj
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	manoj@mspllimited.com

The contact details of the project consultant are provided below:

Shivani Maudgal Datta
Deloitte Touche Tohmatsu India Pvt. Ltd.

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Address:

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DLF Cyber City Complex,
DLF City Phase-II,
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India

1.16 Any information relevant for the eligibility of the project and quantification of emission reductions or removal enhancements, including legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and temporal information.:

The project assists in enhancing sustainable development in India as detailed in the following aspects:

Social well being: The proposed VCS project activity leads to alleviation of poverty by generating additional employment opportunities for the local people of the project area both during the construction phase and the entire lifetime of the project. This would lead to removal of social disparities and therefore, the project is contributing to provision of basic amenities to people leading to improvement in quality of life of people.

Economic well being: The proposed VCS project activity required additional investment to be made to set up the wind turbines, and infrastructure like approach roads, substations, etc.

Environmental well being: The project uses natural resource ,wind, to generate clean and green power. Thus, the impact of the project activity on the state of Karnataka is that it reduces Karnataka's dependency on fossil fuels due to use of wind as fuel source. There is no degradation of resources used for the project. Wind power is a bio-diversity and environmental friendly mode of power generation with no negative impact on human health and leads to reduction of pollution in general as compared to the alternative sources of power such as fossil fuel.

Technological well being: The project activity utilises environmentally safe and sound wind power technology that is comparable to best practices across the world.

Thus, the project assists in the sustainable development of the country, and the state of Karnataka by reducing its dependency on fossil fuels, reducing local air pollution, providing emission free clean electricity and employment to rural youth both during the construction phase and the entire lifetime of the project.

1.17 List of commercially sensitive information (if applicable):

Not applicable

2 VCS Methodology:

2.1 Title and reference of the VCS methodology applied to the project activity and explanation of methodology choices:

The VCS program approved the use of methodologies for "Clean Development Mechanism"(CDM) approved by the CDM Executive Board (CDM EB). Accordingly the project activity in this case uses one of the baseline and monitoring methodologies approved by the CDM EB.

In accordance with Appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project category is categorized as Type – I.D.: Version 13, Scope 1, "Grid Connected renewable electricity generation". Category ID is applicable to projects that use renewable energy technologies that supply electricity to a grid.

2.2 Justification of the choice of the methodology and why it is applicable to the project activity:

In accordance with Appendix B of the simplified modalities and procedures for small-scale CDM project activities, the project is categorized as Type – I.D.: Version 13, Scope 1, "Grid Connected renewable electricity generation". Category ID is applicable to projects that use renewable energy technologies which supply electricity to a grid.

The proposed project activity leads to reduction in the emission of GHG due to the switching of fuel for power generation (substitution of grid power which is primarily generated in coal based power plant with power generated in wind turbines using renewable energy of wind).

The applicability criteria of the above methodology in the context of the proposed project are as follows:

1. *This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass, that supply electricity to and displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit.*

   The proposed project is supplementing the power needs of the Southern grid with clean wind power which otherwise is fed by fossil fuel based power plants. Thus, the proposed project displaces 8.35 MW of electricity by renewable means (through wind power) that would otherwise have been generated from fossil fuel sources.

2. *If the unit added has both renewable and non-renewable components (e.g.. a wind/diesel unit), the eligibility limit of 15MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15MW.*

The proposed project falls under this eligibility limit of 15 MW as the electricity generation potential of the proposed project is 8.35 MW of wind power.

Further, the renewable electricity generation capacity of the proposed project is 8.35 MW, which is less than the maximum qualifying capacity of 15MW. The proposed project activity will continue to generate power from the nine WEGs at the total installed capacity of 8.35 MW during each year of the crediting period.

As is therefore evident, the proposed project meets all the applicability criteria set out under the selected small scale methodology according to CDM baseline and monitoring methodologies and hence the project category is applicable to the project.

2.3 Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:

The GHG sources for the baseline scenario would have been the emissions due to fossil fuel used for the generation of same amount of electricity. The atmosphere would serve as GHG sink or reservoir for emissions generated out of fossil fuel based power plants.

The major sources and justification for GHG emissions are identified as below;

	Source	**Sinks & Reservoirs**
Baseline (Southern grid entity)	Mainly due to fuel combustion, during power generation from the fossil fuel based electricity generation plants, interconnected with the grid.	The reservoirs and sinks would not change and be constant for both the baseline as well as the project activity. Hence for simplicity purposes, these are not considered as significant.
Project Activity (Wind Based Power Generation facility)	In accordance with the applicable methodology AMS I D, there are no GHG emissions from the wind based project activity, and thus it can be safely considered that there are no sources of GHG emissions after the implementation of the project activity. The leakages are also considered as zero.	

2.4 Description of how the baseline scenario is identified and description of the identified baseline scenario:

The usual practice for the generation of electricity is fossil fuel based power plants hence the most probable option for the identification of baseline scenario is the use of fossil fuel such as coal. The proposed VCS project activity is located in Karnataka state of India that lies in the Southern grid of India.

Historically, the Indian power system was divided into five independent regional grids, namely Northern, Eastern, Western, Southern, and North-Eastern. Each grid covered several states as depicted in the following Table.

Geographical scope of the two electricity grids

NEWNE Grid				Southern Grid
Northern	**Eastern**	**Western**	**North-Eastern**	**Southern**
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Pondicherry
Punjab	Andaman-Nicobar	Maharashtra	Nagaland	Lakshadweep
Rajasthan		Goa	Tripura	
Uttar Pradesh				
Uttarakhand				

Source: Central Electricity Authority (CEA), Government of India, "CO2 Baseline Database for the Indian Power Sector", Version 4.0, October 2008

Since August 2006, however, all regional grids except the Southern Grid have been integrated and are operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids will be treated as a single grid and is being named as NEWNE grid from FY 2007-08 onwards in the CO2 Baseline Database. The Southern grid has also been planned to be synchronously operated with rest of all Indian Grid by yearly 12th Plan (2012-2017). Presently Southern grid is connected with Western and Eastern grid through HVDC link and HVDC back to back systems.

With the purpose of providing a ready reference for the emission coefficients to be used in carbon credit projects, Central Electricity Authority (CEA), Government of India, has published, "CO2 Baseline Database for the Indian Power Sector", Version 4.0, October 2008. This database is an official publication of the Government of India for the purpose of carbon credit baselines. It is based on the most recent data available with the Central Electricity Authority (CEA), Government of India.

The project category applicable to the proposed project is AMS ID. Accordingly, the energy baseline being considered is as directed in paragraph 9 of the AMS.I.D/Version 13 as;

"The baseline (emissions) is the energy (in kWh) produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2e/kWh)" calculated in a transparent and conservative manner as:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system[2].

[2] http://cdm.unfccc.int/methodologies/Tools/EB35_repan12_Tool_grid_emission.pdf

OR

(b) The weighted average emissions (in kg CO2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations must be based on the data from an official source (where available) and made publicly available. The wind power project displaces power which would have otherwise been generated from the Southern regional grid. Thereby the energy baseline for this project would be the energy produced by the wind based power generation facility, multiplied by the emission coefficient as calculated for the Southern grid.

2.5 Description of how the emissions of GHG by source in baseline scenario are reduced below those that would have occurred in the absence of the project activity (assessment and demonstration of additionality):

The new wind electric generators installed in the proposed VCS project substitute the baseline consumption of fossil fuel operated power plants with cleaner zero green house gas emitting wind power plant. Thus, carbon intensive fossil fuels are substituted with zero carbon emission sources of energy for the operation of the proposed VCS power plant.

According to the Clause 5.8 of the VCS 2007 guidance document, the additionality of the project is required to be demonstrated using any one of the three tests specified. The proposed VCS project activity is shown to be additional using the Test 1.

Step 1: Regulatory Surplus:

The proposed VCS project activity is not mandated by any statutory law or regulatory framework.

-There is no legal requirement on the choice of a particular technology for power generation.
-The applicable Environmental Regulations do not restrict the use of wind energy for power generation.
- The implementation of project activity is a voluntary initiative and it is not mandatory or a legal requirement. For power generation, the Electricity Act 2003 does not restrict or empower any authority to restrict the fuel choice, the applicable environmental regulations do not restrict the use of wind energy and there is no legal requirement on the choice of a particular technology.
Project Proponents have been issued with all required regulatory clearances before commissioning.

Step 2: Implementation

According to the Attachment A of Appendix B of the Simplified Modalities and Procedures for Small Scale CDM project activities (Version 07, 28th November 2005) (The weblink for accessing the reference is at **http://cdm.unfccc.int/methodologies/SSCmethodologies/AppB_SSC_AttachmentA.pdf**), the project participants are to provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers:

(a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions
(b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions
(c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions
(d) Other barriers: Without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

Investment Barrier

With an intention to strengthen its environmentally responsible brand image to its clients and understanding the seriousness of the issue of global warming, and having the knowledge that wind power projects are a means of generating zero carbon intensive power, MSPL Ltd. examined the option to generate power using wind energy.

The project proponent carried out the financial viability assessment of the investment proposition and it was not found to be attractive enough. An investment analysis of the investment proposition in the proposed VCS project activity was carried out by the project proponent with the Internal Rate of Return (IRR) of the project as the indicator. 'Internal Rate of Return' is one of the known financial indicators used by banks, financial institutions, investors and project developers for making investment decisions.

The local commercial lending rate for March 2003 (the time of placing of purchase order for the project activity) for the company is the applicable Prime Lending Rate (PLR) of the Bank for the company and is set as the benchmark as per the CDM-EB guidance document Annex 45, EB 41. Being the date of the placement of the first purchase order for the project (the other orders for seven more machines being placed by July 2003 and the last order for one machine placed in December 2003), the investment decision of the project proponent regarding going ahead with the project activity was taken at the start of the project activity, i.e. before the placement of purchase order in favour of the project activity. The applicable PLR of this date is 10.75% given by State Bank of India and taken as the benchmark for comparison with the project IRR of the investment proposition in the proposed VCS project activity. The reference to this PLR value is submitted as a certificate from the nationalized bank as Annexure-XVI to the validator.

The parameters used for determination of project IRR for the project activity are provided below:

Considerations	Value	Unit	Basis
Installed Capacity	8.35	MW	Purchase Order
Emission Reduction Factor	0.9269	tCO2/Ths kWH	CEA CO2 Baseline Database, Version 4
Penalty for reactive power	0.4	Rs./ kWh for 5% of power	Purchase Order
O & M Expenses as % of Capital Cost	1.06%	For third year onwards	O&M Contract with Vestas Wind Technologies
Annual Escalation in O & M Expenses	5.0%	Per Annum from fourth year onwards	O&M Contract with Vestas Wind Technologies
Administrative Overheads	5.0%	of Revenues	As per standard practice
Income Tax Rate as per companies act	35.007%		As per Companies Act
Insurance Expns	0.02%	of Capital Cost	Estimated based on standard insurance charges, breakup submitted as Annexure-XVIII and copies of insurance policy premium submitted as Annexure-XVII
Depreciation Rate as per IT act (WDV)	80%		As per IT Act
Depreciation Rate (WDV) as per Companies Act	4.75%		As per Companies Act
Life of the project	20	Yrs	Lifetime of a wind power plant as per the Directory, Indian Wind Power 2007, Page 4-17

It may be noted that the project proponent had engaged a third party for estimation of the PLF as per the C-WET report submitted to the validator. As may be seen from this report, the PLF for the machines was estimated at 25.2% for the 950 KW machine and 20.7% for the 750 KW machine.

The generation figures estimated for the project proponent's machines as per various documents are presented below:

Machine Type	C-WET's Third Party estimation dated September 2005 (Units)	KERC Tariff Order dated Jan 10th, 2005 (Units)	Guaranteed Generation as per machine Purchase Orders (Units)
950 KW	21,00,000	26.5% PLF, i.e. 22,05,330	25,00,000
750 KW	13,60,000	26.5% PLF, i.e. 17,41,050	18,50,000

As per the third party C-WET report, it is unlikely for the PLF to reach the figures as specified in the purchase orders. Considering the above figures, therefore, the PLF as per KERC order has been taken as the most likely estimate for the purpose of IRR calculation for the project activity.

The results of the sensitivity analysis carried out for the proposed project activity are provided in the Tables below:

For Set 1 = 0.95 MW MSPL Ltd. machines

Consideration	**Range of Sensitivity**	**Project Capital Cost**	**Annual escalation in Power Tariff for first 10 years**	**Rate of annual escalation of O & M cost from 4th year onwards**	**Plant Load Factor**	**Results Project**
	(%)	**(Ths. Rs.)**	**(%)**	**(%)**	**(%)**	**(%)**
Project Scenario	**At actual**	**35750**	**0.062**	**5**	**26.5**	**7.53**
Project Capital Cost	10	39325				6.39
	5	37537.5				6.93
	-5	33962.5				8.18
	-10	32175				8.92
Variation in Power Tariff	10		0.068			7.62
	5		0.065			7.57
	-5		0.059			7.48
	-10		0.056			7.44
Rate of Annual Escalation in O & M cost	10			5.5		7.52
	5			5.3		7.52
	-5			4.8		7.53
	-10			4.5		7.54
Plant Load Factor	10				29.15	8.76
	5				27.83	8.15

	-5		25.18	6.9
	-10		23.8	6.28

For Set 2 = 4.75 MW MSPL Ltd. machines

Consideration	Range of Sensitivity	Project Capital Cost	Annual escalation in Power Tariff for first 10 years	Rate of annual escalation of O & M cost from 4th year onwards	Plant Load Factor	Results of Project IRR
	(%)	(Ths. Rs.)	(%)	(%)	(%)	(%)
Project Scenario	**At actual**	**181000**	**0.062**	**5**	**26.5**	**8.53**
Project Capital Cost	10	199100				7.27
	5	190050				7.92
	-5	171950				9.21
	-10	162900				10.13
Variation in Power Tariff	10		0.068			8.63
	5		0.065			8.58
	-5		0.059			8.48
	-10		0.056			8.43
Rate of Annual Escalation in O & M cost	10			5.5		8.52
	5			5.3		8.52
	-5			4.8		8.54
	-10			4.5		8.54
Plant Load Factor	10				29.15	9.95
	5				27.83	9.18
	-5				25.18	7.89
	-10				23.8	7.12

For Set 3 = 2.65 MW RMMPL machines

Consideration	Range of Sensitivity	Project Capital Cost	Annual escalation in Power Tariff for first 10 years	Rate of annual escalation of O & M cost from 4th year onwards	Plant Load Factor	Results Projec IRR
	(%)	(Ths. Rs.)	(%)	(%)	(%)	(%)
Project Scenario	**At actual**	**103795**	**0.062**	**5**	**26.5**	**7.40**

Project Capital Cost	10	114174.5				6.33
	5	108984.8				6.81
	-5	98605.25				8.09
	-10	93415.5				8.76
Variation in Power Tariff	10		0.068			7.51
	5		0.065			7.45
	-5		0.059			7.34
	-10		0.056			7.28
Rate of Annual Escalation in O & M cost	10			5.5		7.38
	5			5.3		7.39
	-5			4.8		7.40
	-10			4.5		7.41
Plant Load Factor	10				29.15	8.45
	5				27.83	7.97
	-5				25.18	6.87
	-10				23.8	6.39

It is evident from the sensitivity analysis conducted that even after varying the four parameters of tariff, escalation in O & M expenses, project capital cost and PLF from +10% to -10%, the project IRR for the project activity never crosses the benchmark local commercial lending rate of 10.75 %.

Project IRR without VCS revenues

The details of the project IRR established for the project activity are provided as follows:

Set No.	Name of Investor	WTG Capacity (MW)	No. of WTG	Total Capacity (MW)	Date of Commissioning	Project (in Crores)	Tariff (Rs./kWh)	Project IRR
1	MSPL Limited	0.95	1	0.95	Apr-03	35.75	3.25	7.53%
2	MSPL Limited	0.95	5	4.75	Sep-03	181.00	3.10	8.53%
3	RMMPL	0.95	2	2.65	Sep-03	103.80	3.10	7.40%
		0.75	1		May-04			
Total			**9**	**8.35**		**320.55**		

As can be seen, the project IRR for each of the three sets of machines is lower than the bench mark local commercial lending rate of 10.75 %. Thus, the project proponent in-spite of their desire to establish wind energy based power generation facilities was not keen to go ahead with the project.

Project IRR with VCS revenues

Realizing that the monetary benefits due to VCS will improve the project IRR of the project, the financial analysis was repeated with VCS benefits as an additional source of revenue. The project IRR of the investment proposition with VCS benefits as additional revenue stream pushed the project IRR near the benchmark. As the project IRR with carbon benefits improved the viability of the investment proposition and keeping in mind

the benefits of clean energy from the project, it was decided to implement the project as a voluntary carbon project.

Hence, it can be justifiably concluded that the voluntary carbon revenue that the project activity would obtain through sale of the emission reductions, is very crucial to sustain the operations of the project activity.

Thus it is quite evident that in the absence of VCS benefits the project would not have got implemented and that VCS was an important consideration which facilitated implementation of the project.

Step 3: Common Practice

The proposed VCS project activity pertains to generation of power using wind energy in the state of Karnataka. In the following paragraphs an account of wind power generation in India in general has been provided.

Based upon the Central Electricity Authority, CEA (a Government of India organization, and a statutory body which works at a policy level to regulate and reform the Indian power sector) database, the region-wise installed capacity as on 31st March 2006 for various grids is shown in Table 3, below. As can be observed from the table that fossil fuels (mainly coal and gas) have a majority share in power generation, and accordingly influence the electricity generation system via various grids in India. Prior to the initiation of the project activity the said power would have been generated from the power plants connected to the southern regional grid, as described in the subsequent paragraphs.

Table 3 – Region wise installed capacity (MW) as on 31.3.2006

Region	Hydro	Thermal				Nuclear	Renew.	Total
		Coal	Gas	Diesel	Total			
Northern	11061.88	17592.50	3213.19	14.99	20820.68	1180.00	694.59	33757.15
Western	6681.33	20941.50	5080.72	17.48	26039.70	1300.00	1098.83	35119.86
Southern	10967.71	15992.50	3434.50	939.32	20366.32	880.00	4233.49	36447.52
Eastern	2496.53	13662.38	190.00	17.20	13869.58	0.00	111.67	16477.78
N. Eastern	1113.07	330.00	771.50	142.74	1244.24	0.00	46.86	2404.17
Islands	5.25	0.00	0.00	70.02	70.02	0.00	5.42	80.69
All India	32325.77	68518.88	12689.81	1201.75	82410.54	3360.00	6190.86	124287.17

Source: CO2 Baseline Database for the Indian Power Sector, Version 3, December 2007, Government of India, Ministry of Power, Central Electricity Authority

Since August 2006, however, all regional grids except the Southern Grid have been integrated and are operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids will be treated as a single grid and is being named as NEWNE grid. The revised geographical scope of the two regional grids is mentioned in table 4 below.

Table 4 - Geographical scope of the current two regional electricity grids.

NEWNE Grid				Southern
Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadra & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Pondicherry
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Lakshadweep
Rajasthan		Goa	Tripura	
Uttar Pradesh				
Uttarakhand				

Source: CO2 Baseline Database for the Indian Power Sector, Version 4, October 2008, Government of India, Ministry of Power, Central Electricity Authority

If the current sector wise installed capacity on a country wide basis, is analyzed as per the Table 5 below, the same scenario emerges. Here again, fossil fuels form a major component of power generation units set up by the Central and various State governments.

Table 5: India - Sector-wise installed capacity (MW) as on 31.03.2008

Sector	Hydro	Thermal				Nuclear	Renew.	Total
		Coal	Gas	Diesel	Total			
State	26086.76	42047.50	3834.22	604.61	46486.33	0.00	2200.04	74773.13
Central	8592.00	29010.00	6638.99	0.00	35648.99	4120.00	0.00	48360.99
Private	1230.00	4991.38	4183.00	597.14	9771.52	0.00	9994.53	20996.05
All India	35908.76	76048.88	14656.21	1201.75	91906.84	4120.00	12194.57	144130.17

Source: CO2 Baseline Database for the Indian Power Sector, Version 4, October 2008, Government of India, Ministry of Power, Central Electricity Authority

It can be observed that after analyzing the conditions prior to project initiation, as well as the current data, fossil fuels still contribute more than 50% of the total power generation capacity in the country, thus having major implications on the GHG emissions resulting out of the sector.

In India, a Wind Resource Assessment Programme[3] is programme is being co-ordinated by the Centre for Wind Energy Technology (C-WET), and has so far covered 25 States and Union Territories, involving establishment of 1050 wind monitoring and mapping stations. The potential for wind power generation and grid interaction in India has been estimated at about 45,000 MW.

State wise Installed Capacity in India from March 2005 to March 2008[4]

[3] Ministry of New & Renewable Energy, http://mnes.nic.in/

[4] http://www.inwea.org/installedcapacity.htm

State	March 2008	March 2007	March 2006	March 2005
Tamilnadu	3873.4 MW	3492.7 MW	2894.6 MW	2037 MW
Karnataka	**1011.4 MW**	**821.1MW**	**584.5 MW**	**410.7 MW**
Maharashtra	1755.9 MW	1487.7 MW	1001.3 MW	456.2 MW
Rajasthan	538.8 MW	469.8 MW	358.1 MW	284.8 MW
Andhra Pradesh	122.5 MW	122.5 MW	121.1 MW	120.6 MW
Madhya Pradesh	187.7 MW	57.3 MW	40.3 MW	28.9 MW
Kerala	10.5 MW	2 MW	2 MW	2 MW
Gujarat	1252.9 MW	636.6 MW	338 MW	253 MW
West Bengal	1.1 MW	1.1 MW	1.1 MW	1.1 MW
Total	**8754.0 MW**	**7090.8 MW**	**5341 MW**	**3594.3 MW**

Thus it can be seen that installed capacity of wind power during March 2005 was 410.7 MW which is around 11% of the total installed capacity of wind power in India.

It is clearly seen that during the start date of the Project Activity, wind power installation in Karnataka state was very less compared to the total wind power installation in India and only thermal power generation was dominating. Hence wind power development was not a common practice during start date of project activity .It is thus understood, that prior to the initiation of the proposed project activity, the electricity produced in the baseline of the Southern Grid was generated by burning of the fossil fuels in the fossil fuel fired power plants. The new wind electric generators installed in the proposed VCS project substitute the baseline consumption of electricity produced from fossil fuel operated power plants, with cleaner zero GHG emitting fuel (wind) to operate the wind power plant. Thus, more carbon intensive fossil fuels are substituted with zero carbon intensive fuels for the operation of the proposed VCS power plant. Clearly, even as on date, wind power development in India is not a common practice.

3 Monitoring:

3.1 Title and reference of the VCS methodology (which includes the monitoring requirements) applied to the project activity and explanation of methodology choices:

The proposed project activity utilizes the UNFCCC CDM methodology AMS ID.: Version 13, Scope 1, “Grid Connected renewable electricity generation”. Category ID is applicable to projects that use renewable energy technologies which supply electricity to a grid.

3.2 Monitoring, including estimation, modelling, measurement or calculation approaches:

As per the requirements of the methodology, monitoring shall consist of metering the electricity generated by the renewable technology. The proposed voluntary carbon project

activity leads to mitigation of GHG due to the substitution of fossil fuel generated power in the baseline with zero GHG emitting wind based power project. The monitoring of the emission reduction will be carried out by measuring the net electricity supplied to the grid by the proposed VCS project with the help of electronic meters installed on each substation and each wind machine.

The WEGs supplied by Vestas RRB are certified to ISO 9001. Also, each project executed by Vestas RRB involves an Operations and Maintenance Agreement that is signed with the project promoter. Vestas RRB also has adequate and technically qualified site managers to ensure constant monitoring of the installed wind turbines.

The project activity will be looked after by the manager responsible for operation of the wind energy generating machines at the project site. Daily operations of the wind energy generating machines will be carried out by the staff responsible for the operation of the WEGs.

The meters used for recording the electricity generation will be of integrator type. The electricity generated will be recorded on a daily basis. The data will be captured and stored electronically, wherever possible. As a separate measure, the same data will be entered in the log book on change of every shift.

Measuring instruments of all the parameters covered under the monitoring plan which are required to be monitored regularly will be calibrated as per maintenance schedule.

3.3 Data and parameters monitored / Selecting relevant GHG sources, sinks and reservoirs for monitoring or estimating GHG emissions and removals:

Data / Parameter:	EGy (Net Electricity supplied to the grid by the WEGs)
Data unit:	KWh
Description:	Monthly recording
Source of data to be used:	Share Certificate from BESCOM providing the monthly electricity generated from project activity and uploaded to Southern grid
Value of data applied for the purpose of calculating expected emission reductions	Will vary and will be obtained from monitoring
Description of measurement methods and procedures to be applied:	Net electricity supplied to grid will be calculated based on the measured values of “export” and “import” on the meter at the delivery point, where joint reading is taken by project proponent representative and BESCOM officials. The meter at the final uploading point to grid (Delivery point) is common to the project activity and other wind turbines in the wind farm that are not under this project activity. Apportioning of net electricity uploaded is done with reference to the electricity generated from individual wind turbines by the state utility

	department. The BESCOM will issue a monthly certificate for actual power exported by each project owner in the wind farm to the grid, based on the individual meter readings of each wind turbine. The reading recorded in this certificate, issued by BESCOM, will be used to calculate actual GHG emission reductions by the project activity. The data relevant to establishing the net electricity generated from the project including the electricity share certificate from BESCOM, the invoice to BESCOM and the monthly metering sheets available with the project proponent shall be archived for the entire crediting period plus two years.
QA/QC procedures to be applied:	The measurement of the electricity generated using an electronic meter as installed in the WEG machine and at the substation is considered to be a reliable method for measurement of electricity generated. The additional meters installed at the sub stations (grid interconnection point) will be used to measure the mentioned variable on a continuous basis and shall act as a cross check. Every month these meter readings will be recorded by site in-charge and the state utility personnel and the records will be archived for crosschecking yearly figures. The meters at the sub station will be trivector meters. The readings in these meters may be used to determine the net power wheeled to the grid and determine the extent of mitigation of GHG over a period of time. Calibration of the energy meters being used will be carried out annually as per the standard practice. Data archiving shall be carried out in electronic format during the crediting period and for a time period of two years greater than the total duration of the crediting period of the project activity to enable monitoring of the net electricity supplied to the grid. All these activities shall be carried out by trained personnel of Vestas Wind

	Technology that is an ISO 9001 certified company. Thus, all QA / QC procedures applicable shall be followed. The data records shall also be maintained as specified in the quality standard.
Any comment:	The accuracy class of the metering equipment shall be 0.2% (both main and check meters) as also mentioned in the Power Purchase Agreement.

3.4 Description of the monitoring plan

The proposed project leads to mitigation of GHG due to the substitution of fossil fuel generated power in the baseline with zero GHG emission wind based power project. The monitoring of the emission reduction will be carried out by measuring the net electricity supplied to the grid by the proposed project with the help of tri-vector type electronic meters installed on each substation.

The WEGs supplied by Vestas Wind Technology are certified to ISO 9001. Also, each project executed by Vestas Wind Technology involves an Operations and Maintenance Agreement that is signed with the project promoter. Vestas Wind Technology also has adequate and technically qualified site managers to ensure constant monitoring of the installed wind turbines.

The proposed project activity has been implemented by MSPL Ltd. at the nine WEG locations at GR Halli, Chitradurga, in Karnataka. The project will be looked after by the manager responsible for operation of the wind energy generating machines at the project site. Daily operations of the wind energy generating machines will be carried out by the staff responsible for the operation of the WEGs. As per the Operation and Maintenance Contract between MSPL, RMMPL and Vestas Wind Technology (earlier NEG Micon), the monitoring of the WEG and furnishing of monthly report of generation shall be the responsibility of Vestas. The Vestas personnel shall be responsible for monitoring the various parameters as explained in the Power Purchase Agreement and reproduced below:

Metering: The Delivered Energy shall be metered by the MSPL and BESCOM at the high voltage side of the step up transformer installed at the receiving station. The electricity generated by the Project shall be metered by MSPL and BESCOM at the high voltage side of the step up transformer installed at the project site.

Metering Equipment: Metering equipment shall be electronic trivector meter of accuracy class 0.2% required for the project (both main and check meters). The Main Meters and check meters at the project site are owned by MSPL, maintained by Vestas Wind Technology and it will be under the custody of BESCOM and will be sealed.

The metering equipment shall be maintained in accordance with electricity standards. Such equipment shall have the facility of recording half-hourly and monthly readings. MSPL shall provide such metering results to BESCOM. The meters installed shall be capable of recording and storing half hourly readings of all the electrical parameters for a minimum period of 35 days with digital output.

The monthly meter readings (both main and check meters) at the project site and the receiving station shall be taken simultaneously and jointly by MSPL representative and BESCOM representative on the first day of the following month. At the conclusion of each meter reading, an appointed representative of BESCOM and representative of Vestas Wind Technology, on behalf of MSPL Limited and which will be cross verified by MSPL representative, shall sign a document indicating the number of kilowatt-hrs indicated by the meter. The electricity generated from each WEG will be recorded on daily basis.. The data will be captured by Vestas officials and submitted to the project proponent in the form of a monthly report. The actual data of energy generation from the WEG can be electronically stored in the individual meters for a period of 30 days.

Net electricity supplied to grid will be calculated based on the measured values of "export" and "import" on the meter at the delivery point, where joint reading is taken by project proponent representative and BESCOM officials. The meter at the final uploading point to grid (Delivery point) is common to the project activity and other wind turbines in the wind farm that are not under this project activity. Apportioning of net electricity uploaded is done with reference to the electricity generated from individual wind turbines by the state utility department. The BESCOM will issue a monthly certificate for actual power exported by each project owner in the wind farm to the grid, based on the individual meter readings of each wind turbine. The reading recorded in this certificate, issued by BESCOM, will be used to calculate actual GHG emission reductions by the project activity.

The data relevant to establishing the net electricity generated from the project including the electricity share certificate from BESCOM, the invoice to BESCOM and the monthly metering sheets available with the project proponent shall be archived for the entire crediting period plus two years. The monitoring data shall also be archived by Vestas Wind Technology as a backup arrangement for the entire crediting period plus two years.

Inspection of Energy Meters: All the main and check energy meters (export and import) and all associated instruments, transformers installed at the project shall be of 0.2% accuracy class. Each meter shall be jointly inspected and sealed on behalf of both BESCOM and MSPL and shall not be interfered by either party except in the presence of the other party or its accredited representatives.

Meter Test Checking: All the main and check meters shall be tested for accuracy annually. The meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2% accuracy class. The consumption registered by the main meters alone will hold good for the purpose of billing as long as the error in the main meter is within the permissible limits.

i) If during the tests, the main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then billing will be as per the main meter as usual. The check meter shall, however, be calibrated immediately.

ii) If during the tests, the main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within the permissible limits of error, then the billing for the month upto the date and time for such test shall be as per the check meter. There will be a revision in the bills for the period from the previous calibration test upto the current test based on the readings of the check meter. The main meter shall be calibrated immediately and billing for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.

iii) If during the tests, both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the meters shall be immediately calibrated and the correction applied to the reading registered by the main meter to arrive at the correct reading of energy supplied for billing purposes for the period from the last month's meter reading upto the current test. Billing for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.

iv) If during any of the monthly meter readings, the variation between the main meter and the check meter is more than that permissible for meters of 0.2% accuracy class, all the meters shall be re-tested and calibrated immediately.

The monitoring, measurement, reporting and training of monitoring personnel shall be conducted by Vestas Wind technology as defined in the Operation and Maintenance agreement between MSPL and Vestas and RMMPL and Vestas and the metering records shall also be maintained by personnel of MSPL Ltd. and BESCOM as defined in the PPAs.

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

The project activity meets the eligibility criteria to use simplified modalities and procedure for small scale CDM project activities as set out in paragraph 6 (c) of decision 17/CP.7. The total installed capacity of the project is 8.35 MW, which is less than the limit of 15 MW prescribed for small scale project. Moreover, being a renewable energy project, the project emissions are zero.

The baseline and monitoring methodology being used for the project is AMS ID. Accordingly the emission reduction for the project will be determined.

The proposed project will supply power to the regional grid of the southern part of the country. This is based on the consideration of free flow of electricity among the member states and the union territory through the Southern Region Load Dispatch Centre (SRLDC). Thus the entire southern grid is considered as a single entity for estimation of the emissions in the baseline.

Accordingly, as per the methodology AMS ID, the emission in the baseline scenario for the project activity will be determined using the following formula

$$BEy = (EGy) \times EFy$$

Where
BEy = Baseline emissions (in tCO2e)
EFy = Baseline Emissions Factor in tCO2/MWh
EGy = Net electricity supplied by the project activity to the grid in MWh

The project category applicable to the proposed project is AMS ID. Accordingly, the energy baseline being considered is as directed in paragraph 9 of the AMS.I.D/Version 13, that provides that the applicable baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO_2e/kWh) calculated in a transparent and conservative manner as:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'.

OR

(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.

The methodology also states that the calculations must be based on data from an official source (where available) and made publicly available.

As per the monitoring procedure defined in AMS ID, the monitoring of the baseline emissions will be done by monitoring the power supplied to the grid. Monitoring shall consist of metering the electricity generated by the renewable technology. Thus, for this purpose, the electronic meters installed at each of the WEG will be used.

As wind power is a zero GHG emission technology there will not be any project emissions (PEy). Some power gets used for maintenance of the common facilities of the wind farm. During lean phases (when the WEG are not generating power) some power gets drawn from the grid for maintenance of the common facilities. This aspect is taken care of as baseline emissions are computed on the net power supplied to the grid. For the purpose of determining the net power, two vector meters are installed at the point of power transmission to the grid.

Being a renewable and clean energy project, the project emissions (PEy) during operation are considered zero. The emission reductions from the project activity are calculated as :

Emission Reductions (y) = BEy-PEy-LEy

where
PEy = zero
LEy = Project Leakage = Zero
and BEy = (EGy) x EFy

4.2 Quantifying GHG emissions and/or removals for the baseline scenario:

The project category applicable to the proposed VCS project is AMS ID. Accordingly, the energy baseline being considered is as directed in paragraph 9 of the AMS.I.D/Version 13, that provides that the applicable baseline is the energy (in kWh) produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO2e/kWh) calculated in a transparent and conservative manner as:

(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.

OR

(b) The weighted average emissions (in kg CO2e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used. Calculations must be based on data from an official source (where available) and made publicly available.

With the purpose of providing a ready reference for the emission coefficients to be used in CDM projects, Central Electricity Authority (CEA), Government of India, has published, "CO2 Baseline Database for the Indian Power Sector", Version 4.0, October 2008. This database is an official publication of the Government of India for the purpose of CDM baselines. It is based on the most recent data available with the Central Electricity Authority (CEA), Government of India.

Historically, the Indian power system was divided into five independent regional grids, namely Northern, Eastern, Western, Southern, and North-Eastern. Each grid covered several states as depicted in the following Table.

Geographical scope of the two electricity grids

NEWNE Grid				Southern Grid
Northern	**Eastern**	**Western**	**North-Eastern**	**Southern**
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Pondicherry
Punjab	Andaman-Nicobar	Maharashtra	Nagaland	Lakshadweep
Rajasthan		Goa	Tripura	
Uttar Pradesh				
Uttarakhand				

Source: Central Electricity Authority (CEA), Government of India, "CO2 Baseline Database for the Indian Power Sector", Version 4.0, October 2008

Since August 2006, however, all regional grids except the Southern Grid have been integrated and are operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids will be treated as a single grid and is being named as NEWNE grid from FY 2007-08 onwards in the CO2 Baseline Database. The Southern grid has also been planned to be synchronously operated with rest of all Indian Grid by yearly 12th Plan (2012-2017). Presently Southern grid is connected with Western and Eastern grid through HVDC link and HVDC back to back systems.

In accordance with the provisions in AMS ID described above and the Tool to calculate the emission factor for the proposed VCS project, the combined margin emission coefficient (in kg CO2e/kWh) of the current generation mix in the Southern grid has been

considered for determining the emission in the baseline, as applicable to wind power projects. The tool to calculate the emission factor requires that for intermittent sources for power generation like wind as in the case of proposed CDM project the weights to be used for calculating the emission factor for Combined Margin.

$W_{OM} = 0.75$
$W_{BM} = 0.25$

The emission factor for simple operating margin (EF_{OM}) can be calculated as the average of ex ante data vintage on the basis of methodological tool (EB35, Annex-12) to calculate emission factor for an electricity system as follows:

FY	Simple Operating Margin (tCO2/MWh) for Southern grid
2007-08	0.991
2006-07	0.999
2005-06	1.006
Average (EF_{OM})	**0.999**

The Build Margin (EF_{BM}) for the year 2007-08, applicable for the project is **0.713** tCO2/MWh from the CEA database[5].

Baseline emission Factor (EF_{BL}) Or Combined margin is calculated as weighted average of simple Operating Margin and build Margin emission Factors. Therefore,

$EF_{BL} = (W_{OM} X EF_{OM}) + (W_{BM} X EF_{BM}) = (0.75 X 0.999) + (0.25 X 0.713) = 0.9269$ tCO2equivalent / MWh

Using the values of emission factors for OM and emission factor for BM, provided in the official database and the weights provided above the value of the emission factor for the combined margin has been determined to be 0.927 tCO2equivalent / MWh. Thus the emission factor considered is 0.927 t CO2e/MWh, calculated by applying a weight of 75% to the Simple Operating Margin and 25% to the Build Margin for the Southern grid. The project emission in the proposed VCS project has been taken as zero t CO2e/MWh, as wind is a zero GHG emitting renewable form of energy.

As per the methodology AMS ID, the emission in the baseline scenario for the project activity will be determined using the following formula

BEy = (EGy) x EFy

Where
BEy = Baseline emissions (in tCO2e)
EFy = Baseline Emissions Factor in tCO2/MWh (from the official database published by the CEA, Version 4.0, October 2008)
EGy = Net electricity supplied by the project activity to the grid in MWh

EGy = 19383.69 MWh x 95% (deduction of 5% internal T & D losses) = 18414.51 MWh

[5] http://www.cea.nic.in/planning/c%20and%20e/user_guide_ver4.pdf

Thus, BEy = 18414.51 MWh x 0.9269 tCO2/MWh = 17068 tCO2

4.3 Quantifying GHG emissions and/or removals for the project:

As described in Section 4.2, the proposed project activity being a wind power project, the project emissions PEy are considered as zero.

4.4 Quantifying GHG emission reductions and removal enhancements for the GHG project:

The emission reductions for the project activity for a year y can be calculated as:

Emission Reductions (y) = BEy-PEy-LEy

where

PE = LEy = Zero.
and BEy = (EGy) x EFy

Thus, Emission reductions per annum from the proposed project activity

= 17068 – 0 – 0 = 17068 tCO2

For the first crediting period of ten years, the total emission reductions are calculated as 17068 X 10 = 170680 tCO2.

5 Environmental Impact:

Wind power is one of the cleanest sources of renewable energy, with no associated emissions and waste products. In India, as per the provisions under the EIA Notification of 1994, wind power projects do not require an Environmental Impact Assessment.

6 Stakeholders comments:

The stake holders in the present context were defined as the parties and individuals who are either affected or are perceived to be affected by the proposed project activity. The proposed activity pertains to replacement of grid power with the power generated in WEGs. The proposed project activity is not likely to have any adverse impact on any of stake holders.

The project proponent invited the local stakeholders like local villagers, neighbouring industry personnel, wind farm developers etc. to participate in a joint stakeholder meeting on May 17th, 2007 at Chitradurga, Karnataka. Before the start of the meeting, the agenda of the meeting and the purpose was explained to the participants. Presentation regarding climate change and the Kyoto Protocol was made to the stake holders in order to familiarise them regarding the concept. Information regarding other global environmental issues like ozone depletion and Montreal Protocol was also provided during the meeting. This was followed by a presentation on the proposed project. The presentations were made in local language (Kannada, English and Hindi). The list of the stake holders who attended the meeting is provided as **Appendix - I** to this document. After the briefing /

presentations, the stake holders were asked to provide their comments / suggestions for the proposed project.

Summary of the comments received:

Some of the comments and queries were raised by the participants verbally and are as follows:

- Local residents pointed out the fact that the hills are turning barren and plantation on a large scale is required to be carried out
- Some of the local habitants felt that the presence of the wind turbines moved away rain clouds and that was the reason the monsoons were not bringing in any rain to the area and causing crop failure.
- Local residents expressed apprehension that wind mills may increase the heat in the neighboring areas.
- The potential of solar energy as a technology option was also pointed out by the stakeholders. It was pointed out that for promotion of solar energy more grants should be given as it is capital intensive.
- Some of the stakeholders pointed out the need to organize workshops and seminars in the educational institutes to raise awareness regarding climate change and other related issues

Report on how due account was taken of any comments received

The stake holders present during the meeting appreciated the initiatives taken by the project proponent and the state government to address the local and global environmental issues. They also appreciated the fact that establishment of wind farms has provided local level employment opportunities. The efforts being undertaken by the project proponent towards greening the hills by undertaking the activity of plantation was highlighted by the management of MSPL.

There were no specific negative comments. There were some apprehensions based on misconceptions rather than actual facts and these were cleared. Since there were no negative comments, there were no changes to project activity. Thus no serious concerns or issues were raised regarding the project.

The issues discussed were well understood and the local stakeholders did not have any issues with the project being in the area. They well understood the fact that it would not interfere with their village and community.

7 Schedule:

S.No.	Activity	Date completed

1	Date of Purchase Orders for the wind machines	Started : 4 March 2003 Completed: 30 December 2003
2	Date of WEG Commissioning Certificates (also Project Start date)	23rd May 2003, 1st October 2003 and 29th May 2004
3	Expected start date for crediting period for the project activity	28th March 2006
4	Date of Power Purchase Agreements for the wind machines	07th August 2003, 11th Feb 2004, 05th Mar 2005
5	Frequency of electricity measurement/monitoring	Hourly
6	Recording of electricity reading from meters	Monthly
7	Project Crediting Period	10 years first crediting period (renewable once)

8 Ownership:

8.1 Proof of Title:

The details of the purchase orders and power purchase agreements for the wind machines are as follows:

S. No.	Name of Investor	Capacity	Supply Order	Erection & Commissioning	Date of Power Purchase Agreement (PPA)
			Order No	Order No	
1	MSPL	1x950	MKA/WM/NEG/ MSPL/5110, 04 Mar 2003	MKA/WM/E&C/ NEG/5112, 04 Mar 2003	07.08.2003
2	MSPL	5x950	MKA/NEG/MSPL/ 10255, 29 July 03	MKA/WM/E&C/ NEG/10256, 29 July 2003	11.02.2004
3	RMMPL	2x950	MKA/NEG/RMMPL/ 10212, 29 July 2003	MKA/RMMPL/ E&C/10213, 29 July 2003	11.02.2004
4	RMMPL	1x750	MKA/RMMPL/ 750/539, 30 Dec 2003	MKA/E&C/ RMMPL/532, 30 Dec 2003	05.03.2005

The purchase orders and power purchase agreements provide the proof of title in the name of MSPL and RMMPL. RMMPL has further certified MSPL to be the focal point for all communication related to carbon credit generation from the proposed project activity. The authorization letter stating this has been submitted to the validator.

8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

Not applicable to the proposed VCS project activity.

Appendix - I

Meeting with Stakeholders for Clean Development Mechanism (CDM) Project for 8.35 MW Wind Power project at Guddarangana Halli, Chitradurga, Karnataka of MSPL Limited

Venue: MSPL Limited Wind Power Project at GR Halli, Karnataka

Date: 17th May 2007

Agenda:

- To discuss general environmental and social concerns
- To discuss initiatives being undertaken by MSPL Limited to address the wellbeing of the environment and community/ employees
- To discuss proposed CDM project to address the issue of climate change/ global warming

Meeting Schedule:

- Welcome & Introduction – By MSPL Limited
- Introduction to Sustainable Development / Climate Change/ CDM – Deloitte
- Introduction to the Wind Power Project & Technology being used by MSPL Limited
- Discussion Forum:
  - ✓ Questions/ Comments/ Suggestions/ Issues
  - ✓ Response to Questions/ Comments/ Suggestions/ Issues

Attendance Sheet:

S.No.	Name	Organization	Address	Phone Number	Signature
1				–	
2					
3					

S.No.	Name	Organization	Address	Phone Number	Signature
1	ರಾಮಣ್ಣ	ರೈತರು	ಗುಡ್ಡದ ರಂಗಪ್ಪನಹಳ್ಳಿ		ರಾಮಣ್ಣ
5	ಹನುಮಪ್ಪ	ರೈತರು	ಗುಡ್ಡದ ರಂಗಪ್ಪನಹಳ್ಳಿ		ಹನುಮಪ್ಪ
6	ನಿಂಗಪ್ಪ	ರೈತರು	ಗುಡ್ಡದ ರಂಗೇನಹಳ್ಳಿ		ನಿಂಗಪ್ಪ
7	ಹನುಮಂತಪ್ಪ	ರೈತರು	ಗುಡ್ಡದ ರಂಗನಹಳ್ಳಿ		ಹನುಮಂತಪ್ಪ
8	ರಂಗಣ್ಣ	ಕಂಬ್ರಾಕ್ಟರ್	ಗುಡದ ರಂಗನಹಳ್ಳಿ		ರಂಗಣ್ಣ
9	ಲಕ್ಷ್ಮಣ್ಣ	ರೈತರು	ಗುಡದ ರಂಗನಹಳ್ಳಿ		ಲಕ್ಷ್ಮಣ್ಣ
10	ಗೌರಮ್ಮ	ರೈತರು	ಗುಡದ ರಂಗನಹಳ್ಳಿ		ಗೌರಮ್ಮ
11	ತಿಮ್ಮಣ್ಣ	ರೈತರು	ಗುಡದ ರಂಗನಹಳ್ಳಿ		ತಿಮ್ಮಣ್ಣ

S.No.	Name	Organization	Address	Phone Number	Signature
12	S. Manjunatha	power process	66KV/33KV Gonur S/S Gonur. Chitradurga	9880690104	
13	S. Ganesh	Power Process	66KV/33KV Gonur S/S chitradurga	994545 9397	
14	Vishnu G Mhaskar	Suzlon	Jogimatti Chitradurga	94495 99026	
15	L. Bodhmanand Gupta	Rotary club	6th Cross Mahaveera nagar Chitradurga	94480 21249	
16	Y. Chandra Sekhariah.	Rotary A.G. 2001-02 Rotary Trust Chairman.	3rd Cons Shadakshara Saibaba Sadan, Prasanthanagar, Chitradurga	99800 55414	
17	Thomas Lot	Wind Energy Consultancy services	# 39/A, 1st F.Loor, D.B Sandra. Vidyanyapura Bangalore	99458 58147	
18	Suraj	"	"	"	
19	Sanal	"	"	"	

Stake Holders Meeting - 8.35 MW Wind Power Project at Guddarangana Halli, Chitradurga, Karnataka of MSPL Limited

Page No. 3

S.No.	Name	Organization	Address	Phone Number	Signature
20	Shabiraj	Wind Energy Consultancy Services	#39/A 1st Floor D.B. Gandra Vidyaranyapura Bangalore		
21	Nishand.	"	"	"	
22)	K. SUBRAMANIYAN	PROJECT ASSISTANT C-WET.	CENTER FOR WIND ENERGY TECHNOLOGY CHENNAI.	9486561286	K. Subra
23)	M.A. BALAJI	CENTRE FOR WIND ENERGY TECHNOLOGY	C-WET Survey No. 657/1A2 PALLIKARANI, CHENNAI - 601302	044 - 22463982	M.A. Balaji
24	N. Soryanarayana	Amuktha Spinning Mills PVT LTD	No-82 KIADB Kelagote Industrial Area	94482 79899	
25	Dayananda	Suzlon infrastructure services Ltd	Chitradurga site	9448 9431	
26	Ravishwara	Suzlon infrastructure services Ltd	Chitradurga site	94487 07899	

Stake Holders Meeting - 8.35 MW Wind Power Project at Guddarangana Halli, Chitradurga, Karnataka of MSPL Limited

Page No. 4

S.No.	Name	Organization	Address	Phone Number	Signature
27	MUTHUMANI M.	SISL - Chitradurga	Joginatti P/K Chitradurga	94489 90270	
28	Ravi Mavaria	SISL - Chitradurga	Joginatti P/K Chitradurga.	94489 90268	
29	Jagadeesha	Suzlon Monitoring works.	Jagadeesha Suzlon Monitoring works CTA	9880296 213	
30	P. Vijaykumar	Patan Wind Energy	Vijaykumar PWS Basaveshwara(Hv) Chitradurga	9480 724530	
31	R. Srinivas				R. Srinivas
32	[illegible]	Agriculture	GR Halli		[illegible]
33	[illegible]	"	"		[illegible]

S.No.	Name	Organization	Address	Phone Number	Signature
34	K. Mahendran				
35	T Pampapathi	Sri Jagadguru Trading Co., Chitradurga		9164684 21391	
36	T. Aravind Kumar	Visras		98459 40356	T. A
37	Chella Perumal	Visras			
38	Yuvaraj	Visras			
39	Kaladhara				
40	K. BALA	Hindcare Ind. Pvt Ltd.	Chitradurga	98800 41985 98800 35761	K. Bala

CDM Project.

Sl.No	Name	Designation	Name of Company	Signature.
01	Malshekar.	Manager.	Suzlon	
02	Muthumoni	Sr. Engineer.	Suzlon	
03	Ravi	Accounts	Suzlon	
04	Ravishwara.	Sr. Engineer	- " -	
05	Nagaraj.	HT Incharge	- " -	
06	Sureshappa	HR Admin.	Suzlon	
07	Arawind	ASM	Vestas	
08	Bala.	Sub Station Incharge	Vestas	
09	Rajendrakumar	Engineers	Vestas	
10	Srikanth	Engineers	Vestas	
11	Manjunath.	Technician	Power Process	
12	Nataraj		KPTC L	
13.	Shanmugam.	Jr. engineer.	Vestas.	
14.	Bala.	Area Incharge	Wind care	
15.	Perumal	Accounts	Vestas	
16.	Ribbu	Customer representative Incharge.	Eshwar Groups.	
17.	Kumar	Technician	Power Process	

Photographs of Stakeholder Consultation Meeting held at proposed VCS project site, Hospet, Karnataka on May 17th, 2007