



Voluntary Carbon Standard

Date of VCS PD: 30 October 2009

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1 Description of Project:

1.1 Project title

Bundled wind power project by KMSPL, Bangalore

Version No. 02.2

Date of document completion: 11/11/2009

1.2 Type/Category of the project

- The project is a renewable energy project falling under the category of “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.
- The project is a grouped project consisting of installation and operation of 49 wind turbine generators by *29 individual Project participants from various industries* in Tamil Nadu and Karnataka states. The power generated is being supplied to the southern grid or wheeled for captive consumption.

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

The project is 38.275 MW wind based electricity generation. Table 1 shows the estimated emission reductions from the project over the crediting period. The crediting period for the project is from 1 April, 2006.

Table 1: Emission reductions over the crediting period

Years	Annual estimation of emission reductions in tonnes of CO ₂ e
2007	83,350
2008	83,350
2009	83,350
2010	83,350
2011	83,350
2012	83,350
2013	83,350
2014	83,350
2015	83,350
2016	83,350
Total estimated reduction (tonnes of CO₂ e)	83,350
Total number of crediting years	10
Annual average over the crediting period of estimated reductions (tonnes of CO₂e)	833,500

** 1 April to 31 March every year*

As per VCS 2007 Guidelines, the project falls under the category of “project” with emission reduction more than 5,000 and less than 1,000,000 tonnes of CO₂ equivalent emission reductions.

1.4 A brief description of the project:

Project Participant: The project is bundled Kanaka Management Services Pvt. Ltd. (KMSPL) Bangalore. It is a CDM consultancy firm and had bundled the individual wind mill owner’s machines as individual owners have only small capacities and were finding VCS validation verification prohibitive for individual capacities. The individual Wind Turbine Generators (WTG) owners have given the PP emission reduction related rights. The revenue generated will be shared further under the agreement.

Description of the project: The project has been undertaken to harness the available wind power potential. The project has established 49 number of WTG aggregating to a total installed capacity of 38.275 MW. The project will generate approximately 89.92 million units of electricity per annum, which will be entirely sold to the State Electricity Boards or wheeled for captive consumption. The project will help in greenhouse gas emission reduction by using renewable energy resource for generating power which otherwise would have been generated using non- renewable, carbon intensive fuel common in the grid. The project is a green field project aimed at utilising wind energy to produce power.

The implementation of project will achieve approximately 83,350 tCO₂e emission reduction per annum by replacing grid based electricity which is predominately generated by fossil fuel based thermal power plant in Sothern Grid.

The Names of the project promoters, Capacity of the WTGs, for the WTGs are as listed in Attachment 1¹.

Purpose of the project: The objective of the project is commissioning and operation of 49 WTGs covered in the project in Tamil Nadu and Karnataka to provide renewable power to the respective state electrical grids and wheeling for captive demand. The project has led to reduced greenhouse gas emissions because it has displaced the electricity from fossil fuel intensive grid.

Pre-project scenario:

¹ Separate Excel spread sheet submitted to DOE

In the pre project scenario, the equivalent amount of electricity would have been generated by grid connected fossil fuel based power plants with prevalent fuel mix.

The Project proponent has ventured into the renewable energy sector with this activity for the first time.

Baseline scenario:

This project is wind energy based renewable, zero emission power project connected to the Southern regional grid. The project will generate approximately 89.92 million units (MU) of electricity which will be supplied to Southern Grid. Hence, the baseline will be generation of equivalent amount of electricity as per the combined margin carbon intensity of the grid which is dominated by the fossil fuel based power plants.

The project reduces the greenhouse gas emissions by generation of electricity from renewable and clean energy source, wind. The electricity thus generated is connected to the regional grid and supplied to the state electricity board and wheeled for captive demand in some cases. The main greenhouse gas that is prevented from being emitted into atmosphere is CO₂ which would have otherwise been emitted from the fossil fuel fired power plants that are connected to the grid.

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

The project sites² are well connected by road and railways. The location of the project sites are summarised in Attachment 1:

1.6 Duration of the project /crediting period:

- *Project start date: 22 March 2005³ (The project start date is the earliest commissioning date amongst all the WTGs in this grouped project)*
- *Crediting period start date: 1 April 2006*
- *VCS project crediting period: 10 years and 0 months, renewable once (considering 20 year life of project)*
- *Estimated life time of the project: 20 years*

1.7 Conditions prior to project initiation:

Prior to the project initiation, the electricity was being developed from the existing fuel mix (fossil fuel dominated) in the grid and there was significant deficit in the grid. The project locations had no energy generating units at these sites.

² Please refer **Attachment 1** for detail information regarding geo-coordinates and WTG

³ Commissioning certificate of the WTG is submitted (Madras Hydraulic Hose P Ltd. Chennai)

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

The Project reduces the anthropogenic emissions of greenhouse gases (GHGs) into the atmosphere by displacing the equivalent amount of electricity generation from the operation of existing/ proposed fossil fuel based power plants connected to the Grid. Even in the case of WTGs wheeling electricity to the respective users, in absence of the project activity, rationally they would have drawn electricity from the grid.

The Project will thus reduce the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation.

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

Technology: The project has employed Horizontal Axis WTGs of different capacities. All the WTGs deployed in the project are tested and ideal for Indian metrological condition.

All the WTGs deployed in project will be composed by WTG of three blades each (with power control) and an active system for rotor orientation. Under wind high speed, a control system will keep the power at the plant's nominal value. Under wind slow speed, a control system will optimize the energy production, selecting an optimal combination of revolutions and angle of attack.

S. N.	Client name	WTG size	Grid/captive	HTSC No	WTG details	Geographical coordinates
1	Madras Hydraulic Hose (P) Ltd.	0.75	Captive		NEG Micon, NM48/750	N8 58 0.01, E77 23 59.99
2	Shanthi Gears Ltd.	1.25	Grid	1624/TIN	Suzlon, S66-1250	N8 59 28.0, E77 32 41.8
		1.5	Captive	2417	Suzlon, S82-1500	E 77 31 56.1 N 8 59 35.6
		2.5	Grid	56; 2020	Suzlon, S66-1250	E 77 33 30.5 N 9 01 11.3; E 77 45 41.0 N 8 14 14.0
3	Raj Ranga Textile Pvt. Ltd.	1.25	Captive	986	Suzlon, S66-	N10 48

VCS Project Description Template

			e		74, 1250	09.5 E77 08 42.9
4	Sueeraa Alloys Global Pvt. Ltd.	1.25		989	Suzlon, S66-74, 1250	N10 48 23.2 E77 08 50.8
5	Cotton Blossom India Pvt. Ltd.	0.75	Grid	1416	NEG Micon, NM48/750	N8 57.436 E77 30.01
		0.75	Grid	2048	NEG Micon, NM48/750	N8 55.923 E77 38.140
6	Ambica Agarbathies and Aroma Industries Ltd.	0.75	Captive	1198	NEG Micon, NM48/750	N8 58 21.7 E77 26 53.2
7	Tirupur Export Knitwear Industrial Complex	4	Grid	1269; 1270; 1271	Vestas RRB, V39-500	N8 18 09.1 E77 41 28.5, N8 18 00.9 E77 41 28.6, N8 18 12.6 E 77 41 38.6, N8 18 04.9 E77 41 39.1, N8 18 15.7 E77 41 49.2, N8 18 7.2 E77 41 49.5, N8 18 17.2 E77 42 1.7, N8 18 9.7 E77 41 59.9
8	Ansan Textile	0.225	Grid	609	NEPC M700-225/40	N10 55.473, E77 17.439
9	Sree Santhosh Garments	0.225	Captive	473	NEPC M700-225/40	N10 55.214 E77 17.391
10	Mod Forge Pvt. Ltd.	0.75	Captive	1952	NEG Micon, NM48/750	8.7° N , 77.8° E.

VCS Project Description Template

11	Sri Kumaran Wind Energy (P) Ltd	3.75	Captive	1739, 1725, 1726	Suzlon, S66-1250	8° 58'54.25", 77°27'31.63"
12	Eskay Design	1.25	Grid	1982	Suzlon, S66-1250	N8 59 50.9 E77 32 54.4
13	Nutech Associates	1.25	Grid	1198	Suzlon, S66-1250	N10 39 42.9 E77 24 47.3
		0.75	Grid		NEG Micon, NM48/750	N 8 15 51.6 E77 37 59.4
		1.5	Grid	H-20	Suzlon, S82-1500	13° 10.6' 32" N 76° 11.6' 93" E
14	Oriental Extractions Pvt. Ltd.	0.7	Captive	1201, 1206	Suzlon, S-33, 350	N10 35 43.9 E77 18 07.0, N10 36 12.3 E77 19 20.4
15	Nagammal Mills Pvt. Ltd.	1.5	Grid	1626, 2126	NEG Micon, NM48/750	8°58'54.25", 77°27'31.63"9°00'54.37", 77°24'29.37"
16	Best Engineers Pumps Pvt. Ltd .	1.25	Grid	1939	Suzlon, S66-1250	N8 59 19.4, E77 33 40.2
17	Premier Carbonic Pvt. Ltd.	0.35	Grid	1145		N103622.7, E771828.0
18	Pure Carbo Gases	0.25	Grid	580	Pioneer Wincon, W-250	N10.94104 E077.31165
19	Popular Carbonic Pvt. Ltd.	0.35	Grid	1144		N103551.7, E771802
20	Royal Classic Mills Pvt. Ltd	0.75	Captive	1937	NEG Micon, NM48/750	N85805.8, E77 29 54.7
21	Saranya Garments Pvt. Ltd.	0.75	Grid	2124	NEG Micon, NM48/750	N8 56 400, E77 38 403
22	Cethar Vessels Ltd	1.25		1648	Suzlon, S66-1250	N8 55 36.7, E77

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						36 20.6
23	VT Switch gears & Transformers	0.6	Grid		Vestas RRB, PS-600	N14 13 59.8, E75 47 3.1
24	Shri Santhosh Meenakshi Textiles Pvt. Ltd.	2.45 (0.5 MW x 4 No. + 0.225 MW* 2 No.)		624; 542, 543, 628; 420; 421	NEPC - 500	N10 54.342, E77 10.271, N10 55.178, E77 08.773, N10 55.466, E77 09.031, N10 55.441, E77 08.748, N10 54.290 E77 10.419
25	Lakshmi Exports	0.35	Grid		Suzlon, S33-350	N10 56 28.9, E77 20 42.2
		0.225	Grid	474		N10 56 27.72, E77 20 42.27
26	Adtech Systems Ltd	0.6	Grid	D 126	Suzlon, S52-600	N10 32 09.9, E77 24 42.5
27	Nutech Prasiddhi Consortium	1.5	Grid	H20	Suzlon, S82-1500	76° 11.7' 75" E, 13° 10.5' 30" N
28	Sri Ramiah Spinners Ltd.	0.35	Captive	2390	Suzlon, S33-350	N8 18 07.1, E77 37 54.9
29	Jayashree Cables & Conductors Ltd.	0.6	Grid		Suzlon, S52-600	N10 32 38.8, E77 24 52.4

Expected level of activity: The major equipment in wind based power generation project is WTG that has useful life of the WTG is 20 years. The comprehensive O & M agreement covers all types of overhauling costs during the life of the project i.e. 20 years. The approved average Plant Load Factors of WTGs (state wise) are given as below:

- Tamil Nadu⁴: 27.46%
: 25.29% for pre-2006 installed – Group I machines)⁵
- Karnataka⁶: 26.50%

Technical specifications of the WTG models used in the project

Technical specifications of Suzlon S-66 (1250 kW)

Rotor	
diameter	66 m
blades	3 No.
Orientation	Upward/ horizontal axis
Rotational speed	13.8 / 20.7 rpm
Rotational direction	clockwise
Swept area	3421 m ²
Hub height	74 m
regulation	Pitch regulated
Operational data	
Cut in wind speed	3 m/s
Rated wind speed	14 m/s
Cut off wind speed	22 m/s
Gearbox	
Type	Integrated 3 stage
Cooling	Oil cooled, forced lubrication
Generator	
Type	Asynchronous, 4/6 pole
Rated voltage	690 V
Frequency	50 Hz
Cooling	Air cooled

Technical specifications of Suzlon S-82 (1500 kW)

Rotor	
diameter	82 m
blades	3 No.
Orientation	Upward/ horizontal axis
Rotational direction	clockwise
Swept area	5281 m ²
Hub height	80 m
regulation	Pitch regulated
Operational data	
Cut in wind speed	4 m/s
Rated wind speed	12.5 m/s
Cut off wind speed	20 m/s
Gearbox	
Type	Integrated 3 stage

⁴ As per TNERC Order on purchase of power from NCES based Generating Plants, 15/05/2006.
<http://tnerc.tn.nic.in/orders/NCESamend.pdf>

⁵ As per TNERC Order on purchase of power from NCES based Generating Plants, 15/05/2006, pg. 70. <http://tnerc.tn.nic.in/orders/ncs%20order%20-approved%20order%20host%20copy.pdf>

⁶ As per KERC, Order dated:18th January 2005, pg. 16
[http://www.kerc.org/order2005/Order%20on%20NCE%20Tariff%20\(FINAL\).doc](http://www.kerc.org/order2005/Order%20on%20NCE%20Tariff%20(FINAL).doc)

Generator	
Type	Asynchronous, 4 pole
Rated voltage	690 V
Frequency	50 Hz
Cooling	Air cooled

Technical specifications of Suzlon S-52 (600 kW)

Rotor	
diameter	52 m
blades	3 No.
Orientation	Upward/ horizontal axix
Rotational direction	clockwise
Swept area	2124 m ²
Hub height	75 m
regulation	Pitch regulated
Operational data	
Cut in wind speed	3.5 m/s
Rated wind speed	12 m/s
Cut off wind speed	25 m/s
Gearbox	
Type	Integrated 3 stage
Cooling	Oil cooled, forced lubrication
Generator	
Type	Asynchronous, 4 pole
Rated voltage	690 V
Frequency	50 Hz
Cooling	Air cooled

Technical specifications of Vestas NM48/750 kW

Rotor	
diameter	48.2 m
blades	3 No.
Orientation	Upward/ horizontal axix
Rotational direction	clockwise
Hub height	55 m
Operational data	
Cut in wind speed	< 3.5 m/s
Cut off wind speed	25 m/s
Gearbox	
Cooling	Splash lubrication
Generator	
Nominal power	750/ 200 kW
Rotational speed (synchronous)	1500/ 1000 rpm
Insulation class	F

Technical specifications of Suzlon S-52 (600 kW)

Rotor	
diameter	52 m
blades	3 No.
Orientation	Upward/ horizontal axix

Rotational direction	clockwise
Swept area	2124 m ²
Hub height	75 m
regulation	Pitch regulated
Operational data	
Cut in wind speed	3.5 m/s
Rated wind speed	12 m/s
Cut off wind speed	25 m/s
Gearbox	
Type	Integrated 3 stage
Cooling	Oil cooled, forced lubrication
Generator	
Type	Asynchronous, 4 pole
Rated voltage	690 V
Frequency	50 Hz
Cooling	Air cooled

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

The wind power project abides and will abide by all regulatory and statutory requirements as prescribed under the state and central laws and regulations. The laws and regulations applicable to the project activities and the status of the project with its compliance are demonstrated in the following Table.

Table 2: Relevant applicable laws & regulations and compliance status of the project

Regulations	Compliance status
NOC from TNEB and KREDL	Complied
Power Purchase Agreement with TNEB and KREDL	Complied
Land acquisition	Complied

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

Wind energy generation by modern wind turbine generators is an established technology. Also, there is dedicated, state of art O&M service in place. Thus, there are no risks identified that may affect the project's GHG emission reduction.

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 involves renewable electricity generation by use of natural wind energy. This does not have any GHG emissions involved in the process. Thus, the project does not involve creating GHG emissions for the purpose of its subsequent removal or destruction.

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

The project does not result in creation of any other kind of environmental credits. An undertaking of such effect is being given to DOE.

All of the WTGs are in a CDM bundle and the project activity is in pre-PDD stage.

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

The project has never been rejected under any other GHG programs. However, the project proponent has applied for registration under Clean Development Mechanism (CDM) of Kyoto Protocol for part of the latest commissioned WTGs and the same is under validation stage. The WTGs that avail CDM registration will declare so and will not claim benefits under VCS.

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

Table 3: Roles and responsibilities of project proponent

Project Proponent	Roles & Responsibilities
Kanaka Management Services Pvt. Ltd. (KMSPL) Bangalore	• To ensure that the project is in compliance with all the local laws and regulation applicable to the project. • It is under the purview of their duty to ensure that parameters are monitored in accordance with the monitoring protocol and the records are maintained in a proper manner, so that it eases the validation/verification procedures.

Table 4: Contact details of the project proponent

Organization:	Kanaka Management Services Pvt. Ltd.
Street/P.O.Box:	
Building:	# 271, SFS 407, 4 th Phase, Yelahanka New Town
City:	Bangalore
State/Region:	Karnataka
Postfix/ZIP:	560 064
Country:	India
Telephone:	+919008167850
FAX:	
E-Mail:	kmscdm@gmail.com , nandagopalkms@gmail.com
URL:	--
Represented by:	
Title:	

Salutation:	Mr.
Last Name:	P
Middle Name:	-
First Name:	Nandagopal
Department:	-
Mobile:	+919008167850
Direct FAX:	-
Direct tel:	-
Personal E-Mail:	-

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 is in conformation of the sustainable development goals of the host country in the following ways:

Social well being:

The project has created employment opportunities to the community during construction, operation as well as for the long term maintenance. The local workforce technical skills and knowledge will improve thus leading to capacity and knowledge building. Also, the project has led sustainable development of non-conventional renewable energy technology for production of power. The infrastructure in and around the project area has been improved due to project activities. This includes development of road network and improvement of electricity availability in the region as the electricity is supplied to Southern grid.

Economic well being:

The generated electricity will be sold to Southern regional grid, thereby improving the grid frequency and availability of electricity to the local consumers which will provide new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development. The project also leads to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

Environmental well being:

The electricity generated by project will be supplied to southern grid, which otherwise would have been generated by fossil fuels. Hence, the project will help in reduction of the greenhouse gas emission (CO₂) and other air pollutants (especially NO_x, SO₂ and particulates). The project helps in conservation of depleting fossil fuels such as coal, oil, natural gas which at present are predominantly used for power generation.

Technological well being:

The project activity utilized state of the art wind turbines available at that time and can encourage other industries to use renewable electricity for meeting the captive requirement and venturing in renewable energy business.

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 and explanation of methodology choices:**

Approved baseline and monitoring methodology applied for the project is

Table 5: VCS Methodology details

Methodology Applicable	ACM0002
Version	10
Sectoral scope	01
Dated	Valid from 11 June 2009 onwards
Reference	http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

Title of the methodology: Consolidated baseline methodology for grid-connected electricity generation from renewable sources

The methodology refers to the following tools in order to calculate the emission reduction from the project:

- 1) Tool to calculate the emission factor for an electricity system (version 1.1);
- 2) Tool for the demonstration and assessment of additionality (version 5.2);
- 3) Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (version 02).

However, for the project, following tools has been used:

- a) Tool to calculate the emission factor for an electricity system (version 1.1);
- b) Tool for the demonstration and assessment of additionality (version 5.2).

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

The project is grid connected wind based energy generation and avoids the expansion of grid connected fossil fuel based power generation, as it utilises renewable resources (wind energy) to generate power.

The adopted baseline methodology ACM0002 has been chosen for the project based on fulfilment of the applicability conditions as described below:

Table 6: Justification for applicable methodology i.e. ACM0002

S. No.	Applicability criteria as per ACM0002, Version 10	Project measures
1	This methodology is applicable to grid-connected renewable power generation project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	<i>The project activity is grid connected renewable power generation project and involves</i> <i>(a) installation of new WTGs at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant)</i> <i>The applicability criterion is met.</i>
2	The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit	<i>The project is installation of power units of type - wind power plant</i> <i>The applicability criterion is met.</i>
3	In the case of capacity additions, retrofits or replacements: the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity	<i>The project is installation of WTGs at green field and does not involve capacity addition.</i> <i>Thus, the criterion is not applicable here.</i>

	expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity	
4	In case of hydro power plants, one of the following conditions must apply: - The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or - The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m²; or - The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m².	<i>The project is installation of WTGs and does not involve hydro power plants.</i> <i>Thus, the criterion is not applicable here.</i>
5	In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is “the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance”.	<i>The project is installation of WTGs at green field and does not involve retrofits, replacements, or capacity additions.</i> <i>Thus, the criterion is not applicable here.</i>
6	<i>In addition, the applicability conditions included in the tools referred to above apply</i>	<i>The applicability condition of Methodological Tools used is presented following this table.</i>

		<i>The applicability criterion is met.</i>
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The methodological Tool ‘Tool to calculate the emission factor for an electricity system’ is applicable as below

‘This tool may be referred to in order to estimate the OM, BM and/or CM for the purpose of calculating baseline emissions for a project activity substitutes electricity from the grid, i.e. where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects). Note that this tool is also referred to in the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” for the purpose of calculating project and leakage emissions in case where a project activity consumes electricity from the grid or results in increase of consumption of electricity from the grid outside the project boundary.’

The project supplies electricity to the grid and in turn substitutes electricity from the grid. Thus the project activity can use this methodological Tool for estimation of OM, BM and CM for the purpose of calculating baseline emissions.

The methodological Tool ‘Tool to calculate the emission factor for an electricity system’ is applicable as below

‘The document provides a general framework for demonstrating and assessing additionality and is applicable to a wide range of project types. Some project types may require adjustments to this general framework. This tool does not replace the need for the baseline methodology to provide a step-wise approach to identify the baseline scenario.’

The project has used this Tool as specified in the applicable baseline methodology. There is no specific applicability and this is a general framework. The project activity has used the Tool with appropriate adjustment.

It can be seen from the above table that the approved methodology ACM0002, Version 10 is applicable to the project.

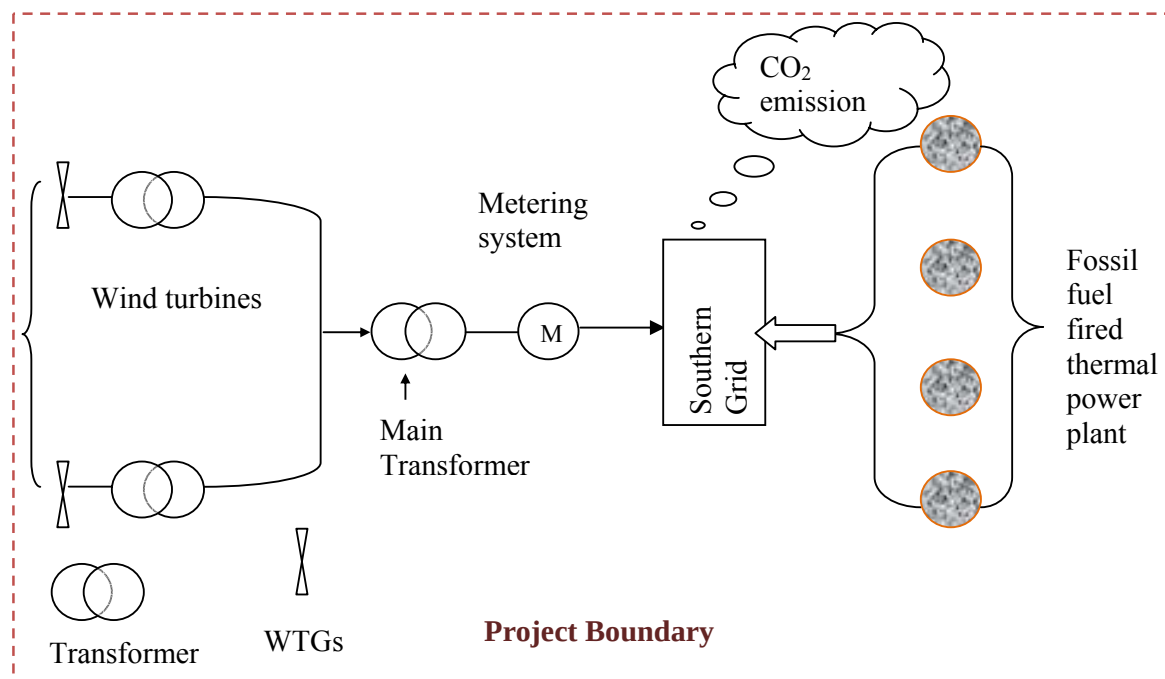
2.3 Identifying GHG sources, sinks and reservoirs for the baseline scenario and for the project:

The proposed project is the installation of a new grid-connected renewable power plant, and the baseline scenario is the following:

Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

The spatial extent of the power plants that are physically connected through transmission and distribution lines to the project and that can be dispatched without significant transmission constraints is defined as the project electricity system. For the proposed project, the spatial extent of the project boundary includes the proposed Wind Power Project and all power plants connected physically to the Southern Regional Grid of India

The schematic diagram of project boundary is as follows:



The **greenhouse gases** included in or excluded from the project boundary are shown in the table below:

Table 7: Overview on emissions sources included in or excluded from the project boundary

	Source	Gas	Included?	Justification/ explanation
Baseline	Grid connected thermal power station	CO ₂	Yes	Major source of emission
		CH ₄	No	Excluded for simplification, this is conservative
		N ₂ O	No	Excluded for simplification, this is conservative
Project	Grid connected	CO ₂	No	There will be no project emissions since
		CH ₄	No	

	electricity generation	N ₂ O	No	WTGs convert wind energy to electricity. Further, the electricity displaced at the grid is on net displacement of equivalent electricity generated by the project, i.e. (exports to grid less imports from grid equals net power displaced), hence auxiliary units consumed from grid is subtracted from benefits.
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2.4 Description of how the baseline scenario is identified and description of the identified baseline scenario:

The baseline methodology has followed the one specified in “Baseline Methodology Procedure” of ACM0002, if the project is the installation of a new grid-connected renewable power plant/unit; the baseline scenario is the following:

Table 8: Alternatives identified to the project

Scenario 1 Proposed project taken without VER revenues	1. The 38.275 MW wind based power generation units in Tamil Nadu and Karnataka would sell the power generated to the regional grid and some would wheel it for captive demand. It would reduce an equivalent amount of fossil fuel that would have been used in order to generate the power in the grid. 2. Implementation of this wind based project will reduce the pollution levels from the burning of fossil fuels and release GHG into the atmosphere and displace the electricity purchase from southern regional grid, which in turn reduce the CO₂ emissions from fossil fuel based thermal power plants of southern regional grid. 3. WTG owners have to make additional investment, which makes this alternative, less attractive for the project without emission reduction benefit. Hence this option can be eliminated for consideration as a baseline scenario.
Scenario 2 No project; Continuation of current situation	1. In this alternative, project is not implemented resulting in the continued current grid mix of TNEB and KSEB. There is no displacement of electricity of the grid mix of the southern grid. 2. In this alternative when there is no project, an

	equivalent amount of electricity would be generated by the power plants comprising of southern grid which is predominantly thermal. An equivalent amount of carbon dioxide would be generated at the thermal power generation. This alternative is in compliance with all applicable legal and regulatory requirements and may be a part of the baseline. This scenario was the status of the existing facility before this project implementation.
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This project is renewable energy resource based power project connected to the Southern regional grid. Hence the baseline scenario for the project will be “*Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources in Sothern regional Grid, as reflected in the combined margin (CM) calculations described below*”.

The estimation of baseline emission using calculation of Combined Margin multiplied by electricity delivered to the grid by the Project. As per “Tool to calculate the emission factor for an electricity system”, version-1.1 the steps followed to calculate Combined margin of Southern regional grid are as follows:

Step 1: Identify the relevant electric power system:

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. 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 for the purpose of CO₂ Baseline Database.

Table 9: Geographical scope of the two electricity grid

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

Punjab Rajasthan Uttar Pradesh Uttarakhand		Maharashtra Goa	Tripura	
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The Southern Regional grid managed by Regional Load Dispatch System (RLDS) constitutes four states (viz Andhra Pradesh, Karnataka, Kerala and Tamil Nadu) and two Union territories (Pondicherry and Lakshadweep). These states under the regional grid have their own power generating stations as well as centrally shared power-generating stations.

The proposed project is located in the state of Tamil Nadu and Karnataka and will be feeding the electricity in the southern regional grid serving the four southern states and two union territories. Therefore the proposed project would have impact on all the generation facilities in the southern grid. Thus all the power generation facilities connected to this grid form the boundary for the purpose of baseline estimation. The southern grid is also connected with other regional grids, however, the net exchange of energy within the regional grids is very small and negligible and hence other regional grids are not included in the boundary for estimation of baseline emissions.

STEP 2. Select an operating margin (OM) method:

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods:

- (a) Simple OM, or
- (b) Simple adjusted OM, or
- (c) Dispatch data analysis OM, or
- (d) Average OM.

As per Tool to calculate emission factor of an electricity system, version-1.1, the simple operating margin (Simple OM) can be used only if low-cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

From the available information published by CEA “CO₂ database for Indian Power sector”, it can be seen from the table below that low cost/must run sources for Southern regional Grid accounts for less than 50% of the total generation in the grid in the last five years. Hence the Simple OM method has been used to calculate the Operating Margin Emission factor applicable.

Share of Must-Run (% of Net Generation)

	2005-06	2006-07	2007-08
NEWNE	18.0%	18.5%	19.0%
South	27.0%	20.9%	21.0%
India	20.1%	20.9%	21.0%

Reference: CO₂ Baseline Database for the Indian Power Sector – Central Electricity Authority (Version 4.0)

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)					
	2000-01	2001-02	2002-03	2003-04	2004-05
North	25.9%	25.7%	26.1%	28.1%	26.8%
East	10.8%	13.4%	7.5%	10.3%	10.5%
South	28.1%	25.5%	18.3%	16.2%	21.6%
West	8.2%	8.5%	8.2%	9.1%	8.8%
North-East	42.2%	41.7%	45.8%	41.9%	55.5%
India	19.2%	18.9%	16.3%	17.1%	18.0%

Reference: CO₂ Baseline Database for the Indian Power Sector – Central Electricity Authority (Version 3.0)

STEP 3. Calculate the operating margin emission factor according to the selected method

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units, using the following equation:

$$EF_{OM,y} = [\sum_{i,j} Fi,j,y * COEFi,j] / [\sum_j GENj,y] \dots\dots\dots(3)$$

where Fi,j,y and $COEFi,j$ are the fuel consumption and associated carbon coefficient of the fossil fuel i consumed by power plant j in the grid in year(s) y . $GENj,y$ is the electricity generation by power plant j connected to the grid excluding zero- or low-operating cost sources in year(s) y .

As per ACM0002, the OM emission factor can be calculated using *ex ante* generation-weighted average of the most recent 3 years for which data is available or using *ex post* generation data in the year in which the project generation occurs. The OM emission factor is calculated using *ex ante* generation-weighted average of the most recent 3 years (2005-06, 2006-07, 2007-08) and hence does not require yearly monitoring of the OM emission factor.

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country.

Calculation of operating margin emission factor for the region based on simple OM

OM values have been taken from CEA⁴ (CO₂ Baseline Database for the Indian Power Sector) as discussed above. The approved methodology ACM0002 has been used in the CEA Baseline Database for the calculation of operating margin.

Operating margin emission factor (Southern Grid) in tCO₂/GWh		
Year	Simple OM	Net generation in OM (GWh)
2005-06	1.0056	100,978
2006-07	0.9991	109,116
2007-08	0.9906	114,702
3 year generation weighted average OM		0.9982

Note: As per the methodology ACM0002 the calculation of OM has been done *ex ante* based on the most recent 3 years for which data is available at the time of PD submission.

STEP 4. Identify the cohort of power units to be included in the build margin (BM)

The database of Carbon Dioxide Emission from the power sector in India published by CEA has calculated the build margin in accordance with the Grid Tool, as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. Depending on the region, the build margin covers units commissioned in the last five to ten years.

STEP 5. Calculate the build margin emission factor

The Build Margin emission factor $EF_{BM,y}$ is calculated ex-ante based on the most recent information available on plants already built. The Build Margin emission factor $EF_{BM,y}$ is given as the generation weighted average emission factor of the selected representative set of recent power plants represented by the 5 most recent plants or the most recent 20% of the generating units built (summation is over such plants specified by k). The most 20% of the generating units built recently is used for build margin emission factor calculation.

The Build Margin emission factor will be EF_{BM} is 0.7133 tCO₂/MWh of the year 2007-08 and this value has been fixed *ex-ante* for the entire crediting period for the project.

Source: Central Electricity Authority: CO₂ Baseline Database. Version 04

<http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>

STEP 6. Calculate the combined margin (CM) emissions factor

The combined margin emissions factor is calculated as follows:

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

Where:

$EF_{grid,BM,y}$ Build margin CO₂ emission factor in year y (tCO₂/MWh)

$EF_{grid,OM,y}$ Operating margin CO₂ emission factor in year y (tCO₂/MWh)

w_{OM} Weighting of operating margin emissions factor (%)

w_{BM} Weighting of build margin emissions factor (%)

For wind and solar projects, ACM0002 allows the usage of the default weights are as follows: $w_{OM} =$

0.75 and $w_{BM} = 0.25$. Using the above values the combined margin emission factor is valued as –

$$\begin{aligned} EF_y &= 0.9982 * 0.75 + 0.7133 * 0.25 \\ &= 0.9269 \text{ tCO}_2/\text{MWh} \end{aligned}$$

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 guidelines as mentioned in VCS 2007.1 have been used to demonstrate the additionality for the project. The test 1 “THE PROJECT TEST” of additionality tool is selected, as the project encounters various barriers. The various barriers that hinder the project is described elaborately by undertaking barrier analysis, and the necessity for VER revenue to overcome the barriers for establishing the project is justified accordingly.

Test 1

Step 1: Regulatory Surplus

There is no law or regulation prevalent in the states of Tamil Nadu and Karnataka that makes mandatory the establishment of the wind power plant for power generation.

Step 2: Implementation Barrier

The project shall face one (or more) distinct barrier(s) compared with barriers faced by alternative projects.

The project is connected to southern grid, which is dominated by fossil fuel based power generation plant. In the absence of the project, in view of the substantial energy deficit situation in the state of Tamil Nadu and Karnataka respective state electricity grid would have gone for predominantly new coal based thermal power plant or capacity addition in existing plants.

The project has displaced fossil fuel based electricity that would otherwise be provided by the operation and expansion of the Southern regional grid, hence reducing the emission of greenhouse gases.

Investment Barrier:

An investment of the project was conducted with project IRR as suggested by additionality tool. The internal rate of return (IRR) on investment as financial indicator is one of the known financial indicator used by banks, financial institutions and project developer for making investment decision. The financial indicator chosen is the internal rate of return of the project (IRR). This is compared with the cost of financing which has been taken from the Weighted average cost of capital from market based returns using Capital asset pricing model.

For the investment analysis a useful life of 20 years has been considered for projections of cash flow. The sub projects have been considered for investment analysis of the project. All the relevant cost i.e. capital cost, O&M cost and revenue (excluding VER revenue and including subsidies/fiscal incentive wherever applicable) are considered for investment analysis wherever applicable. The following table shows the common parameter used for calculation of IRR and project specific parameter are mentioned in the table with references.

Common Parameters

Description	Value	Reference
Free O&M years	1	As per agreement with supplier
O&M escalation	5.0%	
HT Tariff in Tamil Nadu	INR 2.7/ kWh (for sale to grid) INR 3.5/ kWh (for captive consumption)	PPA with TNSEDCL Tariff notification of TNERC ⁷
HT Tariff in Karnataka	INR 3.4 per kWh	PPA with KSEDCL
Insurance cost	As per the actual insurance policy	Including both general insurance and machine breakdown insurance cost
Income Tax rate	30%	As per The Income Tax Act, 1961 (rates as per the assessment year)
Surcharge	10%	
Cess	3%	
MAT	7.5%	
Useful life of project	20 years	
Book	4.5%	As specified by TNERC

⁷ Rate for HT Industries; http://www.tneb.in/template_3.php?tempno=3&cid=0&subcid=54

Depreciation		Guidance
Income Tax Depreciation rate	80%	On WTGs
Book depreciation (% of asset value)	90	On other assets

Benchmark

Since the project activity generates financial benefits other than CDM related income, the investment analysis is carried out by ‘benchmark analysis’ as referred in additionality tool version 5.2 sub-step 2b – option III.

The project activity bundle has WTGs installed between 2005 and 2007. So the Benchmark i.e. WACC has been calculated for each financial year.

The WACC for the subsequent years has been calculated as demonstrated below:

$$WACC = CoE * \{E / (E+D)\} + CoD_{\text{post tax}} * \{D / (E+D)\}$$

Where:

CoE – Cost of equity

CoD – Cost of Debt

CoE – Cost of Equity:

The Capital Asset Pricing Model (CAPM) approach is a generally accepted methodology for determining the Cost of Equity. CAPM is based on the portfolio theory of finance in which risks are classified into:

- Systematic risk - risk applicable to the market as a whole, such as inflation, tax rises, interest rates, etc.
- Specific risk - residual risk unique to an individual firm or a small group of companies that form a subset of the market.

The theory stipulates that specific risks can be eliminated through diversification and hence, only systematic risks determine the return expectation of investors. The basis of CAPM is the relationship between risk and return. Whilst there has been considerable debate on the strength of the risk/return relationship, evidence indicates that there is a strong linear and

positive relationship over the long term, which can be expressed by the following formula⁸

$$E(r_e) = r_f + \text{Equity Beta } (\beta) * [E(r_m) - r_f]$$

Where:

$E(r_e)$ - the expected rate of return on equity (cost of equity)

r_f is the risk-free rate of return (e.g. return on government bonds)

$E(r_m)$ - the expected rate of return on a market portfolio

Equity Beta (β) - coefficient reflecting the volatility (risk) of the stock relative to the market, which measures the systematic risk of the stock

The **Risk free rate (r_f)** has been taken from the long term government bond rates at the time of the investment decision of the project activity (sub Bundle) in 2004 to 2007. The average interest rate on Central Government date Securities i.e. bond rate during year for the considered financial years (i.e. 2004-05 to 2006-07) is given in below table:

Years	Risk Free rate ⁹
2004-05	6.37%
2005-06	7.57%
2006-07	8.22%

The **Market Risk Premium ($E(r_m) - r_f$)**, as measured and applied in practice, is the premium above the risk-free rate of return that investors expect to earn on a well-diversified portfolio of equities.

The **expected rate of return on a market portfolio ($E(r_m)$)** has been calculated as the compounded annual growth rate of the market portfolio. In calculating market risk premium, it is usual to use an established stock market index as a proxy for the market portfolio. In India, a choice of possible indices are available – BSE 30, BSE 100, S&P CNX 500, Nifty, etc.

Choice of stock market index will also be considerably influenced by the availability of historical data. In this regard, BSE 30 has the advantage of having the longest history and data is available for 20 years. The data on other indices, viz. S&P CNX 500 and Nifty, are available only since 1991. Hence BSE Sensex has been considered for calculating the Expected market return at the time of taking decision of project activity. The Expected market return has been estimated for year 2004-05 to 2006-07 on the basis of average of each months return and is given in the below table:

Years	Expected Market Return [$E(r_m)$] ¹⁰
2004-05	17.19%

⁸ Cost of Capital for Central Sector Utilities by Crisil Advisory Services

⁹ <http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf>

¹⁰ The worksheet is being submitted to DOE for validation

2005-06	18.14%
2006-07	19.10%

Equity Beta is the measure of the expected volatility of a particular stock relative to a well-diversified market portfolio. It measures the systematic risk of a stock, i.e. the risk that cannot be eliminated in a well-balanced, diversified portfolio. The beta of equity is calculated as the covariance between its return and the return on a well-diversified market portfolio, divided by the variance of the return on a well-diversified market portfolio.

As the project activity involves the wind power generation, so the beta has to be taken from the listed companies involved in the wind power generation. But as there is no listed companies whose core business is wind power generation, so the beta value has been considered for the listed companies who are involved in the similar business i.e. power generation. The following are listed companies whose beta value available at the time of investment decision during 2002-03 to 2006-07 is given in the below table:

S. N.	Year	Power generating Company	Beta Value
1	2004-05	Tata Power	2.03
2		CESC Ltd	1.21
3		Reliance Energy/Reliance Infra	0.90
4		BF Utilities	2.59
		Average Beta value	1.69
1	2005-06	Tata Power	1.11
2		Godrej Industries	1.34
3		Reliance Energy/Reliance Infra	1.10
4		BF Utilities	1.39
		Average Beta value	1.24
1	2006-07	Tata Power	0.76
2		CESC Ltd	0.57
3		Reliance Energy/Reliance Infra	0.93
4		BF Utilities	3.7
		Average Beta value	1.49

The **Cost of Debt** has been considered as *Prime Lending Rate (PLR)* at the time of investment decision of the project activity. For the post tax cost of debt, the income tax will be deductible at prevailing at the time of conceptualization of the project activity. Since for the first 10 years due to wind promoting policy of 10 year tax holidays, so it has to pay MAT under section 80 I A of Income tax act prevailing at the time of decision making. The PLR during 2004-05 to 2006-07 (at the time of conceptualization of the project activity of all sub-bundles) is given by Reserve Bank of India (RBI) in below table:

Year	Cost of Debt ¹¹
2004-05	10.25%
2005-06	10.25%
2006-07	12.25%

The ***Debt Equity ratio*** as per the Wind Power policy norms has been considered as 70:30.

The WACC as a Benchmark calculated during 2004-05 to 2006-07 is given in the below table:

Year	Benchmark	Comments
2004-05	14.55%	This benchmark is for the WTGs whose decision has been taken in 2005-06
2005-06	13.36%	This benchmark is for the WTGs whose decision has been taken in 2006-07
2006-07	15.91%	This benchmark is for the WTGs whose decision has been taken in 2007-08

Sensitivity analysis

As per guideline provided by EB in meeting no. 41 annex 45 the criteria for choosing the sensitivity analysis parameter is:

Sensitivity analysis

16. Guidance: Only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation (all parameters varied need not necessarily be subjected to both negative and positive variations of the same magnitude), and the results of this variation should be presented in the PDD and be reproducible in the associated spreadsheets.. Where a DOE considers that a variable which constitute less than 20% have a material impact on the analysis they shall raise a corrective action request to include this variable in the sensitivity analysis.

The project activity involves the sale of electricity to the grid; hence it is the sole source of revenue for this project. This revenue is based on two parameters namely, the tariff & the power generation. The tariff is fixed without any escalation. Also, $\pm 10\%$ variation in either of these parameters would be affecting IRR to the similar extent.

Similarly the parameters which can affect 20% of the total cost for this case is only the investment cost. Since the investment costs were considered on the purchase/ work orders, as per actual, there were no possibilities of this cost getting reduced. Hence the sensitivity analysis would have to be performed only for an increase in capital cost which would result in decreasing project IRR further and make VCS revenue

¹¹ <http://www.rbi.org.in/scripts/PublicationsView.aspx?id=9581>

all the more important to make project happen. Hence this analysis has not been presented.

The sensitivity analysis shows that in all case the project is less attractive as it does not yield minimum benchmark returns.

S. N.	Client name	IRR at PLF = +10%	IRR at base PLF ¹²	IRR at PLF = - 10%	Benchmark (%)
1	Madras Hydraulic Hose (P) Ltd.	13.44	11.85	10.20	14.55
2	Shanthi Gears Ltd.	14.08	12.57	11.00	
		15.76	13.92	12.04	15.91
		14.97	13.20	11.37	13.36
3	Raj Ranga Textile Pvt. Ltd.	13.46	11.79	10.06	14.55
4	Sueeraa Alloys Global Pvt. Ltd.	13.30	11.64	9.92	
5	Cotton Blossom India Pvt. Ltd.	13.09	11.45	9.75	
6	Ambica Agarbathies and Aroma Industries Ltd.	13.64	12.17	10.63	
7	Tirupur Export Knitwear Industrial Complex	10.26	8.91	7.48	
8	Ansan Textile	14.18	12.28	10.35	13.36
9	Sree Santhosh Garments	14.29	12.57	10.79	14.55
10	Mod Forge Pvt. Ltd.	14.32	12.60	10.82	13.36
11	Sri Kumaran Wind Energy (P) Ltd	15.55	13.93	12.24	14.55
12	Eskay Design	13.90	12.19	10.35	13.36
13	Nutech Associates	14.24	12.64	10.96	14.55
		13.32	11.64	9.90	
		12.28	10.85	9.34	15.91
14	Oriental Extractions Pvt. Ltd.	12.72	11.26	9.70	14.55
15	Nagammal Mills Pvt. Ltd.	12.40	10.93	9.38	13.36
16	Best Engineers Pumps Pvt. Ltd.	14.53	12.76	10.92	
17	Premier Carbonic Pvt. Ltd.	12.47	11.03	9.51	14.55
18	Pure Carbo Gases	13.85	12.15	10.41	13.36
19	Popular Carbonic Pvt. Ltd.	13.78	12.09	10.34	14.55
20	Royal Classic Mills Pvt. Ltd	15.21	13.35	11.45	13.36
21	Saranya Garments Pvt. Ltd.	13.63	12.08	10.44	
22	Cethar Vessels Ltd	13.62	12.10	10.52	14.55
23	VT Switch gears & Transformers	13.66	12.14	10.54	
24	Shri Santhosh Meenakshi Textiles	13.57	12.08	10.51	13.36
25	Lakshmi Exports	14.48	12.95	11.33	

¹² For Tail Nadu = 27.46% for post 2006 commissioned WTGs and 25.29% for pre-2006 WTGs; for Karnataka = 26.5%

		12.05	10.63	9.09	14.55
26	Adtech Systems Ltd	13.20	11.58	9.89	13.36
27	Nutech Prasiddhi Consortium	15.52	13.66	11.75	15.91
28	Sri Ramiah Spinners Ltd.	15.18	13.42	11.59	15.91
29	Jayashree Cables & Conductors Ltd.	15.35	13.58	11.75	

Considering the VCS revenue the project IRR increases to reduce the gap between project IRR without VCS revenue and established benchmark. CDM registration and the resulting revenue from CER sales helps the project to overcome the barriers outlined above, most notably project IRR. The impact of CER revenue improves the returns associated with undertaking the project and will act as an important buffer against these barriers. The results of the financial analysis are summarised in the excel sheet

Outcome of Investment Analysis: It can therefore be concluded from above analysis that the project is financially not attractive and hence project is additional.

Common Practice Analysis

Scenario in Tamil Nadu:

The first WTGs in the project activity was commissioned in March 2005. As per the TNERC Order on purchase of power from NCES based Generating Plants¹³, the total installed capacity as on 31/03/2006 in India was 124,287 MW. The share of the renewable energy sources in this was only 8661 MW i.e. about 6.97%. Further, the same report also discusses the non-conventional energy scenario in India. As per, the potential for the various non-conventional energy sources and that harnesses was as presented below

Sources / Systems	Potential (MW)	Harnessed (MW)
Biomass based Power	19,500	912.53
Wind Power	45,000	5340.60
Small Hydro power (up to 25 MW)	15,000	1826.43
Energy Recovery from Waste	2,700	45.78

Thus, even with in the available 45,000 MW identified wind energy potential, only 11.87% was established by March 2006.

Scenario in Karnataka:

The total installed capacity of southern grid as on 31/03/2006 was 36447.52 MW¹⁴. The total installed capacity comprises Hydro – 10967.71 MW (30.1%), Coal – 15992.50 MW (43.9%), Gas - 3434.50 MW (9.4%), Diesel- 939.32 MW (2.6%), Nuclear- 880 MW (2.3%), Renewable energy sources (including wind) - 4233.49 MW (11.6%).

¹³ Order No. 3, dt. 15/05/2006, pg. 3

¹⁴ http://www.cea.nic.in/power_sec_reports/Executive_Summary/2006_03/6.pdf

It is clear from above statistics that the southern grid system is mainly dominated by the fossil fuel fired thermal power plant. The share of thermal power sector (Coal + Gas + Diesel) is 20366.32 MW (55.87%) as compared to wind & RES which is 10.7%.

Moreover, the installed capacity for the State of Karnataka as against the total installed capacity in India is given in the following table:

State-wise Grid-interactive Wind Power Installed Capacity (as on 31/12/2005)¹⁵	
State	Cumulative Installed Capacity (MW)
Andhra Pradesh	126.1
Gujarat	287.8
Karnataka	487.0
Kerala	2.0
Madhya Pradesh	35.1
Maharashtra	654.6
Rajasthan	312.6
Tamil Nadu	2526.7
West Bengal	1.1
Others	1.6
Total	4434.5

At the time of investment decision in January 2006, the installed capacity of Karnataka (487.0 MW) was only 10.9% of all India installed capacity.

Of the total WTG installations after 2003, 80%+ capacity is in CDM registration/ validation process¹⁶. Hence, it can be concluded that wind power project development is substantially dependent on carbon revenues and thus 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 project falls under the purview of the approved VCS methodology ACM0002. “Grid connected renewable electricity generation”.

Table 10: Monitoring Methodology Details

Methodology Applicable	ACM0002
Version	10
Sectoral scope	01
Reference	http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html

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

¹⁵ http://mnes.nic.in/annualreport/2005_2006_English/CH8/2.html

¹⁶ <http://cdm.unfccc.int/Projects/registered.html> and
<http://cdm.unfccc.int/Projects/validation.index.html>

- **Purpose of monitoring:** The purpose of an efficient monitoring procedure is to record the real and measurable emission reduction as a result of the project and to avail the revenues they accrue. The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner.
- **Roles and responsibilities:** The roles and responsibilities of various officials at the plant site are explained in detail under section 3.4.
- **Parameter to be monitored:** With respect to the project the only parameters that requires a continuous monitoring is the amount of electricity (EGy in GWh) that is supplied by the project to the grid. Metering system for the project consists of one main (tri-vector) meter of accuracy class 0.5. Net electricity supplied to grid will be measured through meter readings of the two-way export/ import meter installed by TNEB and KSEB. The procedures for metering and meter reading will be as per the provisions of the power purchase agreement (weekly meter readings will be taken by the WTG operator and monthly Net electricity dispatch reports will be collected at the individual client's Head offices).

Table 11: Detail of parameter to be monitored

Data Variable	Data unit	Measured Calculated Estimated	Recording frequency	Party responsible
EGy	GWh	Calculated	Monthly	TNEB/KSEB

M/s. Suzlon Infrastructure Services Ltd., the service provider for the Suzlon make WTGs have their support office at project sites in Tamil Nadu and Karnataka which includes Customer Relations Manager, Technical Staff, Supervisors, Security Staff, etc. The Monitoring Team is headed by the Site Manager with a team of staff working in three shifts (24x7) to effectively control and monitor the wind power generation. The operations of the WTGs like the speed, direction, temperature, Electrical System, Pitch System, Voltage fluctuations, production Statistics, etc are monitored through computerized system (Central Monitoring System) by the software developed by M/s. Suzlon Infrastructure Services Ltd.

The project proponents are given a secured access to the entire information of their wind mills through the website of Suzlon www.suzlon.com. The PP can have all information both historical/current data like Power Generation for the day, month, year (wind mill-wise), down time & reasons there for, temperature, wind velocity, voltage fluctuations etc anytime from the place they are. The PP can also lodge a complaint that would be attended to by the O&M team within 48 hours.

Types of data and information to be reported, including units of measurement

The project activity involves following information which requires accurate reporting:

1. Total electricity generated by the project activity i.e. Export
2. Electricity imported by the project activity
3. Transmission loss (or line loss) incurred by the project activity during export of electricity (for the WTGs in Karnataka)
4. Transmission loss (or line loss) incurred by the project activity during import of electricity (for the WTGs in Karnataka)
5. Net electricity supplied to the regional electricity grid

The data type is Energy, recorded in kWh. The details can be referred under section 3.3 of the PD. Project activity also requires the CO₂ emission data for grid to calculate the grid emission factor.

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

In Tamil Nadu, all the WTGs have individual main meter from the electricity board. The net electricity supplied from the WTGs is arrived directly from this import/ export meter (main meter) by the electricity board and this can be directly read from the invoice of electricity board. Thus, there is only a single monitoring parameter used in the monitoring.

Data / Parameter:	EGy
Data unit:	MWh/ year
Description:	Net electricity supplied to Southern grid by the project activity
Source of data to be used:	Total of the readings from the main meter installed by State Electricity Board at individual WTGs under this project activity
Value of data applied for the purpose of calculating expected emission reductions	89923.7
Description of measurement methods and procedures to be applied:	Metering system for the project activity consists of one main (tri-vector) meter of accuracy class 0.5. Net electricity supplied to grid will be measured through meter readings of this two-way export/ import meter installed by TNEB. The procedures for metering and meter reading will be as per the provisions of the power purchase agreement. Regular monitoring on the power generation is also done through the Central Monitoring System (for Suzlon WTGs) by the O&M agency.
QA/QC procedures to be applied:	Regular calibration of all the meters will be undertaken as per the PPA terms and faulty meters will be duly replaced immediately with information to concerned Authority.
Any comment:	The monitoring records will be archived for whole crediting period + 2 years.

Parameters for monitoring in Karnataka

PPA for WTGs in Gadag is with Hubli Electricity Supply Company Limited (HESCOM), Hubli and for WTGs at Hassan is with Chamundeshwari Electricity Supply Corporation Limited (CESC Mysore), Mysore.

VCS Project Description Template

Data / Parameter:	Total Energy (TEG _y)
Data unit:	MWh
Description:	Total electricity generated by the project activity (i.e. Export)
Source of data to be used:	Joint Meter Readings taken at the metering points. Please note that the value of Net electricity supplied to Grid (EG _y) is used for the purpose of estimating emission reductions.
Value of data applied for the purpose of calculating expected emission reductions	--
Description of measurement methods and procedures to be applied:	Each WTG is connected to an electricity substation measuring system having a dedicated main meter and a check meter. The meters are sealed and are in the custody of CESC Mysore/ HESCOM.¹⁷ Utility officials in the presence of representative/s of project proponent take the readings (Joint Meter Readings) of the meters on a monthly basis. Joint meter reading of one metering point gives the readings of each wind turbine connected to that metering point. While taking JMR, it is possible to record electrical parameters such as export, import etc. JMR gives the readings of both main meter and check meter separately. For each parameter, there is an initial reading and a final reading. In case of electricity exported, initial reading gives the meter reading of 'Export' at the first day of the previous month whereas; final reading gives the meter reading of 'Export' at the first day of the present month. The difference between initial and final reading gives the 'Export' for the last month. Total electricity generated (or exported) by the project activity is arrived at by adding the 'Export' readings of all metering points of the project activity.
QA/QC procedures to be applied:	The readings of main meter are cross-checked against the readings of check meter. In case of failure/error in the main meter, readings of check meter will be considered and the main meter will be replaced/calibrated immediately by CESC Mysore /HESCOM officials.
Any comment:	Data are archived both electronically & on paper. Log records will be maintained for two years from the end of the crediting period.

Data / Parameter:	Energy (EG _i)
Data unit:	MWh
Description:	Electricity imported by the project activity
Source of data to be used:	Joint Meter Readings taken at the metering points

¹⁷ The meters have the capability of recording and storing half hourly readings of all the electrical parameters for a minimum period of 35 days with digital output.

VCS Project Description Template

Value of data applied for the purpose of calculating expected emission reductions	--
Description of measurement methods and procedures to be applied:	Joint meter reading at each metering point will be taken as explained above. The difference between initial and final reading will give the 'Import' for the last month. Electricity imported by the project activity is arrived at by adding the 'Import' readings of all metering points of the project activity.
QA/QC procedures to be applied:	The readings of main meter are cross-checked against the readings of check meter. In case of failure/error in the main meter, readings of check meter will be considered and the main meter will be replaced/calibrated immediately by CESC Mysore /HESCOM officials.
Any comment:	Data are archived both electronically & on paper. Log records will be maintained for two years from the end of the crediting period.

Data Parameter:	/ Energy (EG _{T-E})
Data unit:	MWh
Description:	Transmission loss (or line loss) incurred by the project activity during export of electricity.
Source of data to be used:	Invoice of electricity sale to HESCOM/CESC Mysore.
Value of data applied for the purpose of calculating expected emission reductions.	--
Description of measurement methods and procedures to be applied:	The metering points of the project activity with the metering points of others are connected to 2 different sub-stations: Harogeri sub-station and Bagewadi sub-station at Kappathguda. The metering points of the project activity are connected to the respective sub-station at Hassan. The evacuation arrangement from wind farm to the respective sub-station is done through two separate lines viz Line 1 (L1) & Line 2 (L2). These lines serve as stand by in the exigencies & during the period of the maintenance. The load is divided between L1 & L2. Each line is connected with a dedicated Bulk meter. There are thus 4 Bulk meters installed - two at the Harogeri sub-station (for L1 & L2) and two at the Bagewadi substation (for L1 & L2). Each bulk meter contains a main meter and a check meter. These meters are also sealed and are in the

	custody of HESCOM. Utility officials in the presence of representative/s of project proponent take the readings (Joint Meter Reading) of the meters on a monthly basis. Bulk meters are installed for the purpose of determining transmission loss (or line loss). It also gives the total electricity exported and imported by all the wind turbines connected to the sub-station. The readings for total electricity exported or imported are given by the main and check meters in a manner as explained above. Transmission loss is calculated by using the formula: $Z = (X - Y) / X \times 100$ Where, Z is the percentage transmission loss which is common for all wind turbines located in the same area and connected to the same sub-station. X is the total electricity supplied/exported by all the wind turbines connected to the sub-station.¹⁸ Y is the reading of the bulk meter installed at the sub-station. The above formula gives transmission loss as a percentage. By multiplying the percentage of transmission loss with electricity exported by the project activity, the transmission loss incurred by the project activity can be arrived at. Invoice copy contains this figure. Invoices are raised based on the joint meter readings taken at each metering point as well as joint meter readings taken at the respective sub-stations. Details of transmission loss can be obtained from the invoice copy which gives details of export, import, transmission loss & net generation.
QA/QC procedures to be applied:	The readings of main meter are cross-checked against the readings of check meter. In case of failure/error in the main meter, readings of check meter will be considered and the main meter will be replaced/calibrated immediately by HESCOM/ CESC Mysore officials.
Any comment:	Data is archived both electronically & on paper. Log records will be maintained for two years from the end of the crediting period.

Data Parameter:	/	Energy (EG _{T-I})
Data unit:		MWh
Description:		Transmission loss (or line loss) incurred by the project activity during import of electricity.
Source of data to		Invoice of electricity sale to HESCOM/CESC Mysore.

¹⁸ With $X = X_1 + X_2 + \dots + X_n$ where, X_n is the reading of 'n' number of wind turbines connected to the sub-station; the value 'X' can be verified against the export readings of individual metering points.

VCS Project Description Template

be used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	--
Description of measurement methods and procedures to be applied:	EG_{T-I} is calculated by using the following formula: $EG_{T-I} = 0.15 \times EG_I$ HESCOM/CESC Mysore charges project proponent for the transmission losses incurred during import of electricity to an extent of 15%. Invoices are raised based on the joint meter readings taken at each metering point as well as joint meter readings taken at the respective sub-stations. Details of transmission loss can be obtained from the invoice copy which gives details of export, import, transmission loss & net generation.
QA/QC procedures to be applied:	The readings of main meter are cross-checked against the readings of check meter. In case of failure/error in the main meter, readings of check meter will be considered and the main meter will be replaced/calibrated immediately by HESCOM/ CESC Mysore officials.
Any comment:	Data are archived both electronically & on paper. Log records will be maintained for two years from the end of the crediting period.

Data / Parameter:	Energy (EG _y)
Data unit:	MWh
Description:	Net electricity supplied to the regional electricity grid
Source of data to be used:	Invoice of electricity sale to CESC Mysore/HESCOM. For the purpose of emission reduction estimation in the PD, EG_y has been computed based on certain assumptions.
Value of data applied for the purpose of calculating expected emission reductions	-
Description of measurement methods and procedures to be applied:	Net electricity supplied to the regional electricity grid will be calculated using the formula: $EG_y = TEG_y - EG_I - EG_{T-E} - EG_{T-I}$ Invoices are raised based on the joint meter readings taken at each metering point as well as joint meter readings taken at the sub-station. Invoice copy thus provides details of export, import, transmission losses & net generation. Payments are made on the basis of the net electricity supplied to the grid.

QA/QC procedures to be applied:	The readings of main meter are cross-checked against the readings of check meter. In case of failure/error in the main meter, readings of check meter will be considered and the main meter will be replaced/ calibrated immediately by CESC Mysore /HESCOM officials.
Any comment:	Data are archived both electronically & on paper. Log records will be maintained for two years from the end of the crediting period.

3.4 Description of the monitoring plan

Monitoring plan for the state of Tamil Nadu

The data to be monitored is the net generation of electricity supplied to the grid. The Project has individual main meter at each WTG installed and owned by the State electricity board. These meters are tri-vector meters of 0.5s accuracy class. The meters are sealed by the electricity board and meet the Indian and regional electricity authority's standards. The reading of these individual main meters are used for arriving at the monthly generation of the respective WTG.

The main meter owned by the state electricity board will be calibrated by TNEB officials, according to the frequency and the maintenance schedule as per the TNEB procedures and the PPA signed with the PP or as per the UNFCCC guidelines (paragraph 12.c, EB- 41 Annex- 20).

The daily generation details of individual WTG will be maintained at the wind farms in respective wind farm's electricity meter log books by the O&M team. The reading from the main meter (JMR) is recorded on monthly basis by the official from the state electricity board in the presence of a representative of the PP.

The receipt of the sales to grid is cross-checked with the data recorded by the central monitoring system for each individual meter to avoid any differences. The Joint Meter Readings (JMR) taken will be sent to individual PP every month. Each PP will then raise an invoice to the Tamil Nadu Electricity Board with respect to the electricity exported to the grid by the WTG(s). The same data will be used for the emission reduction calculation.

The project proponents have undertaken an operation and maintenance agreement with the supplier of the wind turbines i.e. Suzlon and Vestas. The performance of the mills, safety in operation and scheduled /breakdown maintenances are organized and monitored by the contractor. So the authority and responsibility of O&M lies with the contractor.

The entire operations of the WTGs of Suzlon make are monitored continuously with the help of the Central Monitoring System (CMS) for each WTG by M/s. Suzlon Infrastructure Services Ltd.. The total electricity generation will also be cross checked with the invoices raised for the particular month.

All the relevant data & reports for maintaining accuracy in future monitoring and reporting of GHGs emission reduction is with Sapthagiri Distilleries Private Limited (SDPL).

Monitoring Plan for the state of Karnataka

For the WTGs in Karnataka, there is one common meter installed at metering site (at the electricity board sub-station, for metering electricity dispatch from project activity WTGs along with a group of WTGs at the site). The metering equipment is electronic trivector system.

Procedure for Monitoring and Recording

The JMR taken at one metering point will give the readings of each WEG connected to that metering point. With a main meter & a check meter installed at each metering point, the JMR taken at any one metering point will give readings of both main meter and check meter. However, it is reading of the main meter which is considered for calculations. The readings of main meter are cross-checked against the readings of check meter. In case of failure/error in the main meter, readings of check meter will be considered and the main meter will be replaced/ calibrated immediately by electricity board officials.

Both Main & Check meter monitor all possible electrical parameter such as export, import etc. The meters monitor & record these parameters independently. The meters also display an initial reading and a final reading for each parameter that is being monitored. For example, if we need to calculate the amount of electricity supplied/exported by all WTGs connected to a particular metering point for the month of September 2008, the initial reading of 'Export' displayed by the main meter should be subtracted from the final reading of the meter. With initial reading being the meter reading of 'Export' as on 1 Sept 08 at 0:00 hrs and the final reading being the meter reading of 'Export' as on 1 Oct 08 at 0.00 hrs, the difference between initial and final reading will give the exact units exported during the month of September 2008.

Bulk meter installed at sub-station is mainly for determining transmission loss (or line loss). It also gives the total electricity exported and imported by all the wind turbines connected to the sub-station.

Invoices are raised based on the joint meter readings taken at each metering point as well as at the respective sub-stations. Invoice copy thus provides details of export, import, transmission loss & net generation. However, payments are made on the basis of the net electricity supplied to the grid.

The monitoring instruments owned by the state electricity board will be calibrated by KPTCL officials, according to the frequency and the maintenance schedule as per the KPTCL procedures and the PPA signed with the PP or as per the UNFCCC guidelines (paragraph 12.c, EB- 41 Annex- 20).

Table 12: Roles and Responsibilities

Designation	<i>Responsibilities</i>
Project Head (Incharge person from Project proponent)	• <i>Registration</i> • <i>Data storage and electronic archiving</i> • <i>Secondary monitoring</i>
Project Executor and Controller (WTG owner or appointed person on behalf)	• <i>Recording</i> • <i>Verification</i>

	• <i>Storage of Data</i>
Site main Controller	• <i>Operation, Monitoring and Verification of Data</i> • <i>Data Recording</i> • <i>Storage of data</i>
Operation and Maintenance Contractor	• <i>Operation and Maintenance</i> • <i>Storage of data</i> • <i>Data Recording</i>

4 GHG Emission Reductions:

4.1 Explanation of methodological choice:

The methodological details have already been discussed under section 2.2.

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

According to the approved methodology ACM0002 (Version 10) Emission Reductions are calculated as:

$$ER_y = BE_y - PE_y - Ly$$

Where:

BE_y : Baseline Emissions in year y (t CO₂e/yr)
 PE_y : Project Emissions in year y (t CO₂e/yr)
 Ly : Leakage Emissions in year y (t CO₂e/yr)

Estimation of Baseline Emissions

Baseline emissions (BE_y in tCO₂) due to displacement of grid-electricity is calculated as the product of the Baseline Emissions Factor (EF_y in tCO₂/MWh) calculated as described below, times the electricity supplied by the project to the grid (EG_y - EG_{baseline} in MWh), over the crediting period.

$$BE_y = EG_{PJ,y} \times EF_{Grid,CM,y}$$

Where:

BE_y : Baseline emissions in year y (tCO₂/yr)
 EG_y : Electricity supplied by the project to the grid (MWh)
 EG_{baseline} : Baseline electricity supplied to the grid in the case of modified or retrofit facilities (MWh). For new power plants this value is taken as zero. As this is a new power plant this is zero for the project

EF_y: Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system”

According to the tool the baseline emission coefficient determination is detailed in section 2.4

Details of Baseline data:

Data of Operating and Build Margin for the three financial years from 2005-06 to 2007-08 has been obtained from –

The CO₂ Baseline Database for the Indian Power Sector

Ministry of Power: Central Electricity Authority (CEA) Version 4

Dated: October 2008

The detailed excel sheet is available at:

<http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>

Parameter	Description	Value	Unit
EG _{PJ,y}	Electricity supplied by the project to the grid	89923.7	MWh
EF _{grid,CM,y}	Combined margin CO ₂ emission factor for grid connected power generation	0.9269 ¹⁹	tCO ₂ e/MWh

$$BE_y = 89923.7 \times 0.9269$$

$$= 83,350 \text{ tCO}_2\text{e}$$

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

Estimation of Project Emissions

The project involves harnessing of wind energy and its conversion to electricity. Hence according to ACM0002, there will be no project emissions in the project (PE_y = 0).

Estimation of Leakage Emissions

As per ACM0002, no leakage has been considered for the calculation of emission factor (LE_y = 0).

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

The emission reductions are estimated by:

¹⁹ Refer Annex 1 for detail

$$ER_y = BE_y - PE_y - Ly$$

Where:

BE_y = Baseline emission due to the project in the year y , tCO₂e/annum

PE_y = Project emission due to the project in the year y , tCO₂e/annum

Ly = Leakage due to the project during the year y , tCO₂e/annum

Table 13: Summary of emission reductions

Year	Estimation of project emissions (tonnes of CO ₂ e)	Estimation of baseline emissions (tonnes of CO ₂ e)	Estimation of leakage (tonnes of CO ₂ e)	Estimation of overall emission reductions (tonnes of CO ₂ e)
2007	0	83,350	0	83,350
2008	0	83,350	0	83,350
2009	0	83,350	0	83,350
2010	0	83,350	0	83,350
2011	0	83,350	0	83,350
2012	0	83,350	0	83,350
2013	0	83,350	0	83,350
2014	0	83,350	0	83,350
2015	0	83,350	0	83,350
2016	0	83,350	0	83,350
Total (tonnes of CO ₂ e)	0	833,500	0	833,500

See ISO 14064-2: 5.2.k for quantifying GHG emission reductions or removal enhancements.

5 Environmental Impact:

As per the Ministry of Environment and Forests (MoEF), Government of India notification dated 14 September 2006 regarding Environment Impact Assessment studies as per the Environment Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) MINISTRY OF ENVIRONMENT AND FORESTS), the project is not categorized to conduct EIA. The

required clearance was obtained from the authorities as recommended by the procedures followed by the host government.

There were no significant Environmental impacts of project on environment.

6 Stakeholder's comments:

The local stakeholders are identified as the people living in the villages in vicinity of the WTGs. The comments were received by the survey through following questionnaire during 06/07/2009 to 30/09/2009. The actual survey was conducted in local language i.e. Tamil.

Survey about the Wind Mills in your neighbouring areas

You are aware of the wind mills operating in your neighbouring areas. These are installed to generate electricity from wind without polluting the environment. The survey is being conducted by the KMSPL on behalf of the wind mill owners for registration of the project under clean development mechanism of the Kyoto Protocol. You are requested to fill your response in the following questionnaire.

Name:

Location:

Occupation:

Education:

Sr. No.	Question	Response
1	Is your environment affected by wind mill/s?	
2	Has the employment increased due to wind mills?	
3	Has your livelihood affected by the wind mills?	
4	Is there any noise pollution at the residential places due to the wind mills?	
5	Is there any vibration problem due to the wind mills?	
6	Is there any water problem due to the wind mills?	
7	Does the wind mill affect migration of birds?	
8	Does the wind mill affect grazing of cattle?	
9	Is your TV reception affected by wind mills?	
10	What are the benefits from the wind mills?	
11	Any other comments and suggestions?	

Signature:

Date:

The responses ²⁰ are categorised as positive and negative based on the comments. The positive responses indicate that respondent feels that the project activity will lead to overall good of their own and the society.

No negative comment were received, overall finding was that the participants expected the local villagers would benefit from the project activity. The general queries raised during the stakeholder consultation meetings were:

7 Schedule:

The project schedule as per VCS guidelines is tabulated in table below:

²⁰ The survey feedback forms and its summary sheets are being submitted to DOE

Table 14: Project Schedule

<i>Parameter</i>	<i>Date/period</i>
Initiation of project	01/03/2005 ²¹
Commissioning date	26/03/2005 ²²
Project lifetime	20 years
VCS PDD completion	August 2009
Begin VCS Validation	August 2009
Monitoring frequency	Once every month
Project termination	2026

8 Ownership:

8.1 Proof of Title:

For the ownership details of the project any of the following may be referred to:

1. Power Purchase Agreement (PPA) between State Electricity Board (TNEB) and PP
2. Commissioning certificates²³

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

The project does not participate in any other emission trading program for the proposed verification term.

²¹ PO for first WTG in the bundle - Ambica Agarbathies and Aroma Industries Ltd.

²² commissioning date for first WTG in the bundle - Ambica Agarbathies and Aroma Industries Ltd.

²³ Will be furnished during validation