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

CONTENTS

Annexes

Revision history of this document

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

SECTION A. General description of small-scale project activity

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

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Title: Bundled Wind Energy Project connected to southern grid of India.
Version: 02
Date: 23/06/2010

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

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Description:

The project activity is a Greenfield project and comprises of installation and operation of 15 Wind Turbine Generators (WTGs) of 12 individual project owners having a combined wind power generation capacity of 14.1 MW. The WTGs are located in 3 districts of Tamilnadu and in 1 district of Karnataka. The generated electricity is sold to the Southern grid from 7.35 MW and 6.75 MW is wheeled for captive consumption.

The project has been divided into Group A and Group B.

The generated electricity from the WTG's which supply to the grid has been categorised as Group A and the generated electricity from WTG's which utilize for captive use has been categorised as Group B. The below mentioned tables represent the distribution of the projects under each category;

Group A:

Sub-Project	**Owner**	**Total capacity** (MW)	**No. of Wind turbines**
1	Nu-Tech Associates	1.25	1
2	Eskay Design	1.25	1
3	Best Engineers Pumps Pvt. Ltd.	1.25	1
4	Pure Carbo Gases	0.25	1
5	Cethar Vessels Ltd.	1.25	1
6	Cotton Blossom India (P) Ltd.	0.75	1
7	Saranya Garments Pvt. Ltd.	0.75	1
8	V.T. Switchgears & Transformers	0.60	1

Group B:

Sub-Project	**Owner**	**Total capacity** (MW)	**No. of Wind turbines**
1	Sri Kumaran Wind Energy (P) Ltd.	3.75	3

2	Nagammal Mills Pvt Ltd.	1.5	2
3	Royal Classic Mills (P) Ltd.	0.75	1
4	Mod Forge Pvt. Ltd.	0.75	1

Purpose of the project activity:
The project activity is utilising renewable wind energy by displacing fossil fuels to generate electricity. The project activity has installed 15 Wind Turbine Generators of which 7 are Suzlon make, 7 of NEG MICON/ Vestas make and 1 each of Pioneer Wincon make. The total installed capacity by the project activity is 14.1 MW. The electricity generated is exported to the southern grid and some amount is wheeled for captive consumption.

The purpose of the project activity is to commission, operate and maintain the 14.1 MW wind based generation facility in the state of Tamilnadu and Karnataka. The project activity utilises renewable wind energy by displacing equivalent amount of electricity that would have been generated from the grid dominated by fossil fuel. The project activity thus reduces anthropogenic GHG emissions to the atmosphere which is approximately 32,002 tCO_2e.

In the pre-project scenario, the electricity was being generated and drawn from the grid that is connected with fossil fuel based power plants predominantly and thus emitting GHGs to the atmosphere.

In the project scenario, the project activity is installing 15 Wind Turbine Generators (WTGs) to generate electricity that which will be supplied to the grid and wheeled for captive consumption. The details of the components of this project activity are as follows:

Sub-Project	**Owner**	**Location**	**Total capacity** (MW)	**No. of Wind turbines**	**Capacity of each turbine**	**Date of Commissioning**
1	Sri Kumaran Wind Energy (P) Ltd.	Uthumalai (Tirunelveli-Tamilnadu)	3.75	3	1250 kW	29/03/2006
2	Nagammal Mills Pvt Ltd.	Ayyansurandai-village, V.K.Pudur-Taluk, Sambavar village Vadakarai, Tenkasi Taluk (Tirunelveli-Tamilnadu)	1.5	2	750 kW	20/03/2006 30/12/2006
3	Royal Classic Mills (P) Ltd.	Karuvantha village, Veerakeralampudur-Taluk, (Tirunelveli-Tamilnadu)	0.75	1	750 kW	07/07/2006
4	Nu-Tech Associates	Kangeyampalayam village, Dharapuram-Taluk, (Erode, Tamilnadu)	1.25	1	1250 kW	31/03/2006
5	Mod Forge	Navaneetha	0.75	1	750 kW	19/07/2006

	Pvt. Ltd.	Krishnapuram village, V.K.Pudur--Taluk, Tirunelveli-Dist (Tamilnadu)				
6	Eskay Design	Uthumalai (Tirunelveli-Tamilnadu)	1.25	1	1250 kW	29/08/2006
7	Best Engineers Pumps Pvt. Ltd.	Uthumalai (Tirunelveli-Tamilnadu)	1.25	1	1250 kW	14/07/2006
8	Pure Carbo Gases	Elavanthi-village, Tirupur-Taluk, Coimbatotre-Dist, Tamilnadu	0.25	1	250 kW	24/09/2006
9	Cethar Vessels Ltd.	Ukkirankottai-village, Manayur Taluk, (Tirunelveli- Dist, Tamilnadu)	1.25	1	1250 kW	22/03/2006
10	Cotton Blossom India (P) Ltd.	Azhaigiapandiapuram-village, Tirunelveli-Dist, Tamilnadu	0.75	1	750 kW	28/09/2006
11	Saranya Garments Pvt. Ltd.	Azhaigiapandiapuram-village, Tirunelveli-Taluk, Tirunelveli-Dist, Tamilnadu	0.75	1	750 kW	30/12/2006
12	V.T. Switchgears & Transformers	Kumbaluru-village, Davangere-Dist, Karnataka	0.60	1	600 kW	31/03/2006

The baseline scenario is similar to the pre-project scenario where electricity supplied would have been generated in/ procured from grid connected by fossil fuels, at a deficit.

The technology employed does not require any fuel input for generating electricity other than the wind energy where it gets converted to kinetic energy and further to electrical energy. The project activity by utilising renewable wind energy for electricity generation reduces anthropogenic GHG emissions to the atmosphere and thereby leading to sustainable development.

Contribution of the project activity to sustainable development

Ministry of Environment and Forests, Govt. of India has stipulated[1] the social well being, economic well being, environmental well being and technological well being as the four indicators for sustainable development in the host country approval eligibility criteria for Clean Development Mechanism (CDM) projects.

[1] http://www.cdmindia.in/approval_process.php

Social well being
The project activity is coming up in a remote hilly area. Due to wind farms in general, there is overall infrastructure development in the area like – all season roads, employment opportunity and increased business due to movement of skilled labour in the area. The land used by wind mills were also sold at better rates, which otherwise had no other use.

Economic well being
The project activity results in generation of additional employment opportunities both directly and indirectly during commissioning and operation of wind mills. It is also creating business opportunities during installation for civil contractors and electrical technicians, traders in the operations. The prices of the infertile lands were raised due to this project activity thus benefiting the land owners.
CDM revenues are encouraging more projects to invest on such wind mills so that the energy demand can be met by such type of cleaner energy projects.

Environmental well being
The project activity is producing electricity through wind energy which would other wise have been produced from fossil fuel, thereby reducing GHG emissions to the atmosphere. It is safe and provides clean energy.

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.

A.3. Project participants:

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Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host Country)	Kanaka Management Services Pvt. Ltd., Bangalore - Private entity	No

The project proponent KMSPL will be the sole owner of the issued CERs.

A.4. Technical description of the small-scale project activity:

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

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A.4.1.1. Host Party(ies):

>>
India

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

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Region-Southern region
State-Tamilnadu, Karnataka

A.4.1.3. City/Town/Community etc:

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Dist.-Tirunelveli, Coimbatore, Erode (Tamilnadu)
Dist- Davangere (Karnataka)

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

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Table 1: Geographical details of installed WTGs

S.N.	Name of the Project participant	Geographical coordinates (Longitude/Latitude)	HT SC. No.	Make/Model
1	Sri Kumaran Wind Energy (P) Ltd.	Lat-8° 58' 54.25", long- 77° 27' 31.63	1739, 1725, 1726	SUZLON
2	Nagammal Mills Pvt Ltd.	8°58'54.25", 77°27'31.63" 9°00'54.37",77°24'29.37"	1626 2126	VESTAS
3	Royal Classic Mills (P) Ltd.	N85805.8, E77 29 54.7	1937	NEG MICON NM 750/48
4	Nu-Tech Associates	N10 39 42.9 E77 24 47.3	1198	SUZLON S 66
5	Mod Forge Pvt. Ltd.	8.7° N, 77.8° E.	1952	NEG MICON
6	Eksay Design	N8 59 50.9 E77 32 54.4	1982	SUZLON
7	Best Engineers Pumps Pvt. Ltd.	N8 59 19.4, E77 33 40.2	1939	SUZLON
8	Pure Carbo Gases	N10.94104 E077.31165	580	Pioneer Wincon
9	Cethar Vessels Ltd.	N8 55 36.7, E77 36 20.6	1648	SUZLON S 66
10	Cotton Blossom India (P) Ltd.	N8 55.923 E77 38.140	2048	NEG MICON
11	Saranya Garments Pvt. Ltd.	N8 56 400, E77 38 403	2124	NEG MICON
12	V.T. Switchgears & Transformers	N14 13 59.8, E75 47 3.1	BVP 10	VESTAS RRB PS-600

Appendix 1 shows the location maps of the project activity.

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

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The proposed CDM project activity will generate power using wind energy, which is a renewable source of energy. The proposed CDM project activity qualifies for the simplified modalities and procedures for the small scale CDM project activities as the electricity generation capacity of the proposed CDM project is 14.1 MW, which is less than the maximum qualifying capacity of 15 MW. The project activity utilizes the wind potential for power generation and the generated electricity is both sold to the grid (7.35 MW) and wheeled for captive consumption (6.75 MW).

According to small scale CDM modalities the project activity falls under:

Type: I –Renewable energy projects

Category: AMS I D-Grid connected renewable electricity generation and AMS I F-Renewable electricity generation for captive use and mini-grid.

The project has been divided into Group A and Group B. Generated electricity from WTG's which supply to grid falls under Group A and generated electricity from WTG's which utilizes for captive usage falls under Group B.

Technology employed for the project activity:
The purpose of the project activity is to generate electricity from renewable wind energy which is wheeled to the southern grid and some amount used for captive consumption. The total installed capacity is 14.1 MW generated from 15 WTGs installed by 12 project proponents in 3 districts of Tamilnadu and in 1 district of Karnataka. The technology implied here is that the kinetic energy of natural wind is converted to mechanical energy which later is converted to electrical energy. Since utilizing wind energy is a clean technology, no anthropogenic GHGs are emitted to the atmosphere in the process.

In the pre-project scenario, the electricity was being drawn from the grid that is connected predominantly to fossil fuel based power plants.

Technical Specifications:
All the wind mills are 3 blades blade, horizontal axis type. Of total 15 WTGs, 7 are Suzlon make, 7 of NEG MICON/ Vestas make and 1 each of Pioneer Wincon make. The useful technical life of each wind mills is 20 years according to the industrial norms and respective state regulatory commissions.

Technical details of all SUZLON WTGs are as follows:

S.N.	Item	Description (1.25 MW)
	HT.Sc.No.	1198, 1939, 1648, 1739, 1725, 1726, 1982
1	Make	SUZLON
2	Model no.	S66
3	Rating in kW	1250 kW
4	Hub height	74 m
5	Rotor diameter	66m
6	No. of rotor blade	3
7	Orientation	Upwind/ horizontal axis
8	Rotational speed	13.8/20.7 rpm, 13.9/20.8 rpm (Sc.- 1198, 1648, 1739, 1725, 1726)
9	Rotor Swept area	3421 m^2
10	Cut-in wind speed	3m/s, 4m/s (Sc.-1198, 1648)
11	Rated wind speed	14m/s
12	Cut-out wind speed	22m/s
13	Regulation	Pitch regulated
14	Generator Type	Asynchronous 4/6 pole
15	Rotation speed	1006/1506 rpm
16	Rated output	250/1250 kW, 300/1250kW (Sc.-1198, 1648, 1739, 1725, 1726)
17	Frequency	50 Hz

Technical details of all NEG MICON (VESTAS) WEGs are as follows:

S.N.	Item	Description (0.75 MW)

	HT.Sc.No.	2124, 1626, 2126, 1937, 1952, 2048
1	Make	NEG MICON
2	Model no.	NM48/750
3	Rating in kW	750 kW
4	Tower Type	Conical modular tower, 24 edged
5	Tower height	Offered 53.6 m
6	No. of blades	3
7	Rotor diameter	48.2m
8	Rotational speed (synchronous)	22.2/14.5rpm
9	Rotor position	upwind
10	Hub height	Offered 55 m
11	Cut-in wind speed	<3.5 m/s
12	Cut-out wind speed	25m/s
13	Maximum rotational speed	22.3 rpm, 22/15 rpm (Sc.-2126)
14	Generator nominal power	750/200 kW
15	Rotational speed (synchronous)	1500/1000 rpm
16	Blade length	23.5m
17	Yaw bearing type	Ball bearing

Technical details of all NEG MICON (VESTAS) WEGs are as follows:

S.N.	Item	Description (0.6 MW)
	HT.Sc.No.	BVP 10
1	Make	NEG MICON
2	Model no.	PS 600 kw
3	Rating in kW	600 kW
4	Tower Type	Conical Tubular
5	Rotor diameter	48.2 m
6	No. of rotor blade	3
7	Rotor Swept area	1824m^2
8	Rotor revolutions	22/15 rpm,
9	Rotor placing	Upwind rotor
10	Cut in wind speed	4m/s
11	Cut out wind speed	25m/s
12	Nominal wind speed	16m/s
13	Power Regulation	stall
14	Generator Type	Asynchronous 4/6 pole
15	Generator Type	Asynchronous 4/6 pole
16	Frequency	50 Hz
17	Yaw bearing type	Ball bearing

A technical detail of Pioneer Wincon WEG is as follows:

S.N.	Item	Description (0.25 MW)

	HTSC No	580
1	Make	Pioneer Wincon
2	Model no.	W250/29
3	Rating in kW	250kW
4	Tower Type	Lattice tower (32m) Lattice tower (50m)
5	No. of blades	3
6	Rotor blade Type	LM 13.4
7	Rotor diameter	29m
8	Rotor speed	38.5 rpm
9	Rotor swept area	661 m^2
10	Hub height	32/50 m
11	Cut-in wind speed	4m/s
12	Cut-out wind speed	25m/s
13	Rated power, wind speed	18m/s
14	Generator type	4 pole asynchronous
15	Generator RPM	1500
16	Power regulation	stall
17	Yaw bearing type	Ball bearing

S.N.	Specifications	Values	Unit
1.	Total installed capacity	14.1 (15 WTGs)	MW
2.	Plant load factor (TNERC Guidelines & KERC Guidelines)	27.46 (for Tamilnadu) 26.50 (for Karnataka)	%
3.	Technical life time	20	years

Since the electricity generated is through renewable wind energy, no GHGs are emitted to the atmosphere. Therefore the technology implemented under the project activity is a clean technology. The power generated mainly depends on wind speed and the grid availability factor.

The baseline is similar to the pre-project scenario where electricity would have continued to be generated in the grid supplied by fossil fuels and future capacity addition in the grid.

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

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The project proponents have chosen the fixed crediting period of 10 years. The estimated emission reductions for chosen crediting period are as follows:

Years	Annual estimation of emission reductions in tonnes of CO_2e
2011	32,002
2012	32,002
2013	32,002
2014	32,002
2015	32,002
2016	32,002
2017	32,002

2018	32,002
2019	32,002
2020	32,002
Total estimated reductions (tonnes of CO_2e)	320,020
Total number of crediting years	10
Annual average of estimated reductions over the crediting period (tCO_2e)	32,002

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

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There is no public funding for the project activity from the Parties included in Annex I. No ODA has been used for the project. The entire project cost is met by the project proponent and in part by the debt finance from banks.

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

According to paragraph 2 of Appendix C to the Simplified Modalities and Procedures for small-scale CDM project activities, a small scale project is considered a debundled component of a large project activity if there is a registered small-scale activity.

- With the same project participants
- In the same project category and technology, and
- registered within the previous 2 years
- whose project boundary is within 1 km of the project boundary of the proposed small-scale activity

The project participants of the proposed CDM project have not registered or applied for registration of any CDM project in the past 2 years whose boundary is within one km of the project boundary of the proposed project and in the same project category and technology. The proposed CDM project activity is not a debundled component of a large scale project activity and can use the simplified modalities and procedures or small scale project activities.

SECTION B. Application of a baseline and monitoring methodology

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

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For Group A AMS I D is used

Electricity generation:

Methodology : AMS-I.D
Title : Grid connected renewable electricity generation
Sectoral Scope : 01
Version : 16
EB : EB 54

And for Group B AMS I F is used

Electricity generation:

Methodology : AMS-I.F
Title : Renewable electricity generation for captive use and mini-grid
Sectoral Scope : 01
Version : 1
EB : EB 54

Refers to the Methodological Tool:
Tool to calculate the emissions factor for an electricity system.
Version: 2,
EB-50.

Reference: Appendix B of the simplified modalities and procedures for small scale CDM project activities in the **"**Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories"

For more information please refer to link:
http://cdm.unfccc.int/methodologies/SSCmethodologies/approved html

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

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The choice of the project category is justified below:

Applicability condition of AMS ID, V. 16	**Proposed project activity**	**Justification**
1. This category comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to a national or a regional grid. Project activities that displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel generating unit shall apply AMS I.F.	The project activity comprises renewable wind energy generation units that supply to (and displace the electricity generated in) the southern grid that is predominantly connected by the fossil fuel fired generating units[2].	Hence this applicability condition is met.
2. This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating 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)	The project involves installation of new wind mills for power generation where there was no renewable energy plant operating prior to the implementation of the project activity.	Hence this applicability condition is met.
3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are	This is not applicable to the project activity as the project activity is not a hydro power plant.	Not Applicable

[2] www.cea.nic.in – All India region wise generating installed capacity (MW) of power utilities

eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • 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; • 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.		
4. In the case of biomass power plants, no other biomass types than renewable biomass are to be used in the project plant.	This is not applicable to the project activity	Not Applicable
5. If the unit 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 co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The project activity is a Greenfield project and has not added units. It is an entirely renewable energy based project and is not co-fired type. In any case, the size is on 7.35 MW and below the limit prescribed in the methodology.	Not Applicable
6. Combined heat and power (co-generation) systems are not eligible under this category.	Tt. he project activity is generating only electricity and is not a Co-generation plan	Not Applicable
7. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15MW and should be physically distinct from the existing units.	The project activity does not involve any capacity additions at an existing facility as it is entirely new installation.	Not Applicable
In case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted unit shall not exceed the limit of 15MW.	The project activity does not involve retrofit of the existing facility. It is a newly implemented power plant/s.	Not Applicable

Thus, the project activity can use the baseline methodology AMS I.D, V. 16.

Applicability condition of AMS IF, V. 1	**Proposed project activity**	**Justification**
1. This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an	The project activity comprises renewable wind energy generation units for captive use which displaces the fossil fuel fired generating unit in Southern Grid of	Hence this applicability condition is met.

electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e., in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below: (a) A national or a regional grid (grid hereafter); (b) Fossil fuel fired captive power plant; (c) A carbon intensive mini-grid.	India which is predominantly Fossil fired electricity generation.	
2. For the purpose of this methodology, a mini-grid is defined as small-scale power system with a total capacity not exceeding 15 MW (i.e., the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid.	The project activity is connected to the national grid	Hence this condition is not applicable
3. Project activities or project activity components supplying electricity to a grid shall apply AMS-I.D. Project activities for standalone off-the-grid power systems supplying electricity to households/users included in the boundary are eligible under AMS-I.A.	Project activity is not supplying the generated units to Grid or to households.	Hence this applicability condition is met.
4.Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • 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; • 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.	This is not applicable to the project activity as the project activity is not a hydro power plant.	Not Applicable
5. For biomass power plants, no other biomass other than renewable biomass are to be used in the project plant.	This is not applicable to the project activity as the project activity is not a Biomass based power plant.	Not Applicable

6. This methodology is applicable for project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition, (c) involve a retrofit[4] of (an) existing plant(s); or (d) involve a replacement[5] of (an) existing plant(s).	Project activity install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant)	Hence this applicability condition is met.
7. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct[6] from the existing units.	Project activity is not a capacity addition to the existing renewable power generation units.	Not Applicable
8. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	Project activity is not a retrofit or replacement of existing project activity	Hence this applicability condition is met
9. 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 15 MW.	The project activity is a Greenfield project and has not added units. It is an entirely renewable energy based project and is not co-fired type. In any case, the size is on 6.75 MW and below the limit prescribed in the methodology.	Not Applicable
10. Combined heat and power (co-generation) systems are not eligible under this category.	The project activity is generating only electricity and is not a Co-generation plant.	Hence this condition is not applicable.
11. In case electricity produced by the project activity is delivered to another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the electricity will have to be entered into specifying that only the facility generating the electricity can claim emission reductions from the electricity displaced.	The project activity does not involve or delivers the generated units to another facility or facilities within the project boundary.	Hence this condition is not applicable.

Thus, the project activity can use the baseline methodology AMS I.F, V.01.

B.3. Description of the project boundary:

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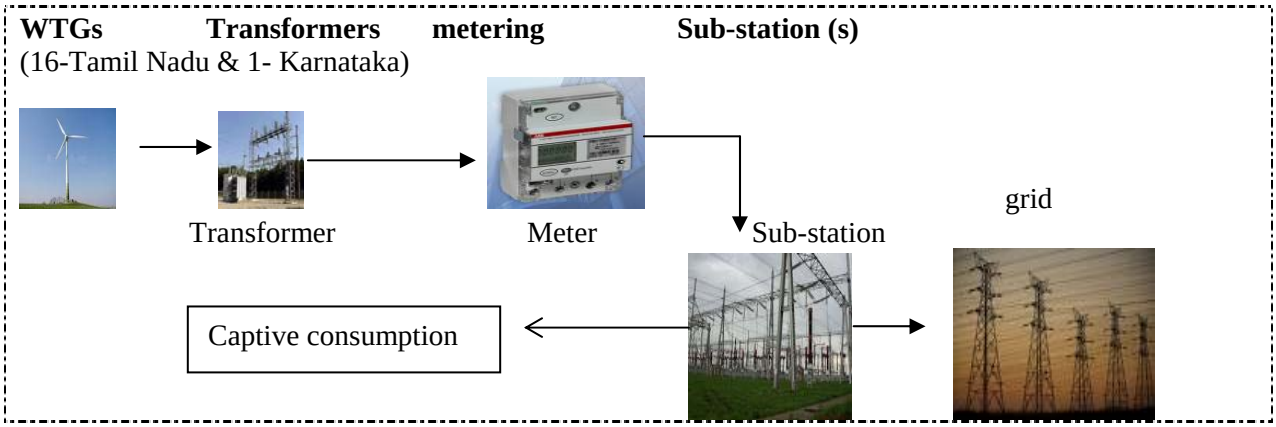
According to the approved small-scale methodology AMS I D and AMS I F, the project boundary encompasses the physical, geographical site of the renewable generation source. The physical,

geographical site of the 14.1MW project activity sites at the project location specified in Section A.4.1.4 above delineates the project boundary. It includes the wind turbine installations, transformers, transmission lines, metering equipment and connected grid sub-stations.

Following are the main emission sources that could be a part of the project boundary:

	Source	Gas	Included?	Justification / Explanation
Baseline	Grid electricity generation	CO_2	Yes	Main emission source.
		CH_4	No	Excluded for simplification. This is conservative.
		N_2O	No	Excluded for simplification. This is conservative.
Project Activity	On-site fuel combustion due to implementation of the project activity	CO_2	Yes	Excluded. This emission source is not required to be estimated for wind energy projects as it does not involve on site fuel consumption.
		CH_4	No	Excluded for simplification.
		N_2O	No	Excluded for simplification.

Flow diagram of the project boundary):



Project boundary

B.4. Description of baseline and its development:

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The Group A project category applicable to the proposed CDM project is AMS ID ver 16. As per Para 10 of methodology AMS I.D. (Version16, EB 54) if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the electricity delivered to the grid by the project activity that otherwise would have been generated by the operation of grid connected power plants and by the addition of new generation sources.

For the present project activity as per para 11 of methodology AMS I.D. baseline emissions are the product of electrical energy $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

The emission coefficient can be 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 t CO_2e/MWh) 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.

The Group B project category applicable to the proposed CDM project is AMS IF. Accordingly, the applicable baseline is (Para 14) the emission factor of a grid shall be calculated as per the procedures provided in AMS ID.

According to step a) the combined margin emission coefficient (in kg CO_2e/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 according to ACM0002. The combined margin calculations were based on the operating margin and build margin data available from the Central Electricity Authority (CEA)[3], Government of India.

Parameters involved defining the baseline Scenario

Parameter	**Data Source**
$EF_{grid,OM,y}$ = Operating Margin Emission Factor (tCO_2/MWh)	Central Electricity Authority : CO2 Baseline Database, version 5.0,November 2009[4]
$EF_{grid,BM,y}$=Build margin Emission factor(tCO_2/MWh)	Central Electricity Authority : CO2 Baseline Database, version 5.0,November 2009[5]
$EF_{grid,CM,y}$= Combined margin CO2 emission factor for the project electricity system in year y(tCO_2/MWh)	Calculated as the weighted average of the operating margin and build margin

The baseline emission factor has been considered from the "**CO_2 Baseline Database for the Indian Power Sector**", Version 05 published by CEA in November 2009. The emission factor, calculated based on the data published by CEA for the latest year 2008-09 (based on combined margin approach), is as mentioned for the respective grids.

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

>>

As per the paragraph 28 of the Simplified modalities and procedures for the small scale CDM project activities, a simplified baseline and monitoring methodology listed in appendix B may be used for a small scale CDM project activity if the project participants are able to demonstrate to a designated operational

[3] http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm

[4] http://www.cea.nic.in/planning/c and e/user_guide_ver5

[5] http://www.cea.nic.in/planning/c and e/user_guide_ver5

entity that the project activity would otherwise not be implemented due to the existence of one or more of the barriers listed in attachment A to appendix B.

Additionality:

Step 1: Identification of alternatives to the proposed project activity
Step 2: Investment analysis
Step 3: Barrier Analysis
Step 4: Common practise analysis

.
The barrier that is considered prohibitive is
a) Investment barrier

Step I: Identification of alternative scenarios to the project activity

1. *Project activity undertaken without CDM revenue*
2. *With the current practice where the supply is from grid*

As the first option is technically feasible, which PP could have opt for, it is considered as a feasible alternative.

Instead of implementing new plants with hydro or any other fossil fuel like coal for such a small individual project capacity, individual project owners would have opted getting the purchase of electricity from grid (in case of captive demand). Therefore, the second alternative can be considered as the most possible alternatives to the project activity.

Both the alternatives are consistence with current laws and regulations.

Therefore the step 1 of the additionality has been crossed.

Step II: Investment analysis

The power generation from wind mills is associated with high cost – both capital intensive and unit cost of electricity generation. The cost of generation of energy through wind mill is higher when compared to other forms of energy like coal, natural gas etc. especially because of its low plant load factor. So the individual sub-project owners have taken the decision to commission windmills considering the CDM revenues to make the project financially viable.

The financial indicator chosen for investment barrier is IRR. 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 (WACC). As per the Guidance on the Assessment of Investment Analysis, V. 03, Para 11, WACC is appropriate benchmark for project IRR. WACC is not calculated based on company's internal returns (to follow Para 13 of same Guidance), but taken from public available data on market returns (for three years) and performance of three energy companies. Following formula is used for WACC calculation.

$$WACC\ (Post\ tax) = [(1-g) * CE] + [g * CD\ (1-T)]$$

where,
g is the level of gearing or leverage in the project activity, i.e. the proportion of debt in the total capital structure (i.e. debt + equity).
CD is the cost of debt finance (pre-tax)
CE is the cost of equity finance (post-tax)
T is the tax rate

Cost of equity in this is calculated from following formula

$$CE = Rf + \beta*(Rm - Rf)$$

where:
Rf = Risk-free rate of return
Rm = Market rate of return
β = Equity beta
Rm – Rf = Market risk premium

The WACC works out to be 16.40% and is used as benchmark for the project IRR in this project activity[6].

The estimated project cost has been referred from the figure which was given by the supplier as a realistic approach, based on the Purchase Orders. The project costs associated with the project activity are the initial investments that are incurred by the project proponent for the supply, commissioning and erection of the wind mills. This includes the cost that was paid to the manufacturer of the turbine (cost of the machine and charges for erection and commissioning) and also to respective Electricity Boards (infrastructure and development charges).

The following table illustrates the (representative case for Tamil Nadu) parameters used for the investment analysis. Some of these parameters are common for all sub projects. Some of the parameters are specific to sub projects.

[6] A detailed calculation sheet is provided to DOE

For the sub-project activity of 3 * 1.25 MW = 3.75 MW wind power by Sri Kumaran wind energy Pvt. Ltd.		
Capacity of the wind farm	3.75 MW	
No. of machines	3	machines
Capacity of machines	1.25	MW each
Plant load factor	27.46%	TNERC Guidelines
Project cost	198	INR million, Project cost estimates from quotes, surveys
Debt: Equity	70: 30%	
Interest rate Tenure Moratorium	10.50% 10 yrs 12 months	
Tariff	3.5 Rs./kWh	TNEB HT tariff[7]

For the WTGs selling electricity to the grid, the Tariff taken is Rs. 2.7/ kWh, as per the PPA (prevalent rate, know at investment decision making). Similar calculation is done for the other sub-project owners and presented to the DOE.

The Table below shows the related data of the client required for the calculation of IRR for the WTG in Karnataka. Most of the data is referred from 'Karnataka Electricity Regulatory Commission, Bangalore, Determination of tariff in respect of renewable sources of energy, dated: 18th January 2005.

For the project activity of 0.60 MW wind power by V.T. Switchgears & Transformers		
Capacity of WTG	0.60 MW	
No. of machines	1	
Plant load factor	26.50%	KERC Guidelines
Project cost	28.9 Million	Project cost estimates from quotes, surveys
Debt Equity	70% 30%	Karnataka electricity regulatory commission for renewable sources of energy (Tariff order 18/01/2005); p.9
Interest rate Tenure Moratorium	11% 10 yrs 12 months	
Tariff	3.40 Rs./kWh	As per PPA

.

The results of the investment analysis are summarised below[8].

S.N.	Owner	Project IRR (%) without CDM	Benchmark
1	Sri Kumaran Wind Energy (P) Ltd	13.93	
2	Nagammal Mills Pvt Ltd.	12.54 & 13.14	
3	Royal Classic Mills (P) Ltd.	10.86	
4	Nu-Tech Associates	10.10	

[7] http://www.tneb.in/template_3.php?tempno=3&cid=0&subcid=54

[8] The individual investment analysis excel sheets are provided to DOE

5	Mod Forge Pvt. Ltd.	11.91	16.40
6	Eksay Design	9.79	
7	Best Engineers Pumps Pvt. Ltd.	10.81	
8	Pure Carbo Gases	6.30	
9	Cethar Vessels Ltd.	10.05	
10	Cotton Blossom India (P) Ltd.	10.01	
11	Saranya Garments Pvt. Ltd.	11.83	
12	V.T. Switchgears & Transformers	12.11	

The results of the financial analysis shows that the project IRR without CDM for all the sub-projects is lower than benchmark WACC considered.

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

Thus PLF is considered to be the only parameter which required to be checked for sensitivity analysis.

S.N.	**Sub-project owner**	**Project IRR (%) without CDM**	
		PLF = +10%	**PLF = -10%**
1	Sri Kumaran Wind Energy (P) Ltd.	15.55	12.24
2	Nagammal Mills Pvt Ltd.	14.11	10.90
		14.51	11.69
3	Royal Classic Mills (P) Ltd.	12.31	9.31
4	Nu-Tech Associates	11.49	8.61
5	Mod Forge Pvt. Ltd.	13.42	10.32

6	Eksay Design	11.46	8.06
7	Best Engineers Pumps Pvt. Ltd.	12.48	9.06
8	Pure Carbo Gases	7.70	4.81
9	Cethar Vessels Ltd.	11.44	8.57
10	Cotton Blossom India (P) Ltd.	11.40	8.55
11	Saranya Garments Pvt. Ltd.	13.38	10.21
12	V.T. Switchgears & Transformers	13.64	10.52

The sensitivity analysis shows that in all case the project activity is less attractive and does not cross the benchmark. By analyzing the comparative analysis, it can be concluded that the project is additional at all load factors analyzed in the sensitivity analysis.

Consideration of CDM:

As per the Guidance of EB49, Annex 22, clause No. 7 and 8,
'7. Assessment of real and continuing actions shall be validated by the DOE and the validation should focus on real documented evidence as indicated in paragraph 6 (b), including an assessment by the DOE of the authenticity of the evidence.

8. In validating proposed CDM project activities where:
(a) there is less than 2 years of a gap between the documented evidence the DOE shall conclude that continuing and real actions were taken to secure CDM status for the project activity;'

As the project activity is a bundled one, the CDM consideration of the individual sub-project owners is considered and it is seen that

1) The individual PPs had taken investment decision based on the discussion with a CDM consultant and issued work order on a Consultant for CDM services and then placed an order on the wind mill supplier.

There on, the key events are mentioned below in the table

SL.No	Dates	Key Events	Evidence
1	2nd January 2006	Work order was issued from Cethar Vessels to First Consultant for bundling the wind mills for CDM project. This is the first WO in the bundle.	Work order from Cethar Vessels to First Consultant
2	18th January 2006	Start date of the project (Based on the first/earliest PO in the bundle)	Purchase order (Cethar Vessels Ltd)
3	6th November 2006	Last Work order / closure of bundle by First consultant/ Bundler for Bundled wind energy project in South India	Work order from Nagammal Mills Pvt. Ltd
4	2nd May 2007	First Consultant signed an ERPA with another CDM Consultant/CER buyer	ERPA deed
5	January 2008	Expiry of contract with First	Work order copy

		Consultant	
6	14th March 2008	Negotiations with other Consultants	Introduction mail received from Consultants
7	3rd October 2008	The work was awarded to a new Consultant	Consulting agreement
8	February 2009	Survey for local stake holder comments (Questionnaire survey)	Filled Questionnaire
10	4th May 2009	Appointment of DoE for validation of CDM project	Agreement copy
11	18th November 2009	Validation & Registration of VCS project	VCS deed issued from DoE
12	23rd November 2009	Submission of PDD to validator for completeness check	Mail dated 23/11/2009
13	1st January 2010	PP terminates the Consultant agreement	Termination letter copy
14	5th February 2010	Appointment of a new CDM Consultant to look after the CDM project	Agreement with new consultant
15	May 2010	PDD for Global stakeholder consultation	

This proves that the PP has taken real and continual effort in securing the CDM status.

The individual chronological sequence of events describes the stages in the CDM process underwent by WTG owners in the project activity are submitted to DOE.

Thus, it can be concluded that the project activity is additional.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

>>

Baseline methodology for projects under Type AMS I.D has been detailed in paragraphs 10-18 and Type AMS I.F has been detailed in paragraphs 13-17 of the above-mentioned document. Paragraph 10 and Paragraph 14 of Type I.D and Type I.F respectively applies to this project activity, which states that:

For all other systems, the baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor.

Type I.D:

$BE_y = EG_{BL,y} * EF_{CO2,grid,y}$

Where,

BE_y = Baseline Emissions in year y; t CO2
$EG_{BL,y}$ = Energy baseline in year y; kWh
$EF_{CO2,grid,y}$ = CO2 Emission Factor in year y; t CO2e/kWh

Type I.F:

$BE_y = EG_{BL,y} * EF_{CO2,y}$

Where,

BE_y = Baseline Emissions in year y; t CO2
$EG_{BL,y}$ = Qunatity of net electricity displaced as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{CO2,y}$ = Emission Factor (t CO2e/MWh), Emission factor of a grid shall be calculated as per the procedures provided in AMS I.D

The Emission Factor can be calculated in a transparent and conservative manner as follows:

(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 CO2equ/kWh) of the current generation mix.*

The project proponent has chosen the option (a) i.e. combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) for the purpose of calculation of baseline. Actual CO2 emission factor are used for the purpose. Value has been used from the latest version of Baseline Carbon Dioxide Emissions from Power Sector provided by the Central Electricity Authority, Version 5, Govt. of India.

The baseline emission (BEy in tCO2) is the product of the baseline emission factor (EFy in tCO2/MWh) times the electricity supplied by the project activity to the grid (EGy in MWh) minus the baseline electricity supplied to the grid in the case of modified or retrofit facilities ($EG_{baseline}$ in MWh), as follows:
$EG_{add,y} = EG_{pj,y} - EG_{existin,y}$

Where,
$EG_{add,y}$ = Net increase in electrical energy generation at existing plant in year y; kWh/y
$EG_{pj,y}$ = The total net actual electrical energy produced in year y by all units, existing and new project units; kWh/y
$EG_{existing}$ = The estimated net electrical energy that would have been produced by existing units (installed before the project activity) in year y in the absence of the project activity, kWh/y

Since the project does not involve any modification or retrofit of the existing generation facility hence $EG_{add,y} = 0$

$EF_{grid\ CM\ y}$ is determined as follows:

The weighted average of the Operating Margin emission factor ($EF_{gridOM,,,y}$) and the Build Margin emission factor ($EF_{grid\ BM,\ y}$)

$EF_{grid\ CM\ y} = EF_{grid\ OM,\ y} * W_{OM} + EF_{grid\ BM,\ y} * W_{BM}$

Where,
$EF_{grid\ CM,\ y}$ = Combined Margin CO2emission factor in year y (tCO2/MWh)
$EF_{grid\ OM,\ y}$ = Operating Margin CO2emission factor in year y (tCO2/MWh)
$EF_{grid\ BM,\ y}$ = Build Margin CO2emission 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, the default weights are as follows: W_{OM} = 0.75 and W_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature).

$EF_{CO2} = EF_{grid\ OM,\ y} * 0.75 + EF_{grid\ BM,\ y} * 0.25$

.
Where,

$EF_{grid\ OM,\ y}$ = Operating Margin CO2emission factor in year y (tCO2/MWh)
$EF_{grid\ BM,\ y}$ = Build Margin CO2emission factor in year y (tCO2/MWh)
W_{OM} = Weighting of operating margin emissions factor (%)
W_{BM} = Weighting of build margin emissions factor (%)

Calculation of combined margin emission factor of the grid

Step 1: Calculation of Operating Margin Emission Factor

For calculation of operating margin four options are available:

a) Simple operating margin
b) Simple adjusted operating margin
c) Dispatch data analysis operating margin
d) Average operating margin

The operating margin emission factor has been calculated using simple operating margin option by using the 3 year data vintage[9]:

The $EF_{OM,Y}$ is estimated to be:

Grid	Year	$EF_{OM,Y}$ (tCO_2/MWh)
Southern	2006-2007	1.00
	2007-2008	0.99
	2008-2009	0.97

[9] Refer Annex 3 for the detailed calculation of emission factor.

Thus the final $EF_{OM,Y}$ based on three years average is estimated to be 0.99 tCO_2/MWh tCO_2/MWh for Southern.

Step 2: Calculation of the Build Margin Emission Factor $EF_{BM,Y}$
The $EF_{BM,y}$ is estimated as 0.82 tCO_2/MWh (with sample group m constituting most recent capacity additions to the grid comprising 20% of the system generation) for Southern.

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

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$$

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

Baseline Emission factor: **0.94 tCO_2/MWh** for Southern grid.

Weighted Average Emission Co-efficient:

The weighted emission rate for the current generation mix as per the CEA CO_2 Baseline database is **0.83 tCO_2/MWh** for **Southern grid**.

The project proponent has opted for approach 'a' i.e. combined margin emission factor with ex-ante approach where emission factor is fixed for the whole crediting period. The ex ante approach is considered conservative since the grid system in future is expected to become more carbon intensive as the projects planned to establish in the region is mostly thermal energy based.

$PE_y = 0$ ----------(**G**)

$L_y = 0$ ----------**(H)**

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

From Equation (A), (B), (G) and (H),

$ER_y = BE_y$ ----------**(I)**

Actual emission reductions will be calculated *ex-post* based on the actual monitored data on energy supplied to respective regional grids during each year of the crediting period and fixed CEA baseline grid emission factor 0.94 tCO_2/MWh for Southern Grid.

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

Data / Parameter:	**EF_{OM}, Southern Regional Grid**
Data unit:	tCO_2/MWh

Description:	Operating margin grid emission factor for Southern Regional grid
Source of data used:	"**CO_2 Baseline Database for the Indian Power Sector**", Version 05 published by Central Electricity Authority, Ministry of Power, Government of India in November 2009.
Value applied:	0.99
Justification of the choice of data or description of measurement methods and procedures actually applied :	To obtain homogeneity in the approach in the country to establish authentic and consistent quantification of the CO_2 emission baseline in the Indian power sector, CEA values have been used. This database by CEA is an official publication of GOI for purpose of CDM Baselines and is based on most recent data available.
Any comment:	-

Data / Parameter:	**EF_{BM}, Southern Regional grid**
Data unit:	tCO_2/MWh
Description:	Build margin grid emission factor for Southern Regional Grid
Source of data used:	"**CO_2 Baseline Database for the Indian Power Sector**", Version 05 published by Central Electricity Authority, Ministry of Power, Government of India in November 2009
Value applied:	0.82
Justification of the choice of data or description of measurement methods and procedures actually applied :	To obtain homogeneity in the approach in the country to establish authentic and consistent quantification of the CO_2 emission baseline in the Indian power sector, CEA values have been used. This database by CEA is an official publication of GOI for purpose of CDM Baselines and is based on most recent data available.
Any comment:	-

Data / Parameter:	**$EF_{grid\ CM,\ y}$, Southern Regional Grid**
Data unit:	tCO_2/MWh
Description:	Combined Margin CO_2 emission factor for southern regional grid
Source of data used:	"**CO_2 Baseline Database for the Indian Power Sector**", Version 05 published by Central Electricity Authority, Ministry of Power, Government of India in November 2009
Value applied:	0.94
Justification of the choice of data or description of measurement methods and procedures actually applied :	To obtain homogeneity in the approach in the country to establish authentic and consistent quantification of the CO_2 emission baseline in the Indian power sector, CEA values have been used. This database by CEA is an official publication of GOI for purpose of CDM Baselines and is based on most recent data available.
Any comment:	• Calculated as per combined margin approach (detailed in B.4) based on 75% of OM and 25% of BM values. • Value is calculated based on ex-ante approach and the same will be used for the crediting period

B.6.3 Ex-ante calculation of emission reductions:

>>

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

$= 0.75 * EF_{OM, y} + 0.25 * EF_{BM, y}$

$= 0.75 * 0.9866 + 0.25 * 0.8200$

$= 0.94$

$EF_y = EF_{CM, grid, y}$

$EF_y = 0.94$

Tamilnadu:

Electricity generation from 13.5 MW sub-total capacity of WTGs in Tamil Nadu is as follows:
= 13.5 *24 *365*27.46% = 32474.20 MWh

Karnataka:

Electricity generation from 1 WTG 0.6 MW of V.T. Switchgears & Transformers, in karnataka is as follows:
= 0.60 *24 *365*26.50% =1392.84 MWh

The total net electricity generation estimated both from Tamilnadu and Karnataka is:
32474.20 + 1392.84 = 33867.04 MWh

EG_y = 33867.04 MWh

Thus,

BE_y= 33867.04 x 0.9449

= 32,002 tCO_2e

Emissions Reductions = Baseline Emissions (BE) – Project Emissions (PE) – Leakage (LE)

Project Emissions $PE_y = 0$

$LE_y = 0$

ER_y = 32,002– 0 -0

= 32,002 tCO_2e

Hence,

$ER_y = BE_y$

Thus,

ER_y = 32,002 **tCO_2e**

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

>>

Year	Estimation of project activity emissions (t CO_2e)	Estimation of baseline emissions (t CO_2e)	Estimation of leakage emissions (t CO_2e)	Estimation of overall emissions reductions (t CO_2e)
2011	0	32,002	0	32,002
2012	0	32,002	0	32,002
2013	0	32,002	0	32,002
2014	0	32,002	0	32,002
2015	0	32,002	0	32,002
2016	0	32,002	0	32,002
2017	0	32,002	0	32,002
2018	0	32,002	0	32,002
2019	0	32,002	0	32,002
2020	0		0	
Total (tonnes CO_2e)	**0**	320,020	**0**	320,020

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

B.7.1 Data and parameters monitored:

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Electricity generated by the project activity
Source of data to be used:	Joint meter reading verified with the electricity generation invoices provided by the respective state electricity board on monthly basis and will be stored at the project proponent's office. For the ex-ante estimation here
Value of data	33867.04 MWh
Description of measurement methods and procedures to be applied:	Electricity generated is obtained from the purchase order provided by all the proponents. The electricity supplied is recorded by meter reading located at the project sites where wind mills are located.
QA/QC procedures to be applied:	Regular calibration of all the meters will be undertaken annually 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.

Data / Parameter:	Total Energy (TEG_y)
Data unit:	MWh
Description:	Total electricity supplied 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	--
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 ESCOM.[10] 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 ESCOM 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.

B.7.2 Description of the monitoring plan:

>>

The Project has a two metering system, first is LCS (Local Control System) meter installed by the WTG supplier which is pre-calibrated and sealed by the supplier that meets the Indian and regional electricity authority's standards. Another meter is installed and owned by the Power Purchaser i.e. Tamilnadu Electricity Board (TNEB) and ESCOM (Karnataka).

The electricity generated is monitored at each wind mill using LCS on daily basis by the site operator or supervisor. The daily meter reading will be taken and maintained at the wind farms in respective wind farm's electricity meter log books. There is also a joint electricity meter installed by the state electricity board for the windmills. The reading of the joint meter reading is recorded on monthly basis by the official from state electricity board in presence of site operator/ supervisor.

The receipt of the sales to grid is then cross-checked with the data recorded by each individual meter to avoid any differences. The individual meter is calibrated and sealed by the supplying company and is not interfered by project proponent with out the presence of manufacturing company or its accredited representatives. Whereas, the other meter is owned by the state electricity board and will be calibrated as

[10] 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.

per their schedule. The invoices are raised based on the TNSEB and ESCOM (Karnataka) meter readings, so this can also be considered as the third party certified electricity generation. In any case, the meter form the power purchaser is the main/ primary meter and the one on LCS is the secondary or check meter.

Secondary Monitoring and Contingency Plan:
The secondary monitoring, which will provide a backup (fail-safe measure), in case of failure of the primary monitoring due to unforeseen reasons, data recording would be done at the individual WTGs with the help of the Local Control System (LCS) meter attached with each WTGs. The total electricity generation will also be cross checked with the invoices raised for the particular month.

In case of any error observed in the meter readings of the individual WTGs and TNSEB/ESCOM (Karnataka) meter, site engineers will set correct value in presence of the supervisor and a written report will be sent to the project proponent. In cases, where the joint meter reading is taken on monthly basis and the data of the few days within a particular month is required, the individual meter readings of the WTG will be used. Also, when there is difference of values for the same reading in two meters, the lower meter reading will be used as a conservative approach.

Designation	Responsibilities
Project Head (Incharge person from Project proponent)	Registration Data storage and electronic archiving
Project Executor and Controller (WTG owner or appointed person on behalf)	• Recording • Verification • Storage of Data
Site main Controller	• Operation, Monitoring and Verification of Data • Data Recording • Storage of data
Operation and Maintenance Contractor	• Operation and Maintenance • Storage of data • Data Recording

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

>>
Date of completion of the application of the baseline and monitoring methodology is: 23/06/2010

Name of responsible person(s)/entity (ies) for application of the above:
Nandagopal.P
Sri Kanaka Management Services Pvt. Ltd., Bangalore
KMSPL is the project proponent and contact details are given in Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

>>
18/01/2006

This is the date on which the purchase order was issued for the first wind mill of the bundle.

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

>>

20 years 0 months

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

>>

NA

C.2.1.2. Length of the first crediting period:

>>

NA

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

>>

01/01/2011 or the date of registration of the project activity which ever is later.

C.2.2.2. Length:

>>

10 years 0 months

SECTION D. Environmental impacts

>>

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

>>

As per the Ministry of Environment and Forests (Government of India) notification the project activity does not fall under the purview of the Environmental impact Assessment thus the project activity is exempted from the environmental clearances[11].

It should be noted here that though EIA is not a regulatory requirement in India for wind energy projects, still the project sponsors conducted the EIA to study if any irreversible and unacceptable impacts on the environment resulted and would result from the project activity.
Although an EIA is not required, the project proponent has foreseen certain impacts due to the project activity.

Environmental impacts:

- Renewable energy generation and GHGs emission reduction.

[11] http://enfor.nic.in/divisions/iass/notif/eia.htm

- *Impact on Landscape*: possible reflections, disturbance of the landscape.
- *Impact due to noise*: Acceptable noise levels for nearby living inhabitants, vulnerable nature areas, etc., by means of a global sound profile.
- *Impact on air and water*: wind energy plant are known to contribute zero atmospheric pollution as no fuel combustion is involved during any stage of operation and there is no effluent discharge during operation of wind turbine generator.
- *Socio economic impacts*: The locals have benefited economically through land scales. The project activity helps the upliftment of skilled and unskilled manpower in the region. The project will be providing employment opportunity to not only during the construction phase, but also during its operational life time. The project activity improves employment rate and livelihood of local populace in the vicinity of the project. Moreover, the project generates eco-friendly, GHG free power, which contributes to sustainable development of the region.

Conclusion: The net impact on the environment pollution category would be positive as all necessary abatement measures would be adopted and periodically monitored. The project activity does not have any major adverse impacts on environment during its construction or operational phase. The human interest parameter would show positive impacts due to increased job opportunities at the facility as well as other ancillary unit coming up in the same region.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

>>

The Environment Impact Assessment concludes that the project will not present any significant impact on the natural environment and will contribute to the socioeconomic development of the region and the reductions of the GHG emissions.

SECTION E. Stakeholders' comments

>>

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

>>

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

E.2. Summary of the comments received:

>>

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 mind mills?	
11	Any other comments and suggestions?	

Signature: Date:

The responses[12] 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.

Ten questionnaires were circulated in each location out of which 6 to 7 filled questionnaires were received back. Based on the filled questionnaires the comments were tabulated and around 98% of the comments received were positive. Some negative comments like disturbance to neighbourhood and bird migration were the common negative comments received.

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

>>

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 resolved.

[12] The survey feedback forms and its summary sheets are being submitted to DOE

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	Kanaka Management Services Pvt. Ltd.
Street/P.O.Box:	
Building:	# 271, SFS 407, 4th Phase, Yelahanka New Town
City:	Bangalore
State/Region:	Karnataka
Postfix/ZIP:	560 064
Country:	India
Telephone:	+91-80-65464140
FAX:	
E-Mail:	kmscdm@gmail.com
URL:	--
Represented by:	
Title:	
Salutation:	Ms.
Last Name:	Rani
Middle Name:	-
First Name:	-Eshwari
Department:	-
Mobile:	-
Direct FAX:	-
Direct tel:	+91-80-65464140
Personal E-Mail:	info@kms-group.com

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no Public funding to the project activity from Annex-I countries.

Annex 3

BASELINE INFORMATION

The baseline is explained under section B.6

Annex 4

MONITORING INFORMATION

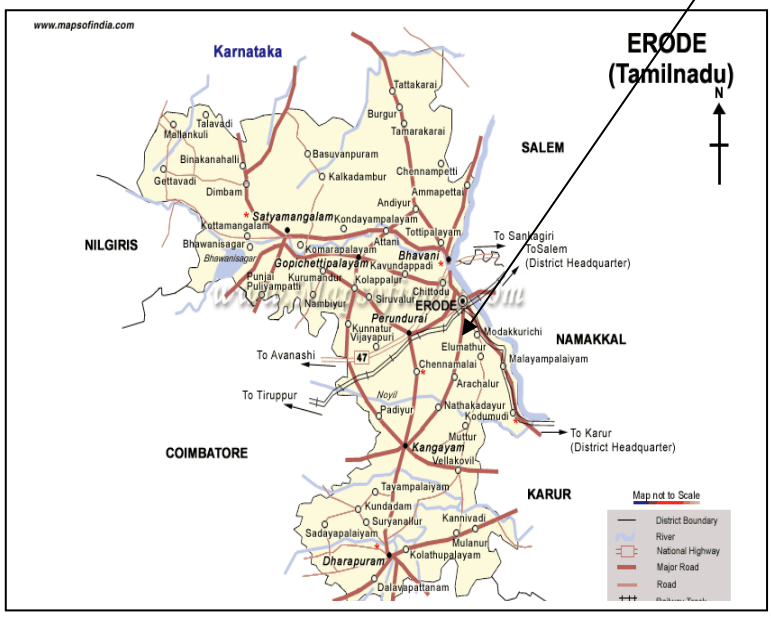
The monitoring information is explained under section B.7

Appendix 1

Location maps of the project activity

The maps below show the geographical location of the project activity.

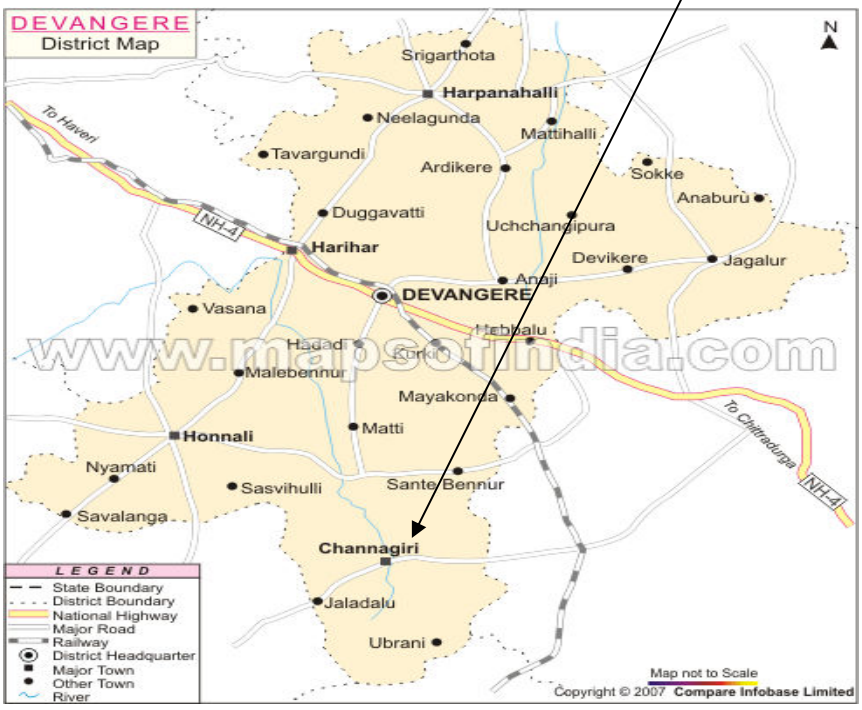
(www.mapsof India.com/maps/tamilnadu/districts/tirunelveli.htm)



(www.mapsof India.com/maps/tamilnadu/districts/erode.htm)

Project activity

(www.mapsof India.com/maps/tamilnadu/districts/Coimbatore.htm)



(http://www.mapsofindia.com/maps/karnataka/districts/davangere.htm)

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