 <p align="center"><b>Project design document form</b> (Version 11.0)</p>	
<b>BASIC INFORMATION</b>	
<b>Title of the project activity</b>	Bundled Wind Project Activity in Tamil Nadu by MMP
<b>Scale of the project activity</b>	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
<b>Version number of the PDD</b>	<u>07.004</u>
<b>Completion date of the PDD</b>	<u>17-11-2020</u> 08/12/2020
<b>Project participants</b>	Core CarbonX Solutions Private Limited
<b>Host Party</b>	India
<b>Applied methodologies and standardized baselines</b>	AMS I.D: Grid connected renewable electricity generation --- Version 18.0
<b>Sectoral scopes</b>	1 : Energy industries (renewable - / non-renewable sources)
<b>Estimated amount of annual average GHG emission reductions</b>	<del>19,879</del> <u>13,867</u> tCO <sub>2</sub> e

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## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

>> The project activity is a bundled wind power project activity consisting of ~~seven-six<sup>1</sup>~~ numbers of Wind Turbine Generators (WTGs) of by M/s Muthoot Fincorp Ltd MFCL), M/s Muthoot Finance Ltd(MFL). ~~Agencia Commercial Maritima (ACM).~~ This involves installation 3 number of 1250 kW Suzlon make WTGs by M/s Muthoot Fincorp Ltd (MFCL) ~~and~~, 3 number of 1250 kW Suzlon make WTGs by M/s Muthoot Finance Ltd ~~and 1 number of 1250kW Suzlon make WTG by Agencia Commercial Maritima (ACM) in the state of Tamil Nadu.~~

The objective of the wind power project activity is to generate renewable electricity using wind energy. The electricity generated by the WTGs located in the Tamil Nadu is being sold to Tamil Nadu Electricity Board (TNEB).

MFCL has placed the P.O. for the three numbers of 1250 kW Suzlon make WTG's at Kavalakuruchi and Vadakku Kavalakuruchi Village, Tirunelveli District, Tamil Nadu on 4th February 2006.

MFL has placed the P.O. for the three numbers of 1250 kW Suzlon make WTG's at Kaduvetti, Kandanganeri and Kavalakuruchi Villages, Tirunelveli District, Tamil Nadu on 4th February 2006.

~~ACM has placed the P.O. for the one number of 1250 kW Suzlon make WTG at Vadakku Kavalakuruchi Villages, Tirunelveli District, Tamil Nadu on 02 December 2006.~~

In the absence of the project activity, the electricity that is generated/will be generated from the project activity would have been generated by the operation of existing/proposed grid connected fossil fuel based power plants. The Project activity thus reduces the anthropogenic emissions of greenhouse gases (GHGs) into the atmosphere associated with the equivalent amount of electricity generation from the existing/proposed fossil fuel based grid connected power plant.

#### Contribution of the project activity to sustainable development:

Ministry of Environment and Forests, Govt. of India has stipulated 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<sup>2</sup>.

#### Social well-being:

- The project activity has led to direct and indirect employment opportunities due to the commissioning of the project in the areas.

#### Economic well-being:

- CDM provides financial incentives, which encourage channelling more investment into cleaner energy projects and also result in improved returns to the project stakeholders.
- It also promotes industrial growth by catering to the energy needs arising out of the supply demand gap of electricity.

#### Environmental well-being:

- The project activity utilizes wind energy for the electricity generation. In the absence of the project activity, equivalent electricity would have been generated by existing/proposed grid connected fossil fuel based power plants. Hence the project activity reduces the anthropogenic GHG emissions into the atmosphere associated with equivalent electricity generation from the existing/proposed grid connected fossil fuel based power plants. Use of renewable energy source (wind energy) for energy generation helps in conservation of natural resources like coal and petroleum fuels.

<sup>1</sup> ~~One turbine~~ belongs to Agencia Commercial Maritima (ACM) is removed from the renewal process

<sup>2</sup> [http://cdmindia.nic.in/host\\_approval\\_criteria.htm](http://cdmindia.nic.in/host_approval_criteria.htm)

Technological well-being:

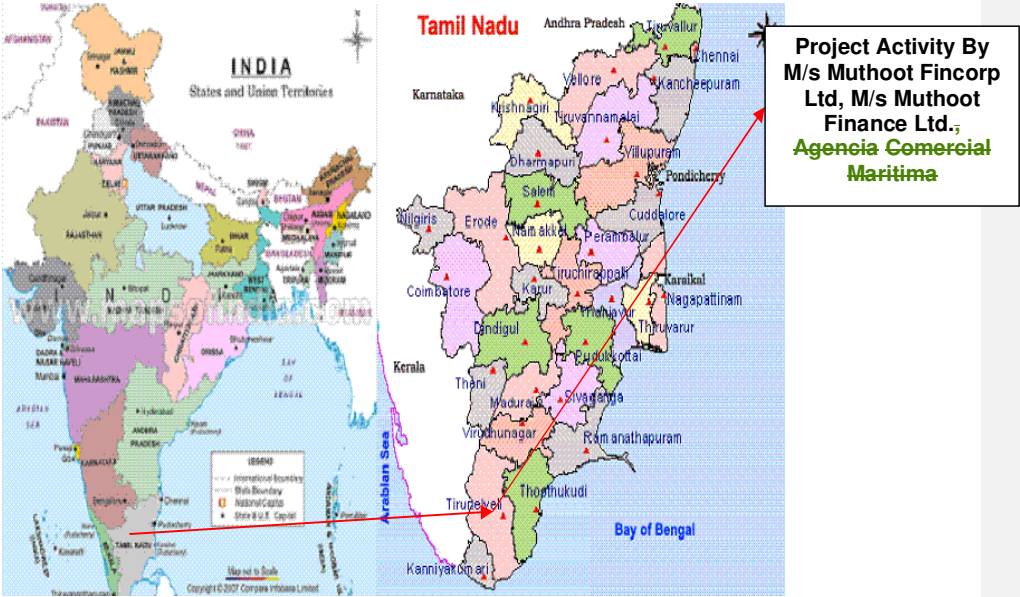
- Wind farm 'marks step towards cleaner and inexhaustible source of energy"

A.2. Location of project activity

>>

Client	WTG Location	Latitude	Longitude	District	Village
Muthoot Fincorp Ltd.	K 936	N 08° 57' 10.7"	E 77° 34' 38.5"	Tirunelveli	Kavalakuruchi
Muthoot Ltd.	K 923	N 08° 57' 46.5"	E 77° 34' 32.7"	Tirunelveli	Kavalakuruchi
Muthoot Fincorp Ltd.	K 912	N 08° 58' 08.1"	E 77° 34' 24.5"	Tirunelveli	Vadakku Kavalakuruchi
Muthoot Ltd.	K 139	N 08° 55' 30.8"	E 77° 34' 57.9"	Tirunelveli	Kandanaganeri
Muthoot Finance Ltd.	K 144	N 08° 55' 21.6"	E 77° 35' 18.2"	Tirunelveli	Kaduvetti
Muthoot Finance Ltd.	K 939	N 08° 56' 59.5"	E 77° 34' 28.3"	Tirunelveli	Kavalakuruchi
Agencia Comercial Maritima (ACM)	K 901	N 08° 58' 43.5"	E 77° 33' 52.1"	Tirunelveli	Vadakku Kavalakuruchi

The nearest airport for the WTG located in Tirunelveli District is Trivandrum and the nearest railway station is Tirunelveli.



**CDM-PDD-FORM****A.3. Technologies/measures**

>> The technical life time for the Wind Turbine Generator is 20 years 0 months<sup>3</sup>. Technical details of 1250 kW Wind Turbine Generators of Suzlon make machines installed by M/s Muthoot Fincorp Ltd. at the location K 936, K 912, K 923, installed by Muthoot Finance Limited at locations K 139, K 144 and K 939, ~~installed by Agencia Commercial Maritima at K 901~~ is as follows:

Sr. no.	Item	Description
1	Make	Suzlon
2	Model no.	S66
3	Rating in KW	1250
4	Rotor Type	3 bladed, horizontal axis
5	Rotor diameter	66m
6	Rotor Swept area	3421 m <sup>2</sup>
7	Hub Height	74 m
8	Regulation	Pitch Regulated
9	Cut-in wind speed	3 m/s
10	Rated wind speed	14 m/s
11	Cut-out wind speed	22 m/s
12	Gearbox Type	Integrated 3 stage 1 planetary & 2 helical
13	Gear Ratio	1:74.917
14	Nominal Load	1390 kW
15	Generator Type	Asynchronous 4/6 Pole
16	Rotation Speed	1006/1506 RPM
17	Rated Voltage	690 V
18	Frequency	50 Hz
19	Insulation	Class "H"
20	Enclosure Class	IP 56
21	Cooling System	Air cooled

Installation and operation of the windmills do not pose any environmental hazards. The technology of harnessing wind power through windmills is environmentally safe and sound. The host Government also agrees to this fact and does not ask for Environmental Impact Assessment for this type of projects. As supplier of wind energy converters (wind mills) are well known in the market. They have a strong R&D back up.

**A.4. Parties and project participants**

M/s Core CarbonX Solutions Private Limited is authorized to be the bundling agency and also to be the project participant by all the project proponents in the bundled project i.e. Muthoot Finance Limited, Muthoot Fincorp Limited, ~~Agencia Commercial Maritima~~.

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host Party)	M/s Core CarbonX Solutions Private Limited (Private entity )	No

**A.5. Public funding of project activity**

>> Public funding from Annex I is not involved in this project.

**A.6. History of project activity**

>> The PP hereby confirms that:  
a) The CDM project activity is a registered as a CDM project activity (UNFCCC CDM Project 8284 : Bundled Wind Project Activity in Tamil Nadu by MMP; Registration Date is 12/12/2012) but is NOT

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<sup>3</sup> <http://tnerc.tn.nic.in/orders/draft%20order%202020-3-2009%20complete%20final.pdf> , page No. 18

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included as a component project activity (CPA) in a registered CDM programme of activities (PoA); and

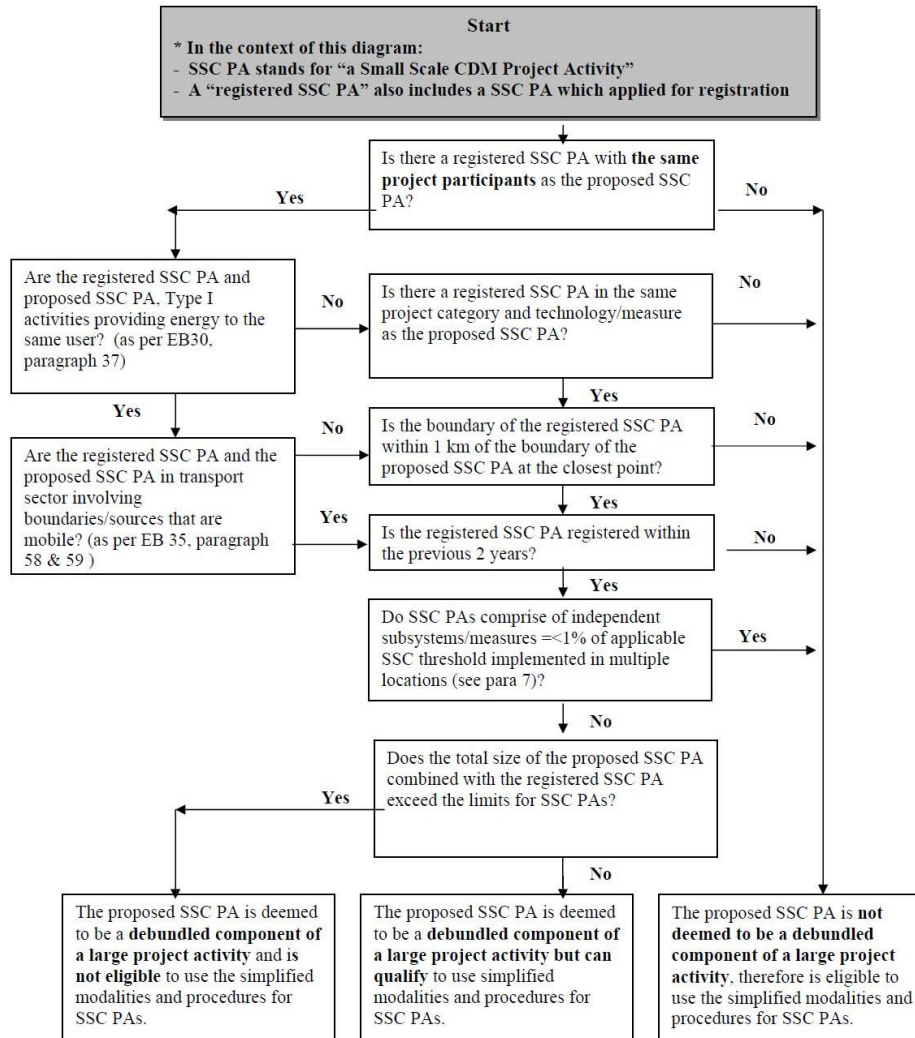
b) The proposed CDM project activity is not a project activity that has been deregistered.

### A.7. Debundling

>> As per the EB [8354](#) Annex 13 [Tool 20: Assessment of debundling of small-scale project activities](#) ["GUIDELINES ON ASSESSMENT OF DEBUNDLING FOR SSC PROJECT ACTIVITIES,"](#)(Version 04.03.1) : "a proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity of an application to register another small-scale CDM project activity:

- With the same project participants;
- In the same project category and technology/ measure; and
- Registered within the previous 2 years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point"

## I. DETERMINING THE OCCURRENCE OF DEBUNDLING



As there is no registered small scale project activity registered within the previous two years with the same project participants; in the same project category and technology whose project boundary is within 1 km of the project boundary of the proposed small scale activity, the project activity is not a debundled component of any other large-scale project activity.

## SECTION B. Application of methodologies and standardized baselines

## B.1. References to methodologies and standardized baselines

>> Project has applied approved methodology available for small-scale CDM project at UNFCCC website under Appendix B of the simplified modalities and procedures for small-scale CDM project activities

**Type I:** Renewable Energy Projects

**Category ID:** Grid connected renewable electricity generation

**Reference:** I.D./Version 187

**Scope:** 01 EB 861.

Valid from 28-7th November 2014

**Tool 07:** Tool to calculate the emission factor for an electricity system.  
Version 0702-4 EB 1060

## B.2. Applicability of methodologies and standardized baselines

>> The project activity involves generation of electricity by the means of renewable energy, wind. The project activity falls under the category of small scale projects. The methodology chosen for the project activity and its applicability to the project activity is discussed below.

**Type I: Renewable Energy Projects**

**Category D: Grid Connected Renewable Electricity Generation**

S.No	Technology /Measure as per AMS I.D/version 187	Measure of Project activity
1	This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass <sup>4</sup> : (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The Project activity involves electricity generation using renewable energy which is based on wind power and sale of electricity to the Tamil Nadu Electricity Board (TNEB). This project activity displaces the equivalent amount of electricity generation through the operation of existing/proposed fossil fuel based power plants connected to the Grid.
2	Illustration of respective situations under which each of the methodology (i.e. AMS-I.D,AMS-I.F and AMS-I.A) applies is included in Table 2.	The project supplies electricity to the Indian National Southern grid. Hence AMS I D is applicable.
3	This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition <sup>5</sup> in (an) existing plant(s); (c) Involve a retrofit <sup>6</sup> of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement <sup>7</sup> of (an) existing plant(s)	The project involves installation of 7 6 numbers of new WTG's each with capacity 1250 kW at sites where there was no renewable energy power plant operating prior to the implementation of the project activity
4	Hydro power plants with reservoirs <sup>8</sup> that satisfy at least one of the following conditions are eligible to apply this methodology:  (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir;  (b) The project activity is implemented in an existing	This is not applicable to the project activity as the project activity is not a hydro power plant.

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<sup>4</sup> Refer to EB 23, annex 18 or the definition of renewable biomass.

<sup>5</sup> A capacity addition is an increase in the installed power generation capacity of an existing power plant through: (i) The installation of a new power plant besides the existing power plant/units; or (ii) The installation of new power units, additional to the existing power plant/units. The existing power plant/units continue to operate after the implementation of the project activity.

<sup>6</sup> Retrofit (or rehabilitation or refurbishment). It involves an investment to repair or modify an existing power plant/unit, with the purpose to increase the efficiency, performance or power generation capacity of the plant, without adding new power plants or units, or to resume the operation of closed (mothballed) power plants. A retrofit restores the installed power generation capacity to or above its original level. Retrofits shall only include measures that involve capital investments and not regular maintenance or housekeeping measures.

<sup>7</sup> Replacement. It involves investment in a new power plant or unit that replaces one or several existing unit(s) at the existing power plant. The installed capacity of the new plant or unit is equal to or higher than the plant or unit that was replaced.

<sup>8</sup> A reservoir is a water body created in valleys to store water generally made by the construction of a dam.

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	reservoir <sup>9</sup> , 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/m <sup>2</sup> ;  (c) 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/m <sup>2</sup> .	
5	If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel <sup>10</sup> , the capacity of the entire unit shall not exceed the limit of 15 MW.	The project activity will generate electricity from wind energy which is lower than 15 MW.
6	Combined heat and power (co-generation) systems are not eligible under this category.	The project activity doesn't involve co-generation; hence this condition is 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 15 MW and should be physically distinct <sup>11</sup> from the existing units.	The project activity doesn't involve the addition of renewable energy generation units at an existing renewable power generation facility; hence this condition is 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.	The project activity doesn't retrofit or modify an existing facility; hence this condition is not applicable.
9	<u>In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.</u>	<u>The project activity does not involve landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions, hence this condition is not applicable</u>
10	<u>In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.</u>	<u>The project activity does not involve biomass sourced from dedicated plantations hence this condition is not applicable.</u>
		The total installed capacity of the project activity is <del>7.58.75</del> MW which is less than the eligibility limit of 15 MW to qualify as a small scale project activity under Type I of the small scale methodologies Also no additional WTGs will be added to the project activity during its lifetime; Hence the project activity will remain under small scale project activity during every year

<sup>9</sup> A reservoir is to be considered as an "existing reservoir" if it has been in operation for at least three years before the implementation of the project activity.

<sup>10</sup> A co-fired system uses both fossil and renewable fuels, for example the simultaneous combustion of both biomass residues and fossil fuels in a single boiler. Fossil fuel may be used during a period of time when the biomass is not available and due justifications are provided.

<sup>11</sup> Physically distinct units are those that are capable of generating electricity without the operation of existing units, and that do not directly affect the mechanical, thermal, or electrical characteristics of the existing facility. For example, the addition of a steam turbine to an existing combustion turbine to create a combined cycle unit would not be considered "physically distinct".

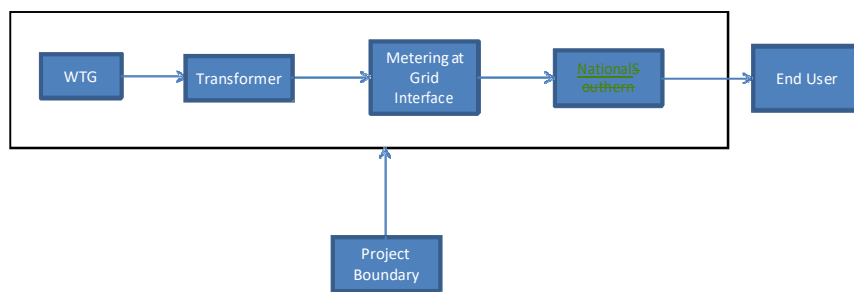


Hence it can be concluded that the selected methodology, AMS I D – Grid Connected Renewable Electricity Generation is applicable to project activity.

### B.3. Project boundary, sources and greenhouse gases (GHGs)

>> According to the methodology, AMS ID, Version 187, the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

The project boundary encompasses the physical, geographical site of the 8-757.5 MW project activity at the project location as specified in Section A.24-1-4 above, the metering interface and the ~~Southern-Indian~~ National Grid to which the proposed project activity is connected to and all other power plants connected to the ~~Southern-Indian~~ National Grid.



	Source	GHG	Included?	Justification/Explanation
Baseline	CO <sub>2</sub> emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity.	CO <sub>2</sub>	Yes	Major Source of emissions
		CH <sub>4</sub>	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
		N <sub>2</sub> O	No	Minor source of emissions and limited data available. Exclusion is conservative assumption.
Project activity	Generation of electricity from Wind Turbine Power Plants	CO <sub>2</sub>	No	Electricity generation from renewable power project involving wind energy does not incur any emission
		CH <sub>4</sub>	No	Electricity generation from renewable power project involving wind energy does not incur any emission
		N <sub>2</sub> O	No	Electricity generation from renewable power project involving wind energy does not incur any emission

### B.4. Establishment and description of baseline scenario

>> The emission reductions occur as the project activity generates electricity by the renewable energy, wind energy, and the sale of electricity generated to the state electricity board.

In the absence of the project activity, the electricity generated from the project activity would have been generated by the operation of existing/proposed grid connected power plants that are predominantly GHG intensive Thermal power plants. The Project activity will thus reduce the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere by displacing the equivalent amount of electricity generation through the operation of existing fossil fuel based power plant and future capacity expansion of fossil fuel-based power plants connected to the Grid.

As per AMS I D version 187:

Baseline emissions include only CO<sub>2</sub> emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows: The baseline scenario is that the 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 into the grid.

The baseline emissions are the product of electrical energy baseline  $EG_{BL-y}$  expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$$BE_y = EG_{P,y} * EF_{grid,y}$$

Where:

$BE_y$  = Baseline Emissions in year y (t CO<sub>2</sub>)

$EG_{P,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{grid,y}$  = Combined margin CO<sub>2</sub> 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 – Version 07.0" (t CO<sub>2</sub>/MWh)

$$BE_y = EG_{BL,y} * EF_{CO_2-grid,y}$$

Where:

$BE_y$  = Baseline Emissions in year y; t CO<sub>2</sub>

$EG_{BL,y}$  = Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO_2-grid,y}$  = CO<sub>2</sub> emission factor of the grid in year y (t CO<sub>2</sub>/MWh)

As per AMS I D version 187 paragraph 2312 the Emission Factor has to 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 t CO<sub>2</sub>e/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)<sup>12</sup> and made publicly available.

<sup>12</sup> Plant Emission Factors used for the calculation of Emission Factors should be obtained in the following priority: 1. Acquired directly from the dispatch center or power producers, if available; or 2. Calculated, if data on fuel type, fuel Emission Factor, fuel input and power output can be obtained for each plant; If confidential data available from the relevant host Party authority are used, the calculation carried out by the project participants shall be verified by the DOE and the CDM-PDD may only show the resultant carbon Emission Factor and the corresponding list of plants; 3. Calculated, as above, but using estimates such as: default IPCC values from the 2006 IPCC Guidelines for National GHG Inventories for net calorific values and carbon Emission Factors for fuels instead of plant-specific values technology provider's name plate power plant efficiency or the anticipated energy efficiency documented in official sources (instead of calculating it from fuel consumption and power output). This is likely to be a conservative estimate, because under actual operating conditions plants usually have lower efficiencies and higher emissions than name plate performance would imply; conservative estimates of power plant efficiencies, based on expert judgments on the basis of the plant's technology, size and commissioning date; or 4. Calculated, for the simple OM and the average OM, using aggregated generation and fuel consumption data, in cases where more disaggregated data is not available.

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Accordingly, the option (a) of the paragraph 2342, version 187, AMS I.D has been chosen. The CO<sub>2</sub> emission factor of the grid (measured in tCO<sub>2</sub>e/MWh) is calculated in a transparent and conservative manner as 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 (version 072.4)" (hereafter referred to as "Tool"). This is being determined in line with paragraph 2342 (a) of AMS-I.D version 178. Baseline scenario would be equivalent amount of electricity generation by the prevailing generation mix of the Southern-Indian National Grid

Variable	Data Source
EG <sub>BL,y</sub> – <u>Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)</u> <u>Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)</u>	Records maintained by project proponent
Parameter	Data Source
EF <sub>grid,OM, y</sub> = Build Margin Emission Factor (tCO <sub>2</sub> /MWh)	Central Electricity Authority (CEA) CO <sub>2</sub> database version 15 dated <u>DecNovember</u> 20109. (www.cea.nic.in)
EF <sub>grid,BM, y</sub> = Operating Margin Emission Factor (tCO <sub>2</sub> /MWh)	Central Electricity Authority (CEA) CO <sub>2</sub> database version 15 dated <u>DecNovember</u> 20109.
EF <sub>CO<sub>2</sub>,grid,y</sub> = CO <sub>2</sub> emission factor of the grid in year y (t CO <sub>2</sub> /MWh)	Calculated as the weighted average of the operating margin and build margin

In accordance with the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of crediting period" (EB66 Annex 47), the demonstration of the validity of the original baseline or its update does not require a reassessment of the baseline scenario, but rather an assessment of the emissions which would have resulted from that scenario. The "CDM project standard for programmes of activities" (Version 02.0) states in paragraph 289 that the coordinating/managing entity shall assess and incorporate the impact of national and/or sectoral policies and circumstances existing at the time of requesting renewal of the PoA period on the modalities to estimate baseline GHG emissions for the subsequent crediting period of each corresponding CPA, without reassessing the baseline scenario.

As such and in accordance with Tool and AMS I.D version 18, the "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" is applied for the demonstration of the validity of the current baseline;

### Step 1: Assess the validity of the current baseline for the next crediting period

The validity of the current baseline is assessed using the following sub-steps.:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies.

As the proposed activity is a Greenfield activity and in the absence of the project activity (the current baseline) the 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 the grid. The baseline meets all current national and sectoral policies. The relevant national laws and regulations pertaining to generation of energy are:

- Electricity Act 2003
- National Electricity Policy
- Tariff Policy

The above mentioned Acts or policies do not mandate the choice of fuel to be used for power project. Power generation using renewable energy is not a mandatory legal requirement in India.

Step 1.2: Assess the impact of circumstances

The conditions used to determine the baseline emissions in the previous crediting period are still valid. At the time of inclusion of Project Activity, there were two regional grids in India namely Southern grid and NEWNE grid. On 31<sup>st</sup> December, 2013, these two grids were integrated as a single National grid. This will have no impact on baseline emissions as national grid emission factor will be considered for any new project activity or at the time of renewal of existing project activity.

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The updated emission factor for the national grid in the country will be used based on the database published by Central Electricity Authority (CEA), Government of India. The latest version of emission factor that will be available at the time of inclusion of Project activity will be applied to calculate the baseline emissions for the project activity.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

Not applicable as the projects in the PoA are all green field projects.

Step 1.4: Assessment of the validity of data and parameters

The updated emission factor for the national grid in the country will be used based on the database published by Central Electricity Authority (CEA), Government of India. The latest version of emission factor available at the time of inclusion of project activity will be applied to calculate the baseline emissions for the project activity as a part of the project activity.

## **B.5. Demonstration of additionality**

>> In the absence of the project activity the equivalent amount of electricity would have been generated by the operation of grid connected power plants that are predominantly GHG intensive Thermal power plants. The Project activity will thus reduce the anthropogenic emissions of greenhouse gases (GHGs) in to the atmosphere associated with the equivalent amount of electricity generation.

National and sectoral policies relevant to project activity are as below:

The Ministry of New and Renewable Energy (MNRE) has been providing subsidy to grid interactive power generation based on various renewable energy sources like small hydro, biomass and wind (only demonstration project). The following national policy measures are in place for the Wind power projects:

- Renewable Energy Certificates The Central Electricity Regulatory Commission (CERC) has made it mandatory that power companies need to buy a minimum 6% of their total installed capacity from renewable energy sources. These sources include solar, wind, mini and micro-hydro projects, along with electricity generated by using bagasse and biomass.
- National feed-in-tariff Feed-in-tariff introduced a Generation Based Incentives (GBI) scheme for electricity from renewable energy. In the short run (up to a maximum period of 5 years), the investor would have an option to either choose the GBI or the existing accelerated depreciation benefits, which are currently in place for the wind sector. However, over a period of time, the accelerated benefits will give way for a progressive performance based generation incentives.

The above mentioned National and/or sectoral policies or regulations under (E-, policy) have been implemented since the adoption by the COP of the CDM M&P (decision 17/CP.7, 11 November 2001). Hence as per EB 22, Annex 3; it has not been taken into account in developing a baseline scenario.

The tariff has also not been effected by any national or sectoral policy.

National and/or sectoral policies or regulations in India that give comparative advantages to more emissions-intensive technologies or fuels over less emissions-intensive technologies or fuels i.e. the baseline scenario (E+, policy) have been implemented before adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11 December 1997). Thus, the same have been taken into account when developing a baseline scenario.

## **Additionality**

As explained above, the project initiative qualifies under Type ID- Grid Connected Renewable Electricity Generation. The following paragraph has been detailed on project additionality.

In accordance with simplified modalities and procedures for small-scale Clean Development Mechanism (CDM) project activities, a simplified baseline and monitoring methodology listed in Appendix B may be used if project participants can demonstrate that the project activity would otherwise not be implemented due to

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the existence of one or more barrier(s) listed in "Guidelines On The Demonstration Of Additionality Of Small-Scale Project Activities", Version 09, Annex 27, EB 68.

Project participants shall provide an explanation to show that the project activity would not have occurred anyway due to at least one of the following barriers: *f*

- Investment barrier *f*
- Technological barrier *f*
- Barrier due to prevailing practice *f*
- Other barriers

The additionality of the project activity is being established using the following barriers:

- a) Investment barrier

### Investment Barrier:

The Project Proponent (PP) has adopted benchmark analysis for demonstrating the additionality of the project activity. PP has chosen Post Tax Equity Internal Rate of Return (Post Tax Equity IRR) as the financial indicator for the investment analysis of this project activity.

There are ~~three-two~~ project developers in the project activity i.e. Sub Project 1: M/s Muthoot Fincorp Ltd. has 3 number of WTGs ~~and~~; Sub Project 2: M/s Muthoot Finance Ltd. has 3 number of WTGs ~~and Sub Project 3: M/s Agencia Commercial Maritima (ACM) has 1 number of WTGs.~~

The investor usually looks for the return on the equity investment when they make investment into the project. When the firm can avail debt finance; more often than not the firm tends to optimize the debt financing in order to enhance the equity return. It must be noted that the interest rate payable to the bank is paid pre-tax and the benefits accrued due to the wind project from the 80% accelerated depreciation and the Section 80 IA are post tax. Moreover the debt financing is only for 10 years where as the life time of the project activity is for 20 years, which makes the investor to look for the returns on the equity investment for 20 years. Hence the equity IRR is used by the PP as the financial indicator.

As per the paragraph 12 of EB 62 Annex 05, Required/expected returns on equity are appropriate benchmarks for equity IRR.

As per paragraph 15 of EB 62, Annex 05, If the benchmark is based on parameters that are standard in the market, the cost of equity should be determined either by: (a) selecting the values provided in Appendix A; or by (b) calculating the cost of equity using best financial practices, based on data sources which can be clearly validated by the DOE, while properly justifying all underlying factors.

Hence for the project activity the benchmark is calculated as Required/Expected returns on equity using the standard, popular paradigm, the Capital Asset Pricing Model (CAPM) which is financially acceptable practice and is calculated based on data sources available in the market.

Cost of Equity: The cost of equity has been determined based upon the Capital Asset Pricing Model (CAPM)

$$CoE = r_f + \beta(ERP)$$

Where:

CoE = cost of equity

$r_f$  = risk free rate

ERP = equity risk premium for the market or market risk premium.

$\beta$  = Beta or systematic risk for this type of equity investment coefficient reflecting the volatility (risk) of the stock relative to the market

Yield to Maturity of Central Government Securities for the latest month available at the time of decision making has been chosen as proxy for the Risk Free Rate. This works out 7.47%<sup>13</sup> for the Sub Projects 1 ~~and~~ 7.44%<sup>14</sup> for Sub Project 2 ~~and 8.25%<sup>11</sup> for the Sub Project 3.~~

<sup>13</sup> [http://www.rbi.org.in/scripts/BS\\_ViewBulletin.aspx?Id=7171](http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=7171)

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Capital Asset Pricing Model (CAPM) provides the framework for computing risk premium. Risk premium, or market risk premium as it is commonly known as is the difference between the market return and the risk free return (YTM on Government Securities). As required by CAPM, market Index representing a widely diversified portfolio has been selected to compute the market return. Amongst the stock indices available in the Country at present, BSE Sensex which was introduced on 01/04/1979 is in operation for more than 20 years (20 years corresponding to the lifetime of the project activity). The return on BSE Sensex index has been computed from 01/04/1979 till the date prior to the investment decision making date. This return works out to 18.51 % for the Sub Project 1 ~~and~~, 18.52% for the Sub Project 2 ~~and 19.97% for Sub Project 3.~~

Based on the market return arrived at as explained above and the risk free return, the market risk premium works out to be 11.04% for the Sub Projects 1 ~~and~~, 11.08% for Sub Project 2 ~~and 11.12% for the Sub Project 3.~~

The risk of the project type has been computed using Beta. Beta has been computed for all power generating companies listed and traded in the stock exchange and having a minimum track period of 3 years. There were in all 5 companies for at the decision making time for the Sub Projects 1 ~~and~~, 2 ~~and~~ 3.

The beta of the selected companies was computed using 3 years trading data by regressing the stock return on BSE Sensex index and the resultant beta represents both business and leverage risk. The leverage risk has been eliminated by using the well accepted HAMADA equation and using the gearing and the tax rate of the respective companies. Out of the beta the minimum beta has been chosen to compute the risk premium to reflect the risk of the project type. This works out to 0.59 for the Sub Projects 1, 2 ~~and 0.65 for the Sub Project.~~

The cost of equity is obtained by adding the risk premium reflecting the risk of the project type to the government bond rates which works out to 13.96% for Sub Project 1, 2 ~~and 15.43% for the Sub Project 3.~~

Company	Benchmark
M/s Muthoot Fincorp Ltd.	13.96%
M/s Muthoot Finance Ltd.	13.96%
<del>Agencia Commercial Maritima</del>	<del>15.43%</del>

### Post Tax Equity IRR Calculation:

As per the guidance on assessment of Investment Analysis version 05, "Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate." The period considered for Post Tax Equity IRR calculation is 20 years which corresponds to the operational lifetime of the project activity.

Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, is added back to net profits for the purpose of calculating the financial indicator.

As per Annex 11, EB 48, "GUIDELINES FOR THE REPORTING AND VALIDATION OF PLANT LOAD FACTORS" The plant load factor shall be defined ex-ante in the CDM-PDD according to one of the following three options:

- The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval;
- The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company);

Accordingly the Plant Load Factor provided to the banks which is 27.46% while applying the project activity for project financing is considered for investment analysis. The following table illustrates the assumptions used for the calculation of the financial indicator i.e. Post tax equity IRR for the Sub Project 1.

<sup>14</sup> [http://www.rbi.org.in/scripts/BS\\_ViewBulletin.aspx?Id=7250](http://www.rbi.org.in/scripts/BS_ViewBulletin.aspx?Id=7250)

**Table 1: Input Values for the Sub Project 1 consisting of the 3 WTGs installed by Muthoot Fincorp Limited**

Operation & Maintenance Cost (10 Lakhs per WTG from 2 <sup>nd</sup> year with escalation of 5% per annum every year thereafter) (INR Million). The Operation and Maintenance Services are provided free of cost for the 1 <sup>st</sup> year of operation.	3	Quotation from Suzlon Energy Limited to Muthoot Fincorp Limited dated 28/09/2005
% of escalation per annum on O & M Charges every year	5%	Quotation from Suzlon Energy Limited Quotation from Suzlon Energy Limited to Muthoot Fincorp Limited dated 28/09/2005
Derating for every year after the 10th year	1.00%	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Service Tax	10.20%	Service Tax of 10% and 2% Educational Cess on Service Tax ( <a href="http://indiabudget.nic.in/ub2004-05/bh/bh1.pdf">http://indiabudget.nic.in/ub2004-05/bh/bh1.pdf</a> )
Tariff for sale to TNEB - INR/Kwh	2.77	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-2005
Project Cost	INR Million	
WTG Cost	195.00	Quotation from Suzlon Energy Limited to Muthoot Fincorp Limited dated 28/09/2005
Land	4.50	Quotation from Suzlon Energy Limited to Muthoot Fincorp Limited dated 28/09/2005
Total Project Cost	199.50	Quotation from Suzlon Energy Limited to Muthoot Fincorp Limited dated 28/09/2005
Means of Finance	INR Million	
Internal Accruals	59.85	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-2005
Loan Component	139.65	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-

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		2005
Total Source	199.5	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Interest Rate (%)	10.5%	Commercially prevailing interest rate as per RBI BPLR <sup>15</sup>
Repayment Period (years)	10.0	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Moratorium (Months)	12.0	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Number of Quarterly Instalments	36.0	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-2005
Income Tax Depreciation Rate (Written Down Value basis)	80%	Income Tax Rules 2005
Book Depreciation Rate (Straight Line Method basis)	4.50%	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Book Depreciation up to (% of asset value)	90%	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-2005
Income Tax rate	30%	Indian Union Budget 2005-2006 dated 28/02/2005 <sup>16</sup>
Surcharge	10%	Indian Union Budget 2005-2006 dated 28/02/2005
Cess	2%	Indian Union Budget 2004-2005 dated 08/07/2004 <sup>17</sup>

<sup>15</sup> <http://www.rbi.org.in/scripts/WSSView.aspx?Id=9520>

<sup>16</sup> [indiabudget.nic.in/ub2005-06/bh/bh1.pdf](http://indiabudget.nic.in/ub2005-06/bh/bh1.pdf)

<sup>17</sup> <http://indiabudget.nic.in/ub2004-05/bh/bh1.pdf>



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The following table illustrates the assumptions used for the calculation of the financial indicator i.e. Post tax equity IRR for the Sub Project 2.

As per Annex 11, EB 48, "GUIDELINES FOR THE REPORTING AND VALIDATION OF PLANT LOAD FACTORS"

The plant load factor shall be defined ex-ante in the CDM-PDD according to one of the following three options:

- a) The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval;
- b) The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company);

Accordingly the Plant Load Factor provided to the banks which is 27.46% while applying the project activity for project financing is considered for investment analysis.

**Table 2: Input Values for the Sub Project 2 consisting of the 3 WTGs installed by Muthoot Finance Limited**

Operation & Maintenance Cost (10 Lakhs per WTG from 2 <sup>nd</sup> year with escalation of 5% per annum every year thereafter) (INR Million). The Operation and Maintenance Services are provided free of cost for the 1 <sup>st</sup> year of operation.	3	Quotation from Suzlon Energy Limited to Muthoot Finance Limited dated 10/01/2006
% of escalation per annum on O & M Charges every year	5%	Quotation from Suzlon Energy Limited to Muthoot Finance Limited dated 10/01/2006
Derating for every year after the 10th year	1.00%	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Service Tax	10.20%	Service Tax of 10% and 2% Educational Cess on Service Tax ( <a href="http://indiabudget.nic.in/ub2004-05/bh/bh1.pdf">http://indiabudget.nic.in/ub2004-05/bh/bh1.pdf</a> )
Project Cost	INR Million	
WTG Cost	195.00	Quotation from Suzlon Energy Limited to Muthoot Finance Limited dated 10/01/2006
Land	4.50	Quotation from Suzlon Energy Limited to Muthoot Finance Limited dated 10/01/2006
Total Project Cost	199.50	Quotation from Suzlon Energy Limited to Muthoot Finance Limited dated 10/01/2006
Means of Finance	INR Million	
		Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory

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Internal Accruals	59.85	Committee Members and special invitees on 24-10-2005
Loan Component	139.65	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Total Source	199.5	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-2005
Interest Rate (%)	10.5%	Commercially prevailing interest rate as per RBI BPLR <sup>18</sup>
Repayment Period (years)	10.0	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-2005
Moratorium (Months)	12.0	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Number of Quarterly Instalments	36.0	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Income Tax Depreciation Rate (Written Down Value basis)	80%	Income Tax Rules 2005
Book Depreciation Rate (Straight Line Method basis)	4.50%	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005
Book Depreciation up to (% of asset value)	90%	Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10- 2005

<sup>18</sup> <http://www.rbi.org.in/scripts/WSSView.aspx?Id=9566>

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Income Tax rate	30%	Indian Union Budget 2005-2006 dated 28/02/2005 <sup>19</sup>
Surcharge	10%	Indian Union Budget 2005-2006 dated 28/02/2005
Cess	2%	Indian Union Budget 2004-2005 dated 08/07/2004 <sup>20</sup>

The following table illustrates the assumptions used for the calculation of the financial indicator i.e. Post tax equity IRR for the Sub-Project 3. The estimated PLF by different sources for the WTG's installed by PP is given in the below table:

Source	PLF
As per the client's estimate as reflected in the Draft Discussion Paper on "Tariff Related Issues " for Non-Conventional Energy Sources, Copies of the draft consultative paper were sent to all State Advisory Committee Members and special invitees on 24-10-2005 which was available at the time of investment decision time.	27.46%
The plant load factor determined by a third party contracted by the project participants in accordance with Para 3 (b) of Guidelines for the Reporting and Validation of Plant Load Factors, EB-48, Annex-11, Version-01	23.33%

The Estimated Plant Load Factor in the investment analysis for the project activity is considered as 27.46% which is the highest of all the above mentioned estimates on a conservative basis.

**Table 3: Input Values for the Sub-Project 3 consisting of the 1 WTGs installed by Agencia Commercial Maritima**

Operation & Maintenance Cost (11 Lakhs per WTG from 2 <sup>nd</sup> year with escalation of 5% per annum every year thereafter) (INR Million). The Operation and Maintenance Services are provided free of cost for the 1 <sup>st</sup> year of operation.	1.1	Quotation from Suzlon Energy Limited to Agencia Commercial Maritima
% of escalation per annum on O & M Charges every year	5%	Quotation from Suzlon Energy Limited to Agencia Commercial Maritima
Derating for every year after the 10th year	1.00%	TNERC Order No. 3 "In the matter of : Power purchase and allied issues in respect of Non-Conventional Energy Sources based Generating Plants and Non-Conventional Energy Sources based Co-Generation Plants" dated 15/05/2006
Service Tax	12.24%	Service Tax of 12% and 2% Cess on Service Tax ( <a href="http://indiabudget.nic.in/ub2006-07/bh/bh1.pdf">http://indiabudget.nic.in/ub2006-07/bh/bh1.pdf</a> )
Tariff for sale to TNEB – INR/Kwh	2.90	TNERC Order No. 3 "In the matter of : Power purchase and allied issues in respect of Non-Conventional Energy Sources based Generating Plants and

<sup>19</sup> [indiabudget.nic.in/ub2005-06/bh/bh1.pdf](http://indiabudget.nic.in/ub2005-06/bh/bh1.pdf)

<sup>20</sup> <http://indiabudget.nic.in/ub2004-05/bh/bh1.pdf>

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		Non-Conventional Energy Sources based Co-Generation Plants" dated 15/05/2006
Project Cost	INR Million	
WTG Cost	65.00	Quotation from Suzlon Energy Limited to Agencia Commercial Maritima
Land	1.50	Quotation from Suzlon Energy Limited to Agencia Commercial Maritima
Total Project Cost	66.50	Quotation from Suzlon Energy Limited to Agencia Commercial Maritima
Means of Finance	INR Million	
Internal Accruals	66.50	The entire funding is through internal accruals.
Loan Component	0.00	The entire funding is through internal accruals.
Total Source	66.5	Quotation from Suzlon Energy Limited to Agencia Commercial Maritima
Income Tax Depreciation Rate (Written Down Value basis)	80%	Income Tax Rules 2006
Book Depreciation Rate (Straight Line Method basis)	4.50%	TNERC Order No. 3 "In the matter of : Power purchase and allied issues in respect of Non-Conventional Energy Sources based Generating Plants and Non-Conventional Energy Sources based Co-Generation Plants" dated 15/05/2006
Book Depreciation up to (% of asset value)	90%	TNERC Order No. 3 "In the matter of : Power purchase and allied issues in respect of Non-Conventional Energy Sources based Generating Plants and Non-Conventional Energy Sources based Co-Generation Plants" dated 15/05/2006
Income Tax rate	30%	KPMG's Corporate Tax Rate Survey 2006 <sup>18</sup>
Surcharge	10%	KPMG's Corporate Tax Rate Survey 2006
Cess	2%	KPMG's Corporate Tax Rate Survey 2006

The following table indicates the Post Tax Equity IRR for the project activity along with the benchmarks.

Company	Post Tax Equity IRR		
	Benchmark	Without CDM Revenue	With CDM revenue
M/s Muthoot Fincorp Ltd.	13.96%	9.76%	26.67%
M/s Muthoot Finance Ltd.	13.96%	8.95%	25.72%
M/s Agencia Commercial Maritima	15.43%	9.82%	16.26%

Thus, it is evident that the project is not financially attractive.

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The robustness of the conclusion drawn above, namely that the project is not financially attractive, has been tested by subjecting critical assumptions to reasonable variation. As required by Annex 05 of EB 62, 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. PP has identified that the total revenue from the project activity is dependent on the Plant Load Factor & Tariff whereas the Project Cost, O&M Costs constitute more than 20% of the project costs. These factors have been subjected to a 10% variation on either side. The results of the sensitivity analysis so conducted are given in the following table.

Project Developer	FACTOR	VARIATION		
		-10%	0%	10%
M/s Muthoot Fincorp Ltd.	PLF	5.80%	9.76%	14.85%
	Project Cost	14.51%	9.76%	6.69%
	O&M Expenses	10.56%	9.76%	8.95%
	Tariff	5.80%	9.76%	14.85%
M/s Muthoot Finance Ltd.	PLF	5.17%	8.95%	14.00%
	Project Cost	13.56%	8.95%	6.12%
	O&M Expenses	9.84%	8.95%	8.07%
	Tariff	5.17%	8.95%	14.00%

The above analysis shows that with a 10% variation in PLF, project cost and tariff for M/s Muthoot Fincorp Ltd. and with a variation of 10% in PLF and tariff for M/s Muthoot Finance Ltd. WTG's the Equity IRR crosses the benchmark. However, this is unlikely to happen. The detailed analysis has been demonstrated in the below paragraph:

### Sub Project 1: consisting of the 3 WTGs installed by Muthoot Fincorp Limited

In the case of the variation in PLF by 10%, the Post Tax Equity IRR is 14.85%, i.e. it crosses the benchmark rate of 13.96%. The post-tax equity IRR crosses the benchmark with a variation of 8.4% in the PLF i.e. the PLF becomes 29.77%. The generation from the project is dependent upon several factors like wind velocity, air density, quality, capacity and age of machines, height of hub, and length of the blades, etc. Moreover the generation data of all 3 WTG's at locations K 912, K 923 and K 936 from the date of commissioning and the PLF recorded by the WTG is given in the below table:

K 912:

Period	Generation (kWh)	PLF
01/04/2006 - 31/03/2007	2485692	22.70%
01/04/2007 - 31/03/2008	2390850	21.83%
01/04/2008 - 31/03/2009	2644758	24.15%

K 923:

Period	Generation (kWh)	PLF
01/04/2006 - 31/03/2007	2691072	24.57%
01/04/2007 - 31/03/2008	2357766	21.53%
01/04/2008 - 31/03/2009	2395598	21.87%

K 936:

Period	Generation (kWh)	PLF
01/04/2006 - 31/03/2007	2506194	22.88%
01/04/2007 - 31/03/2008	2206656	20.15%
01/04/2008 - 31/03/2009	2452662	22.40%

It was initially envisaged that the PLF will be always below than 27.46% and the same can be seen from the past generation figure. Thus, the PLF is unlikely to increase 8.4% i.e. the PLF becoming 29.77% is highly unlikely.

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In the case of the variation in Project Cost by -10%, the Post Tax Equity IRR is 14.51%, i.e. it crosses the benchmark rate of 13.96%. The post-tax equity IRR crosses the benchmark with a variation of – 9.1% in the Project Cost. The actual cost incurred which has already been paid to the supplier is INR 185.1 Million i.e. the difference between the actual cost and the cost considered at the time of investment decision is -7.21%. Hence the reduction of 9.1% in the Project cost is not possible.

In the case of the variation in tariff by 10%, the Post Tax Equity IRR is 14.85%, i.e. it crosses the benchmark rate of 13.96%. The post-tax equity IRR crosses the benchmark with a variation of 8.4% in the tariff. The Power Purchase Agreement was signed at the rate of INR 2.75/kWh which is lower than the value considered in the investment decision. Hence the increase in the tariff is not possible.

#### Sub Project 2: Consisting of the 3 WTGs installed by Muthoot Finance Limited

In the case of the variation in PLF by 10%, the Post Tax Equity IRR is 14.00%, i.e. it crosses the benchmark rate of 13.96%. The post-tax equity IRR crosses the benchmark with a variation of 10% in the PLF i.e. the PLF becomes 30.21%. The generation from the project is dependent upon several factors like wind velocity, air density, quality, capacity and age of machines, height of hub, and length of the blades, etc. Moreover the generation data of all 3 WTG's at locations K 139, K 144 and K 939 from the date of commissioning and the PLF recorded by the WTG is given in the below table:

K 139:

Period	Generation (kWh)	PLF
01/04/2006 - 31/03/2007	2563182	23.40%
01/04/2007 - 31/03/2008	2316582	21.15%
01/04/2008 – 31/03/2009	2672190	24.40%

K 144:

Period	Generation (kWh)	PLF
01/04/2006 - 31/03/2007	2734812	24.97%
01/04/2007 - 31/03/2008	1881216	17.18%
01/04/2008 – 31/03/2009	2635506	24.07%

K 939:

Period	Generation (kWh)	PLF
01/04/2006 - 31/03/2007	2612736	23.86%
01/04/2007 - 31/03/2008	2123676	19.40%
01/04/2008 – 31/03/2009	2510712	22.92%

It was initially envisaged that the PLF will be always below than 27.46% and the same can be seen from the past generation figure. Thus, the PLF is unlikely to increase 10% i.e. the PLF becoming 30.11% is highly unlikely.

In the case of the variation in tariff by 10%, the Post Tax Equity IRR is 14.00%, i.e. it crosses the benchmark rate of 13.96%. The Power Purchase Agreement was signed at the rate of INR 2.75/kWh which is lower than the value considered in the investment decision. Hence the increase in the tariff is not possible.

The above analysis proves that varying the parameters does not lead to a Post-Tax Equity IRR without CDM revenue which will cross the benchmark value.

The carbon revenue from the project activity would provide significant amount of returns from the sale of the Emission Reductions accrued from the project activity and in turn increase the financial attractiveness of the project activity and hence make the project activity more financially viable.

In spite of the low returns for the Project activity the Project participants have made the investment only in lieu of the due consideration of the Carbon Finance. Hence it is evident that without the GHG emission reduction credits the project activity wouldn't have been taken up.

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The arguments in the above paragraphs with respect to the financial analysis of the project activity augment the fact that project activity can be deemed additional.

As per the EB's Guidelines on Demonstration and assessment of the prior consideration of the CDM, Version 04 Annex 13, EB 62 the following table indicates the events taken up by the all the sub projects to indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. As per the EB's Guidance on Demonstration and assessment of the prior consideration of the CDM the following table indicates the events taken up by the PP to indicate that continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. The start date of the project activity is the date of the Purchase Order Placed for the 1st Wind Turbine Generator which is 04/02/2006. As per Glossary of CDM Terms, Version 05, "The starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins". Hence 04/02/2006 which represents the earliest date for the real action i.e. placement of the Purchase Order for the WTG's by Muthoot Fincorp Limited and Muthoot Finance Limited is considered as the start date of the project activity.

Timeline for the Sub Project 1 (Muthoot Fincorp Limited)			
Date	Project Implementation	Actions for acquiring CDM	Proof
28/09/2005	Date of Offer for the supply of WTG's from Suzlon Energy Limited		Copy of the Offer
14/01/2006		Consideration of the CDM in the Minutes of the Meeting of board of directors of Muthoot Fincorp Limited	Extracts of the Minutes of the Meeting of the Board of Directors
04/02/2006	P.O. to Suzlon for the supply of 3 WTGs by Muthoot Fincorp Limited		Copy of the P.O.
31/03/2006	Commissioning of the 3 WTG of Muthoot Fincorp Limited		Commissioning Certificate
03/07/2006		Contract between Muthoot Fincorp Limited and Synergy global for the development of CDM PDD for the 3 Nos of WTG at locations K912, K923 and K936	Copy of the contract
29/10/2007		Host Country Approval Meeting for the "Wind based Renewable Energy Project, Tamilnadu, India" a bundle project which included the WTGs at location Nos K 912, K923 and K936, the PID Number for the project activity was 672/07	communication from Synergy Global Private Limited
22/10/2007		PDD for the project activity "Wind based Renewable Energy Project, Tamilnadu, India" a bundle project which included all the WTGs at location Nos K	<a href="http://cdm.unfccc.int/Projects/Validation/DB/9L8G2GJ/KZ6MONKELSYMI9L8/QWNM4W/view.html">http://cdm.unfccc.int/Projects/Validation/DB/9L8G2GJ/KZ6MONKELSYMI9L8/QWNM4W/view.html</a>

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		912, K923 and K936, was webhosted for global stakeholder consultation	
14/11/2007		Revised PDD was again webhosted for global stakeholder consultation	<a href="http://cdm.unfccc.int/Projects/Validation/DB/NL768PU/SVEEJJWKRMJ52W0F1G/GT8A2/view.html">http://cdm.unfccc.int/Projects/Validation/DB/NL768PU/SVEEJJWKRMJ52W0F1G/GT8A2/view.html</a>
16/09/2008		Resubmission of the project activity titled "Wind based Renewable Energy Project, Tamilnadu, India" a bundle project which included the WTGs at location Nos K 912, K923 and K936, for the Host Country Approval	communication from Synergy Global Private Limited
27/10/2009		Termination of the agreement with Synergy Global Private Limited	Copy of the Termination letter
03/03/2010		Newspaper advertisement for the stakeholder meeting was published	Copy of the Newspaper advertisement
19/03/2010		Local stakeholder consultation Meeting for the 8.75MW Bundled Wind Project which included the WTGs at location Nos K 912, K923 and K936	Copy of the MOM
30/01/2010		CoreCarbonX has been appointed as the new CDM advisory firm for the development of the PDD for the WTGs at location Nos K 912, K923 and K936	Copy of the Contract
31/08/2010		Date of appointment of Perry Johnson Registrars CDM, INC as the DOE for the project activity titled "Bundled Wind Project Activity in Tamil Nadu by MMP"	Copy of the Contract
20/01/2011		Web Hosting of the project activity <a href="http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HX/DKUD5L/view.html">Bundled Wind Project Activity in Tamil Nadu by MMP</a> which includes the WTGs at locations Nos K 912, K923 and K936	<a href="http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HX/DKUD5L/view.html">http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HX/DKUD5L/view.html</a>
25/04/2012		Date of Receipt of the HCA for the project "Bundled Wind Project Activity in Tamil Nadu	Copy of the LoA



CDM-PDD-FORM

		by MMP"	
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Timeline for the Sub Project 2 (Muthoot Finance Limited)			
Date	Project Implementation	Actions for acquiring CDM	Proof
10/01/2006	Date of Offer for the supply of WTG's from Suzlon Energy Limited		Copy of the Offer
23/01/2006		Consideration of the CDM in the Minutes of the Meeting of board of directors of Muthoot Finance Limited	Extracts of the Minutes of the Meeting of the Board of Directors
04/02/2006	P.O. to Suzlon for the supply of 3 WTGs by Muthoot Finance Limited		Copy of the P.O.
29/03/2006	Commissioning of the 3 WTG of Muthoot Finance Limited		Commissioning Certificate
21/06/2006		Contract between Muthoot Finance Limited and Synergy global for the development of CDM PDD for the 3 Nos of WTG at locations K 139, K 144, K 939	Copy of the contract
29/10/2007		Contract between Synergy Global Private Limited and DNV was signed for development of "Wind based Renewable Energy Project, Tamilnadu, India" a bundle project which included the WTGs at location Nos K 139, K 144, K 939 were included.	Copy of the contract
22/10/2007		Host Country Approval Meeting for the "Wind based Renewable Energy Project, Tamilnadu, India" a bundle project which included the WTGs at location Nos K 139, K 144, K 939, the PID Number for the project activity was 672/07	Communication from Synergy Global Private Limited
14/11/2007		PDD for the project activity "Wind based Renewable Energy Project, Tamilnadu, India" a bundle project which included all the	<a href="http://cdm.unfccc.int/Projects/Validation/DB/9L8G2GJ/KZ6MONKELSYMI9L8/QWNM4W/view.html">http://cdm.unfccc.int/Projects/Validation/DB/9L8G2GJ/KZ6MONKELSYMI9L8/QWNM4W/view.html</a>

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		WTGs at location Nos K 139, K 144, K 939, was webhosted for global stakeholder consultation	
16/09/2008		Revised PDD was again webhosted for global stakeholder consultation	<a href="http://cdm.unfccc.int/Projects/Validation/DB/NL768PU/SVEEJJWKR MJ52W0F1G GT8A2/view.html">http://cdm.unfccc.int/Projects/Validation/DB/NL768PU/SVEEJJWKR MJ52W0F1G GT8A2/view.html</a>
16/03/2009		Resubmission of the project activity titled "Wind based Renewable Energy Project, Tamilnadu, India" a bundle project which included the WTGs at location Nos K 139, K 144, K 939 for the Host Country Approval	Communication from Synergy Global Private Limited
12/11/2009		Termination of the agreement with Synergy Global Private Limited	Copy of the Termination letter
03/03/2010		Newspaper advertisement for the stakeholder meeting was published	Copy of the Newspaper advertisement
19/03/2010		Local stakeholder consultation Meeting for the 8.75 <sup>21</sup> MW Bundled Wind Project which included the WTGs at location K 139, K 144, K 939	Copy of the MOM
30/01/2010		CoreCarbonX has been appointed as the new CDM advisory firm for the development of the PDD for the WTGs at location Nos K 139, K 144, K 939	Copy of the Contract
31/08/2010		Date of appointment of Perry Johnson Registrars CDM, INC as the DOE for the project activity titled "Bundled Wind Project Activity in Tamil Nadu by MMP"	Copy of the Contract
20/01/2011		Web Hosting of the project activity <a href="http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HXDKUD5L/view.html">Bundled Wind Project Activity in Tamil Nadu by MMP</a> which includes the WTGs at locations K 139, K 144, K 939	<a href="http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HXDKUD5L/view.html">http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HXDKUD5L/view.html</a>
25/04/2012		Date of Receipt of the HCA for the project "Bundled Wind Project Activity in Tamil Nadu by MMP"	Copy of the LoA

<sup>21</sup> [This is now reduced to 7.5 MW.](#)

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Timeline for the Sub Project 3 (Agencia Commercial Maritima)			
Date	Project Implementation	Actions for acquiring CDM	Proof
02/11/2006	Date of Offer for the supply of WTG from Suzlon Energy Limited		Copy of the Offer
14/11/2006		Consideration of the GDM in the Minutes of the Meeting of board of directors of Agencia Commercial Maritima	Extracts of the Minutes of the Meeting of the Board of Directors
02/12/2006	P.O. to Suzlon for the supply of WTG by Agencia Commercial Maritima		Copy of the P.O.
13/03/2007	Commissioning of the WTG of Agencia Commercial Maritima at location K 901		Commissioning Certificate
12/07/2008		LOI to Mr. Sudhakaran Pillai for the CDM/VCS consultancy services	Copy of the contract
02/02/2010		Termination of the agreement with Mr. Sudhakaran Pillai	Copy of the Termination letter
03/03/2010		Newspaper advertisement for the stakeholder meeting was published	Copy of the Newspaper advertisement
19/03/2010		Local stakeholder consultation Meeting for the 8.75MW Bundled Wind Project which included the WTGs at location K 901	Copy of the MOM
25/03/2010		GoreCarbonX has been appointed as the new CDM advisory firm for the development of the PDD	Copy of the Contract
31/08/2010		Date of appointment of Perry Johnson Registrars CDM, INC as the DOE for the project activity titled "Bundled Wind Project Activity in Tamil Nadu by MMP"	Copy of the Contract
20/01/2011		Web Hosting of the project activity Bundled Wind Project Activity in Tamil Nadu by MMP which includes the WTGs at locations K 901	<a href="http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HXDKUD5L/view.html">http://cdm.unfccc.int/Projects/Validation/DB/OK0JBZ5T8FM8ON0Y1G79X0HXDKUD5L/view.html</a>
25/04/2012		Date of Receipt of the	Copy of the LoA

HCA for the project  
"Bundled Wind Project  
Activity in Tamil Nadu  
by MMP"

## B.6. Estimation of emission reductions

### B.6.1. Explanation of methodological choices

>> As per AMS I D version 187 paragraph 224: The baseline emissions are the product of electrical energy baseline  $EG_{BL,y}$  expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where,

$BE_y$  = Baseline Emissions in year y (t CO<sub>2</sub>)

$EG_{BL,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)  
Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO_2,grid,y}$  = Combined margin CO<sub>2</sub> 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 - Version 07.0" (t CO<sub>2</sub>/MWh)  
CO<sub>2</sub> emission factor of the grid in year y (t CO<sub>2</sub>/MWh)

Input values and data sources for emission reductions associated with electricity displacement.

Parameter	Description	Value	Source
$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$			
$BE_y$	Baseline Emissions in year y; t CO <sub>2</sub>		Calculated
$EG_{BL,y}$	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh) Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)	14,72321048	Calculated as PLF (22.417.46%) × installed capacity of machines (8.757.5) × Number of Hours (8760)
$EF_{CO_2,grid,y}$	Combined margin CO <sub>2</sub> 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- Version 07.0" (t CO <sub>2</sub> /MWh) CO <sub>2</sub> emission factor of the grid in year y (t CO <sub>2</sub> /MWh)	0.941945	Calculated

As per paragraph 2342, AMS ID Version 187, 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

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- (b) The weighted average emissions (in t CO<sub>2</sub>/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

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Calculations must be based on data from an official source (where available)<sup>22</sup> and made publicly available.

In the project activity, the option A has been used which prescribes use of "Tool to calculate the emission factor for an electricity system." Version 0702.4

Subsequent to Meth Panel Clarification CLA\_TOOL\_0014, The Meth Panel clarified that:

"The changes that were introduced in version 2.2.0 against version 2.1.0 and version 2, as well as changes in version 2.1.0 against version 2 are editorial amendments, which, according to paragraph 35 of the Procedure for the submission and consideration of requests for revision of approved baseline and monitoring methodologies and tools for large scale CDM project activities, have no effect on the global stakeholder consultations of PDDs and registration of project activities applying the previous version of the tool (as long as they are not specified in the underlying methodology). Therefore, there are no provisions to mandate the project participants to use the newest version of the tool when multiple versions are valid."

Hence "Tool to calculate the emission factor for an electricity system." Version 0702.4 has been used for the project activity<sup>23</sup>.

### **Step 1: Identify the relevant electric power system**

Since the CDM project activity is connected to the Southern regional grid it is also preferred to take the Southern regional grid as project boundary than the state boundary. It also minimizes the effect of interstate power transactions, which are dynamic and vary widely.

### **Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)**

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

**Option I:** Only grid power plants are included in the calculation.

**Option II:** Both grid power plants and off-grid power plants are included in the calculation.

Only Grid power plants are included in the Combined Margin calculation as published by Central Electricity Authority in "The Central Electricity Authority (CEA): Baseline Carbon Dioxide Emission database version 15.0 dated 5th DecNovember 2019", hence the Option I has been considered for the project activity.

### **Step 3: Select an operating margin (OM) method**

<sup>22</sup> Plant Emission Factors used for the calculation of Emission Factors should be obtained in the following priority:

1. Acquired directly from the dispatch center or power producers, if available; or
2. Calculated, if data on fuel type, fuel Emission Factor, fuel input and power output can be obtained for each plant; If confidential data available from the relevant host Party authority are used, the calculation carried out by the project participants shall be verified by the DOE and the CDM-PDD may only show the resultant carbon Emission Factor and the corresponding list of plants;
3. Calculated, as above, but using estimates such as: default IPCC values from the 2006 IPCC Guidelines for National GHG Inventories for net calorific values and carbon Emission Factors for fuels instead of plant-specific values technology provider's name plate power plant efficiency or the anticipated energy efficiency documented in official sources (instead of calculating it from fuel consumption and power output). This is likely to be a conservative estimate, because under actual operating conditions plants usually have lower efficiencies and higher emissions than name plate performance would imply; conservative estimates of power plant efficiencies, based on expert judgments on the basis of the plant's technology, size and commissioning date; or
4. Calculated, for the simple OM and the average OM, using aggregated generation and fuel consumption data, in cases where more disaggregated data is not available

<sup>23</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf> shows that the "Tool to calculate the emission factor for an electricity system." Version 07.0 is still active.

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The calculation of the operating margin emission factor ( $EF_{grid,OM,y}$ ) is based on one of the following methods: (a) Simple OM, (b), Simple adjusted OM, (c) Dispatch Data Analysis, or (d) Average OM. The two variants "Simple adjusted operating margin" and "Dispatch data analysis operating margin" cannot currently be applied in India due to lack of necessary data.

In India, hydro and nuclear stations qualify as low-cost / must-run sources and are excluded.

The average of the low cost / must-run sources to the Net generation of the Southern grid over the period of the last five years is as per the below table:

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)	2014-2015	2015-16	2016-17	2017-18	2018-19
Southern Indian National Grid	16.821-61%	15.127-0%	14.628-3%	14.327-1%	14.522-8%

The operating margin, therefore, can be calculated by dividing the region's total CO<sub>2</sub> emissions by the net generation of all thermal stations. Thus, Simple OM has been chosen.

The Central Electricity Authority (CEA): CO<sub>2</sub> baseline database Version 15.0 dated December 2019 data have been publicised and the simple OM has been referred for the OM calculation. The ex-ante option has been selected for the Project.

### Step 4: Calculate the operating margin emission factor according to the selected method (OM)

The Operating Margin is calculated considering of the generation based weighted average of Operating Margin date for the Indian National Southern Grid as published by CEA during the years 2016-2017, 2017-2018 and 2018-2019. The generation based weighted average value for the Southern Indian National Grid is 0.96228680 tCO<sub>2</sub>/MWh.

(Source: Central Electricity Authority (CEA) CO<sub>2</sub> database version 15 dated December 2019. (www.cea.nic.in))

The option B as mentioned in "Tool to calculate the emission factor for an electricity system" Version 07.1.1 which is "Based on data on net electricity generation, the average efficiency of each power unit and the fuel type(s) used in each power unit" is considered by Central Electricity Authority in the calculation of the Operating Margin as published in the Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database version 15.0 dated 5th December 2019.

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### Step 5: Identify the cohort of power units to be included in the build margin (BM)

The build margin is calculated as the generation-weighted average emission factor of a sample of power plants. As per the Tool, the sample group to calculate BM consists of either:

- 1-(a) The set of five power units that have been built most recently, or
- 2-(b) The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

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The option (b) has been chosen for the BM calculation.

In terms of vintage of data, project participants can choose between one of the following two options:

Option 1: For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as

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described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

The option (1) ex-ante calculation option has been chosen. The Build Margin Emission factor has been calculated and established by CEA.

### Step 6: Calculate the build margin emission factor

The build margin considered is for the year 20108-20109 for the Southern grid and the value is 0.8811792 tCO<sub>2</sub>/MWh. The data for the build margin and the operating margin is taken from the Central Electricity Authority CO<sub>2</sub> Baseline Data base Version 195 dated December 2019November 2009.

The data for the build margin is calculated by Central Electricity Authority using the formula 152 as mentioned in the "Tool to calculate the emission factor for an electricity system" Version 074-1, which is same as the formula 13 as mentioned in "Tool to calculate the emission factor for an electricity system" Version 02-1, and the same is published in the Central Electricity Authority Baseline Carbon Dioxide Emission database version 15.0 dated 5th DecemberNovember 2019. The same is considered for project activity and is fixed ex-ante for the entire crediting period.

### Step 7: Calculate the combined margin emission factor

The combined margin emission factor is calculated as follows:

Parameter	Description	Unit	Source
$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$			"Tool to calculate the emission factor for an electricity system" version 0702-1, equation 146
$EF_{grid,CM,y}$	Combined margin CO <sub>2</sub> emission factor in year y. This equals to $EF_{CO_2,grid,y}$	tCO <sub>2</sub> /MWh	Calculated
$EF_{grid,OM,y}$	Simple operating margin CO <sub>2</sub> emission factor in year y.	tCO <sub>2</sub> /MWh	Calculated
$EF_{grid,BM,y}$	Build margin CO <sub>2</sub> emission factor in year y	tCO <sub>2</sub> /MWh	Calculated
$w_{OM}$	Weighting of operating margin emission factor	0.75	"Tool to calculate the emission factor for an electricity system" version 0702-1, equation 164
$w_{BM}$	Weighting of build margin emission factor	0.25	"Tool to calculate the emission factor for an electricity system" version 0702-1, equation 164
$EF_{CO_2,grid,y} = EF_{grid,CM,y} / 1000$	CO <sub>2</sub> Emission Factor in year y; t CO <sub>2</sub> e/MWh	tCO <sub>2</sub> e/MWh	Calculated

$EF_{grid,CM,y}$  = Weighted Average OM & BM = 0.941945 tCO<sub>2</sub>e/MWh.

Baseline Emission Factor:  $EF_{CO_2,grid,y} = EF_{grid,CM,y} = 0.941945$  tCO<sub>2</sub>e/MWh

Emissions Reductions = Baseline Emissions (BE<sub>y</sub>) – Project Emissions (PE<sub>y</sub>) – Leakage (L<sub>y</sub>)

### Leakage

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In accordance with methodology AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity. This is not applicable here so  $L_y = 0$

### Project Emissions

As per paragraph ~~3920~~ AMS I D version ~~187~~ "For most renewable energy project activities,  $PE_y = 0$ . However, for the following categories of project activities, project emissions have to be considered following the procedure described in the most recent version of ACM0002<sup>24</sup>.

- a) ~~•~~ Emissions related to the operation of geothermal power plants (e.g. non-condensable gases, electricity/fossil fuel consumption);
- b) ~~•~~ Emissions from water reservoirs of hydro power plants.

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Para ~~4021~~ "CO2 emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the "Tool to calculate project or leakage CO2 emissions from fossil fuel combustion".

The project activity is a wind power generation project. Thus, hence  $PE_y = 0$

Hence,

$$ER_y = BE_y$$

### B.6.2. Data and parameters fixed ex ante

Data/Parameter	EF <sub>grid,OM</sub> , y
Data unit	tCO <sub>2e</sub> /MWh
Description	The Operating Margin emission factor of <del>Southern</del> Indian National Grid
Source of data	Central Electricity Authority (CEA) CO2 database version <del>15</del> dated <del>November</del> December 20 <del>10</del> 9. (www.cea.nic.in)
Value(s) applied	0.9622 <del>8680</del>
Choice of data or measurement methods and procedures	The value used is calculated ex-ante as generation based weighted average of the last three years of the Operating margin i.e. for the years 20 <del>10</del> 6-20 <del>10</del> 7, 20 <del>10</del> 7- 20 <del>10</del> 8 and 20 <del>10</del> 8-20 <del>10</del> 9 provided by Central Electricity Authority (CEA) in the CO2 database version <del>15</del> dated <del>November</del> December 20 <del>10</del> 9. (www.cea.nic.in).
Purpose of data	<u>Calculation of baseline emissions</u>
Additional comment	

<sup>24</sup> ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"



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Data/Parameter	EF <sub>grid,BM</sub> , y
Data unit	tCO <sub>2e</sub> /MWh
Description	The Build Margin emission factor of <u>Indian national Southern-grid</u>
Source of data	Central Electricity Authority (CEA) CO <sub>2</sub> database version <u>15</u> dated <u>November December 2019</u> . (www.cea.nic.in)
Value(s) applied	<u>0.88111792</u>
Choice of data or measurement methods and procedures	The value used is calculated ex-ante as recent most Build margin i.e. for the year <u>2018-2019</u> as provided by Central Electricity Authority (CEA) in the CO <sub>2</sub> database version <u>15</u> dated <u>DecNovember 2019</u> . (www.cea.nic.in).
Purpose of data	
Additional comment	

Data/Parameter	EF <sub>grid,CM,y</sub>
Data unit	tCO <sub>2e</sub> /MWh
Description	The grid CO <sub>2</sub> emission factor in year y
Source of data	Calculated
Value(s) applied	<u>0.941945</u>
Choice of data or measurement methods and procedures	The value has been calculated as $0.75 * EF_{grid,OM,y} + 0.25 * EF_{grid,BM,y}$
Purpose of data	Used for emission reduction calculation.
Additional comment	

Data/Parameter	EF <sub>CO<sub>2</sub>,grid,y</sub>
Data unit	tCO <sub>2e</sub> /MWh
Description	The grid CO <sub>2</sub> emission factor in year y
Source of data	Calculated
Value(s) applied	<u>0.941945</u>
Choice of data or measurement methods and procedures	The value has been calculated as $EF_{CO_2,grid,y} = EF_{grid,CM,y}$ <u>As per the requirements in "Tool to calculate the emission factor for an electricity system – Version 07.0"</u>
Purpose of data	Used for emission reduction calculation.
Additional comment	

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## B.6.3. Ex ante calculation of emission reductions

>> As per AMS I D version 187 paragraph 2244:

The baseline emissions are the product of electrical energy baseline  $EG_{BL,y}$  expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

$$BE_y = EG_{PJ,y} * EF_{grid,y}$$

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Parameter	Description	Value	Source
$BE_y = EG_{PJ,y} * EF_{grid,y}$			
BE <sub>y</sub>	Baseline Emissions in year y; t CO <sub>2</sub>		Calculated

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EG <sub>PUBL,y</sub>	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)	14.72321,048	Calculated as PLF (22.417.46%) × installed capacity of machines (7.8-75) × Number of Hours (8760)
EF <sub>CO<sub>2</sub>,grid,y</sub>	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 – version 07.0" (t CO <sub>2</sub> /MWh)CO <sub>2</sub> emission factor of the grid in year y (t CO <sub>2</sub> /MWh)	0.941945	Calculated

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$$BE_y = 21,04814,723 \text{ (kWh)} * 0.941945 \text{ (tCO}_2\text{/kWh)} = 1386719,879 \text{ tCO}_2\text{e}$$

Emissions Reductions = Baseline Emissions (BE<sub>y</sub>) – Project Emissions (PE<sub>y</sub>) – Leakage (L<sub>y</sub>)

In accordance with methodology AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity.

This is not applicable here so L<sub>y</sub> = 0

Project Emissions PE<sub>y</sub> = 0

Hence,

$$ER_y = BE_y$$

$$ER_y = 1386719,879 \text{ tCO}_2 \text{ e}$$

## B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO <sub>2</sub> e)	Project emissions (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions (t CO <sub>2</sub> e)
2012-2013	1386719,879	0	0	1386719,879
2013-2014	1386719,879	0	0	1386719,879
2014-2015	1386719,879	0	0	1386719,879
2015-2016	1386719,879	0	0	1386719,879
2016-2017	1386719,879	0	0	1386719,879
2017-2018	1386719,879	0	0	1386719,879
2018-2019	1386719,879	0	0	1386719,879
<b>Total</b>	139,15397,069	0	0	97,069139,153
<b>Total number of crediting years</b>	7			
<b>Annual average over the crediting period</b>	13,867139,153	0	0	13,867139,153

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## B.7. Monitoring plan

### B.7.1. Data and parameters to be monitored

Data/Parameter	EG <sub>export,y</sub>
Data unit	kWh
Description	Electricity export to the grid during the year y

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

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Source of data	Monthly billing records which is given by Tamil Nadu Electricity Board (TNEB).
Value(s) applied	21,04814,723,000
Measurement methods and procedures	Electricity exported will be measured at the grid interconnection point using energy meters. The meter readings are taken every month by TNEB officials in the presence of company representatives and the readings are jointly certified. These readings are mentioned in the monthly statement issued by TNEB in the statement showing the Energy Generated through the wind mill. The export readings as mentioned in the monthly statement by TNEB will be considered for calculating the annual electricity exported to the grid by the project activity during the year y. Accepted industry standard: National standard as described in the Power Purchase Agreement. Measurement equipment : Energy meters Calibration frequency : Once in a Year for Energy meters Accuracy of the meters : 0.5s Measurement interval : Continuous measurement, monthly recording
Monitoring frequency	Monthly reading
QA/QC procedures	The energy meter installed is electronic trivector energy meter of 0.5s class accuracy. The meter will be tested for accuracy and calibrated once every year.
Purpose of data	Calculation of emission reductions
Additional comment	

Data/Parameter	EGimport,y
Data unit	kWh
Description	The electricity imported from the grid during the year y
Source of data	Monthly billing records of the Tamil Nadu Electricity Board (TNEB) for the electricity import from the grid
Value(s) applied	0
Measurement methods and procedures	The electricity imported from the grid will be measured using energy meter at grid interconnection point which is under the control of TNEB. The readings are taken every month by TNEB officials in the presence of company representatives. These readings are mentioned in the monthly statement issued by TNEB in the statement showing the Energy Generated through the wind mill. The import readings as mentioned in the monthly statement generated by TNEB will be considered for calculating the annual electricity imported from the grid by the project activity during the year y. Accepted industry standard: National standard as described in the Power Purchase Agreement. Measurement equipment : Energy meters Calibration frequency : Once in a Year for Energy meters Accuracy of the meters : 0.5s Measurement interval : Continuous measurement, monthly recording
Monitoring frequency	Monthly Recording
QA/QC procedures	The energy meter installed is electronic trivector energy meter of 0.5s class accuracy. The meter will be tested for accuracy and calibrated once every year.
Purpose of data	Calculation of emission reductions
Additional comment	

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Data/Parameter	EG <sub>PJBL,y</sub>
Data unit	MWh
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y
Source of data	Calculated
Value(s) applied	21,04814,723
Measurement methods and procedures	<p><u>Data Type: Calculated</u>  <u>Monitoring equipment: Energy Meters of accuracy class of 0.5s or of better accuracy class</u>  <u>Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters. Summarized Annually.</u>  <u>Archiving Policy: Paper &amp;/or Electronic</u>  <u>Calibration frequency: Once in 5 years as per CEA guidelines</u>  <u>Electricity exported and imported to the grid is in kWh. However for the calculation purpose electricity exported and imported is converted in MWh.</u>  <u>The Net electricity supplied to the grid by the project activity will be either monitored using bi-directional energy meter or calculated as difference between (a) the quantity of electricity supplied by the project plant/unit to the grid; and (b) the quantity of electricity the project plant/unit from the grid.</u>  <u>In case it is calculated then the following parameters shall be measured:</u>  <u>(a) The quantity of electricity supplied by the project plant/unit to the grid; and</u>  <u>(b) The quantity of electricity delivered to the project plant/unit from the grid.</u>  <u>The net electricity supplied to the grid as a result of the implementation of the CDM project activity is calculated <math>EG_{export,y} - EG_{import,y}</math>. The same is then converted from kWh to MWh.</u>  <u>The electricity exported and electricity imported will be continuously monitored and recorded once every month using energy meter at grid interconnection point which is under the control of TNEB.</u></p> <p><u>The readings are taken every month by TNEB officials in the presence of company representatives. These readings are mentioned in the monthly statement issued by TNEB in the statement showing the Energy Generated through the wind mill. The electricity export and electricity import as mentioned in the monthly statement generated by TNEB will be considered for calculating the annual net electricity supplied to the grid by the project activity during the year y. The same electricity is considered for emission reduction calculations.</u></p>
Monitoring frequency	Monthly reading
QA/QC procedures	<p>The data is used directly to calculate the emission <del>reductions</del><u>reductions</u>; hence the data is checked for accuracy with the statement showing the Energy Generated through the wind mill issued by TNEB to decrease the uncertainty.</p> <p><u>Calibration of all the meters will be undertaken once every five year and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.5s.</u>  <u>The data on net electricity exported to the grid can be cross checked with the invoices raised by the PP to TNEB.</u></p>
Purpose of data	Calculation of emission reductions
Additional comment	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

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### B.7.2. Sampling plan

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### B.7.3. Other elements of monitoring plan

>> The project activity is operated and managed by the project proponent with the help of site incharge (personnel from the Wind Turbine Manufacturer (Suzlon Energy Limited)) and site O & M contractor (personnel from the wind turbine manufacturer). For the accurate execution of the Project activity a project

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team has been constructed. 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 project team is delegated with the responsibility of monitor and document the electricity generated and also safe keeping of the recorded data.

**Metering:** The Delivered Energy is metered by the Tamil Nadu Electricity Board (TNEB) and PP at the high voltage side of the step up transformer installed at the Project Site. The project activity consists of main meter and check meter.

**Metering Equipment:** Metering equipment is bi-directional electronic trivector meter of accuracy class 0.5s required for the Project activity capable of measuring both the import readings and export readings.

**Meter Readings:** The monthly meter reading which includes the readings of the electricity exported to the grid and the readings of electricity imported from the grid is taken jointly by the representative of Tamil Nadu Electricity Board and representative of PP. At the conclusion of each meter reading an appointed representative of the Tamil Nadu Electricity Board (TNEB) and the PP sign a document indicating the number of Kilowatt-hours indicated by the meter.

**Inspection of Energy Meters:** The main meters (export and import) and all associated instruments (CTPT) installed at the Project shall be of 0.5s accuracy class or of better accuracy class. Each meter is jointly inspected and sealed on behalf of the Tamil Nadu Electricity Board (TNEB) and PP and is not interfered with by either Party except in the presence of the other Party or its accredited representatives.

**Meter Test Checking:** The electronic trivector energy meter will be tested for accuracy and calibrated once every year. The portable standard meter is owned by the TNEB at its own cost and tested and certified from an accepted laboratory standard meter in accordance with electricity standards. The meters are deemed to be working satisfactorily if the errors are within specifications.

If during the tests, the meter is found to be beyond the permissible limits of error, the meter shall be immediately calibrated and the correction applied to the reading registered by the meter to arrive the correct reading of energy supplied for billing purposes for the period from the last month's meter reading up to the current test. Billing for the period thereafter till the next monthly reading shall be as per the calibrated meter.

**Data Uncertainty:** In the case of the main meter readings are different from the check meter readings it is deemed that either the main meter or check meter are faulty. In case of the main meter being faulty, the O&M contractor immediately shuts down the respective WTG. The O&M contractor then notifies TNEB official of the fault in the main meter and request for its correction. The TNEB official then attends to the request and replaces the faulty meter after which the WTG is operational again. The TNEB in the statement showing the Energy Generated through the wind mill thus does not include the electricity generation for the period during which the main meter was faulty and therefore, no correction is applied thereto. As the electricity generated during the period is not included in the statement showing the Energy Generated through the wind mill (which is used for Emission Reduction calculation) no correction factor is applied thereto.

There will be a timeline on the date on which the project activity will be registered and the date on which the joint meter reading (JMR) will be conducted. To avoid confusion for metering of electricity for this initial period (date of registration to date of joint meter reading), the project proponent proposes to calculate the initial period generation on pro rata basis as follows:

1. as per the generation reading at the controller of the individual turbines for this period / (total generation reading at the controller for the entire month) \* Net electricity supplied by the WTG to the grid for the entire month

Verification periods would be taken up to a JMR date to avoid confusion. For the last verification period, the remaining days between the JMR reading date and the end of verification period would be estimated as follows:

2. as per the generation reading at the controller of the individual turbines for this period / (total generation reading at the controller for the entire month) \* Net electricity supplied by the WTG to the grid for the entire month

All the monitoring data is stored /will be recorded and kept under safe custody of the project head. All the monitoring data is stored /will be recorded and kept under safe custody of the project head for a period of a

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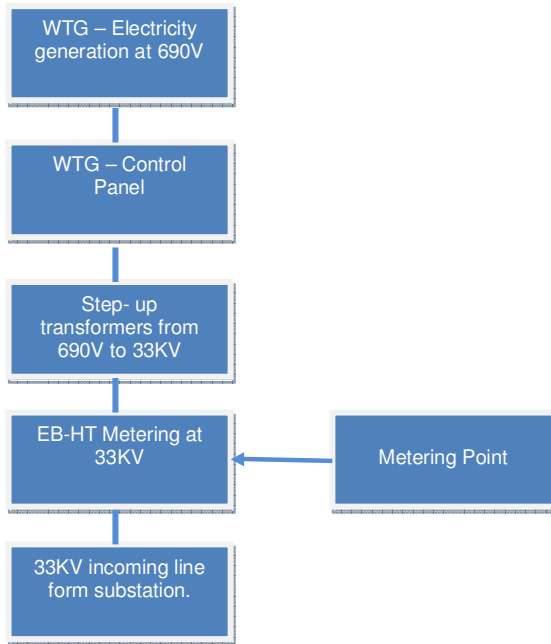
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# CDM-PDD-FORM

minimum of two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

The project team is also responsible for calculation of actual creditable emission reduction in the most transparent and relevant manner.

Single Line Diagram of the monitoring equipment:

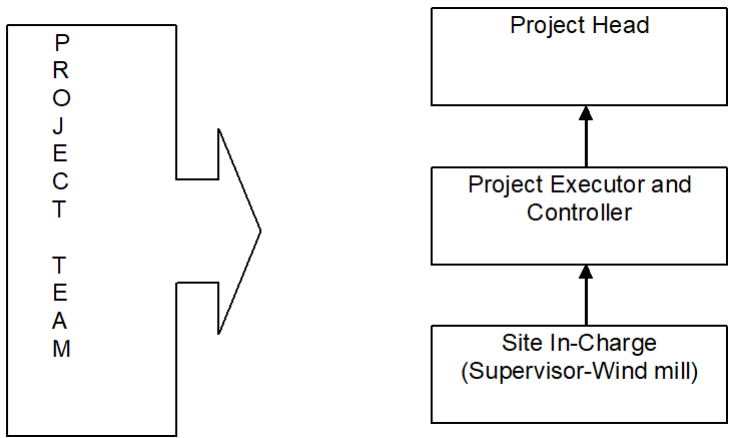


Designation	Responsibilities
Project Head	Registration Project Execution
Project Executor and Controller	<ul style="list-style-type: none"> <li>Statement collection</li> <li>Verification</li> <li>Storage of statement and Data</li> <li>Invoicing</li> </ul>
Site In charge	<ul style="list-style-type: none"> <li>Operation, Monitoring and Verification of Data</li> <li>Data Recording</li> <li>Storage of data</li> </ul>
Operation and Maintenance Contractor	<ul style="list-style-type: none"> <li>Operation and Maintenance</li> <li>Storage of data</li> <li>Data Recording</li> </ul>

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**SECTION C. Start date, crediting period type and duration**

**C.1. Start date of project activity**

>> 04/02/2006 (Date of P.O. for the WTG)

**C.2. Expected operational lifetime of project activity**

>> 20 years 00 -months

**C.3. Crediting period of project activity**

**C.3.1. Type of crediting period**

Renewable crediting period seven years renewable up to two more times to have total three crediting period of 21 years. This is the second crediting period. >> ~~Renewable crediting Period~~

**C.3.2. Start date of crediting period**

>> 2014-12/12/2012-2019 (This is start date for second crediting period), or a date of complete request for registration (whichever is later)

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**C.3.3. Duration of crediting period**

>> 7 years 00 months

## SECTION D. Environmental impacts

### D.1. Analysis of environmental impacts

>> 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<sup>25</sup>.

### D.2. Environmental impact assessment

>> Not Applicable

## SECTION E. Local stakeholder consultation

### E.1. Modalities for local stakeholder consultation

>> The local stakeholder consultation meeting for the wind mill installations in Tamil Nadu by M/s Muthoot Fincorp Ltd., Muthoot Finance Ltd and Agencia Commercial Maritima were arranged for the local villagers, shareholders and other stakeholders to discuss on the CDM initiatives taken up by project developers on 19/03/2010 from 11.00 A.M. to 1.00 PM at CMS Hall at Thattaparai.

Accordingly the stakeholders were duly informed on dated 03/03/2010 by means of newspaper advertisement. In addition public notices were also displayed and distributed at key public places for the local stakeholder consultation meeting.

The list of stakeholder identified include nearby villagers, residents from nearby towns, employees of the PP. Apart from these stakeholders all the persons with an interest in the Wind Mill Generation project activity were also invited through the advertisement published in the local Newspaper.

Comments of stakeholders were recorded during the stakeholder meeting.

The stake holder meeting process is followed in the following sequence

- Election of the Chair of the meeting and approval of the proposed Agenda
- Presentation of the CDM-Kyoto Protocol and role of local stake holder
- Presentation on the Proposed Projects.
- Discussion and Articulation of concerns
- Chair summarizing the local stake holder concerns
- Vote of Thanks followed by Tea

Mr. R.K.S Pillai (Suzlon) started with brief introduction and welcomed all the stakeholders. He further suggested the participants to elect a chairman to conduct the meeting. He explained that the meeting has been convened for discussing opinions, concerns and benefits from Wind Power Project established in this region for the aforementioned corporates by the Suzlon. Sri Venkatesan was elected as the Chairman for the meeting.

Mr. Subramanian explained about the project. He explained about the Clean Development Mechanism (CDM) and the importance of the Local Stakeholders Consultation Meeting.

After the presentation was completed, the Chairman opened the session for stakeholders to express their queries, comments and suggestions.

Finally, Mr. Sudhakaran Pillai (Technical Consultant – Muthoot Fincorp Ltd & Muthoot Finance Ltd) proposed the vote of thanks and the meeting concluded with thanks to the chair.

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<sup>25</sup> <http://envfor.nic.in/divisions/iass/notif/eia.htm>



**E.2. Summary of comments received**

>> The stakeholder appreciated the CDM initiatives and applauded the effort towards clean energy produced. All the participants informed that there has been overall development in the area due to the installation of WEGs.

**E.3. Consideration of comments received**

>> None of the concerns expressed by the stakeholders required an action to be taken by the M/s Muthoot Fincorp Ltd., M/s Muthoot Finance Ltd., Agencia Commercial Maritima during the project operation and at any other stage.

**SECTION F. Approval and authorization**

>> HCA was obtained from DNA, India on 25<sup>th</sup>, April 2012.

**Appendix 1. Contact information of project participants**

<b>Organization name</b>	Core CarbonX Solutions Private Limited
<b>Country</b>	India
<b>Address</b>	5R, Block-A, #6-3-668/9, Kanthi Shikara Complex, Punjagutta, Hyderabad-500082, Telangana, India
<b>Telephone</b>	040-23410367,
<b>Fax</b>	
<b>E-mail</b>	<a href="mailto:nmohanty@corecarbonx.com">nmohanty@corecarbonx.com</a> and <a href="mailto:info@corecarbonx.com">info@corecarbonx.com</a>
<b>Website</b>	<a href="http://www.corecarbonx.com">www.corecarbonx.com</a>
<b>Contact person</b>	Niroj Kumar Mohanty

**Appendix 2. Affirmation regarding public funding**

Public Funding from Annex I is not involved in this project.

**Appendix 3. Applicability of methodologies and standardized baselines**

Parameter	Data Source
EF <sub>grid,OM, y</sub> = Build Margin Emission Factor (tCO <sub>2</sub> /MWh)	Central Electricity Authority (CEA) CO <sub>2</sub> database version 15 dated December 2019. ( <a href="http://www.cea.nic.in">www.cea.nic.in</a> )
EF <sub>grid,BM, y</sub> = Operating Margin Emission Factor (tCO <sub>2</sub> /MWh)	Central Electricity Authority (CEA) CO <sub>2</sub> database version 15 dated December 2019.
EF <sub>CO<sub>2</sub>,grid, y</sub> = CO <sub>2</sub> emission factor of the grid in year y (t CO <sub>2</sub> /MWh)	Calculated as the weighted average of the operating margin and build margin

**Appendix 4. Further background information on ex ante calculation of emission reductions**

[Please refer section B6.1, B6.2 and B6.3](#)

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**Appendix 5. Further background information on monitoring plan**

Please refer section B7.1 and section B7.3.

**Appendix 6. Summary report of comments received from local stakeholders**

[Please refer section E.1 and E.2 of the PDD.](#)

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## Appendix 7. Summary of post-registration changes

S.No.	Post Registration Change	Type of Change	Reason
1	The latest format of the CDM-PDD-FORM (Version 11.0) is used	General requirement: New PDD template has been used	The latest format of the CDM-PDD-FORM (Version 11.0) is used
2	Section A.6: History of project activity	Permanent changes: Corrections	The section has been added as per the requirement of the new version of the CDM-PDD-FORM (Version 11.0)
3	Correction of typographical errors and minor editorial changes	Permanent Changes: Corrections	Correction of typographical errors and minor editorial changes have been carried out
4	The wind power project with the WTG number K901 under the name Agencia Commercial Maritima of the capacity 1250 KW has been withdrawn.	Permanent Changes: Changes to project design: Corrections	The wind power project with the WTG number K901 has been sold. Thus, this will not be taken underfor renewalrenewal.
5	Section B.5. of Demonstration of additionality for Agencia Commercial Maritima is removed from the Section B.5 of the PDD	Permanent Changes: Changes to project design	The wind power project with the WTG number K901 has been sold. Thus, this will not be taken for renewal.
6	Estimated emission reduction from the project is changed due to removal of Agencia Commercial Maritima project component	Permanent Changes: Changes to project design	The wind power project with the WTG number K901 has been sold. Thus, this will not be taken for renewal.
7	Any reference to Agencia Commercial Maritima and details are removed from the PDD.	Permanent Changes: Changes to project design	The wind power project with the WTG number K901 has been sold. Thus, this will not be taken for renewal.
8	PDD baseline emission calculation is carried out as per the para 22 of the AMS I D version 18. Thus, necessary changes are done in the section B.4, B.6.1, B.6.2, B.6.3 and B.7.1 of the PDD	Permanent Changes: Changes to project design	This is done inline with the terminology and parameters that is used in the version 18 of the AMS I D methodology.

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### Document information

Version	Date	Description
11.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN);</li> <li>Make editorial improvements.</li> </ul>
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>Improve consistency with the "CDM project standard for project activities" and with the PoA-DD and CPA-DD forms;</li> <li>Make editorial improvement.</li> </ul>

**CDM-PDD-FORM**

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	24 May 2017	Revision to: <ul style="list-style-type: none"><li>• Ensure consistency with the "CDM project standard for project activities" (CDM-EB93-A04-STAN) (version 01.0);</li><li>• Incorporate the "Project design document form for small-scale CDM project activities" (CDM-SSC-PDD-FORM);</li><li>• Make editorial improvement.</li></ul>
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: <ul style="list-style-type: none"><li>• Include provisions related to statement on erroneous inclusion of a CPA;</li><li>• Include provisions related to delayed submission of a monitoring plan;</li><li>• Provisions related to local stakeholder consultation;</li><li>• Provisions related to the Host Party;</li><li>• Make editorial improvement.</li></ul>
05.0	25 June 2014	Revision to: <ul style="list-style-type: none"><li>• Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0));</li><li>• Include provisions related to standardized baselines;</li><li>• Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1;</li><li>• Change the reference number from F-CDM-PDD to CDM-PDD-FORM;</li><li>• Make editorial improvement.</li></ul>
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the project design document form for CDM project activities" (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.

Decision Class: Regulatory

Document Type: Form

Business Function: Registration

Keywords: project activities, project design document