Project design document form for CDM project activities

(Version 05.0)

PROJECT DESIGN DOCUMENT (PDD)	
Title of the project activity	Clean Energy Project in the State of Tamil Nadu
Version number of the PDD	17.0
Completion date of the PDD	07/10/2014
Project participant(s)	Vaayu Renewable Energy (Tapti) Pvt. Ltd. (Private) [1]
Host Party	India
Sectoral scope and selected methodology(ies), and where applicable, selected standardized baseline(s)	01 -Energy industries (renewable - / non-renewable sources) ; Approved consolidated baseline methodology, ACM0002 (Version 13.0.0, EB 67)
Estimated amount of annual average GHG emission reductions	27,546

[1] Ownership of project activity has been changed from 'Vish Wind Infrastructure LLP' to 'Vaayu Renewable Energy (Tapti) Pvt. Ltd." as per the purchase order dated 17 May 2013.

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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The purpose of the project activity is to utilize renewable wind energy for generation of electricity. The project activity replaces anthropogenic emissions of greenhouse gases (GHG's) into the atmosphere, which is estimated to be approximately 27,546 tCO_2e per year, by displacing the equivalent amount of electricity generation estimated i.e. 30,690.83 MWh/yr through the operation of existing fuel mix in the grid comprising mainly fossil fuel based power plants and future capacity expansions connected to the grid.

During post registration phase, the ownership of the project activity has been transferred from 'Vish Wind Infrastructure LLP' to 'Vaayu Renewable Energy (Tapti) Pvt. Ltd' as per the purchase order dated 17/05/2013.

Originally, the electricity generated by the project activity was being supplied to the state grid.

Further from 15/06/2013 onwards, electricity is being supplied to SRF Limited through a third party sale agreement (as per TANGEDCO statements). As per the present arrangement, the electricity generated by the project activity is being pooled through Tamil Nadu state distribution & transmission network first (part of southern grid) and then further supplied to SRF Limited.

In the absence of the project activity, equivalent amount of electricity would have been generated from the connected/ new power plants in the southern grid, which are/ will be predominantly based on fossil fuels[2]. Whereas the operation of Wind Energy Convertors (WEC's) is emission free and no emissions occur during the lifetime of the project activity. As per the applicable methodology the baseline scenario for the project activity is the grid based electricity system, which is also the pre-project scenario.

Wind World (India) Limited (hereafter referred as "WWIL")[3] is the equipment supplier and the operations and maintenance contractor for the project activity. The project activity is owned by Vaayu Renewable Energy (Tapti) Pvt. Ltd.[4]. WWIL is having the responsibility of operation and maintenance of the wind farm.

The project activity is set up to produce clean power from the wind energy converters (WEC's) which can be also named as Wind Turbine Generator (WTG). The project activity involves supply, erection, commissioning and operation of 18 machines of rated capacity 800 kW each comprising of 14.4 MW. The machines are E-53 make. The average life time of the WEC is around 20 years as per the equipment supplier specifications. The project will thus address the demand – supply gap in the state of Tamil Nadu and will assist the sustainable growth, conservation of resources and reduction of greenhouse gas emissions by using renewable energy source like wind energy.

The project is type of Greenfield project as there is no possibility of switch of technology or change of Energy source.

Implementation status of the Project Activity:

Vagaikulam Site, Tirunelveli District, Tamil Nadu						
Sl. No	**Loc. No.**	**HTSC No**	**Village**	**Taluka**	**District**	**Commissioning Date**
1	V200	3957	Kanarpatti	Tirunelveli	Tirunelveli	20-Oct-11
2	118	3919	Kattarankulam	Tirunelveli	Tirunelveli	29-Sep-11
3	V177	3947	Ettankulam	Tirunelveli	Tirunelveli	30-Sep-11
4	V98	3914	Kalakudi	Tirunelveli	Tirunelveli	29-Sep-11
5	V50	3915	Kuruchikulam	Tirunelveli	Tirunelveli	29-Sep-11

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

[3] With effect from 01/01/2013 name of Enercon (India) Limited has been changed to 'Wind World (India) Limited'

[4] Ownership of project activity has been changed from 'Vish Wind Infrastructure LLP' to 'Vaayu Renewable Energy (Tapti) Pvt. Ltd." as per the purchase order dated 17 May 2013.

6	V52	3916	Kuruchikulam	Tirunelveli	Tirunelveli	29-Sep-11
7	SF 141	3917	Kuruchikulam	Tirunelveli	Tirunelveli	29-Sep-11
8	168	3918	Vagaikulam	Tirunelveli	Tirunelveli	29-Sep-11
9	117	3949	Ukkirankottai	Tirunelveli	Tirunelveli	30-Sep-11
10	173	3986	Vagaikulam	Tirunelveli	Tirunelveli	10-Jan-12
11	170	3955	Vagaikulam	Tirunelveli	Tirunelveli	7-Oct-11
12	135	3948	Ukkirankottai	Tirunelveli	Tirunelveli	30-Sep-11
13	136	3959	Kanarpatti	Tirunelveli	Tirunelveli	21-Oct-11
14	V76	3954	Kuruchikulam	Tirunelveli	Tirunelveli	7-Oct-11
15	126	3981	Kattarankulam	Tirunelveli	Tirunelveli	28-Dec-11
16	120	3920	Melelanthaikulam	Sankarankoil	Tirunelveli	29-Sep-11
17	V213	3921	Kanarpatti	Tirunelveli	Tirunelveli	29-Sep-11
18	V202	3999	Kanarpatti	Tirunelveli	Tirunelveli	31-Jan-12

Contribution to sustainable development

Ministry of Environment and Forests [5], Government of India has stipulated the social well being, environmental well being, economic 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.

The project activity contributes to sustainable development in the following manner:

1. **Social well being:**

- The candidate CDM project has resulted in investment in rural sector thereby creating employment opportunities for the skilled, semi skilled and unskilled manpower available in and around project location.
- The project activity has led to the development of supporting infrastructure such as road network etc., in the wind park location, which also provides access to the local population.
- Use of a renewable source of energy reduces the dependence on imported fossil fuels and associated price variation thereby leading to increased energy security.

2. **Economic well being:**

- The project activity requires temporary and permanent, skilled and semi-skilled manpower at the wind farm; this will create additional employment opportunities in the region.
- The generated electricity will be fed into the Southern grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub-urban habitants) which will provide new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development.

[5] Ministry of Environment and Forest, web site: http://envfor.nic.in/division/clean-development-mechanism-interim-approval-criteria

3. Technological well being:

- Increased interest in wind energy projects will further push R&D efforts by technology providers to develop more efficient and better machinery in future.

4. Environmental well being:

- The project activity involves use of renewable energy source for electricity generation instead of fossil fuel based electricity generation which would have emitted gaseous, liquid and/or solid effluents/wastes.
- Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

All the above - discussed points are the contributions of the project activity for the sustainable development.

A.2. Location of project activity

A.2.1. Host Party

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India

A.2.2. Region/State/Province etc.

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Southern Region/ Tamil Nadu State

A.2.3. City/Town/Community etc.

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The project is located across villages in Kanarpatti, Ettankulam, Kalakudi, Kuruchikulam, Ukkirankottai, Vagaikulam, Kattarankulam and Melelanthaikulam of Tirunelveli& Sankarankoil Taluk, in Tirunelveli District of Tamil Nadu state in India.

Tirunelveli railway station is about 25 kms away from the site. Nearest airport is at Tuticorin about 70 kms from the site.

A.2.4. Physical/Geographical location

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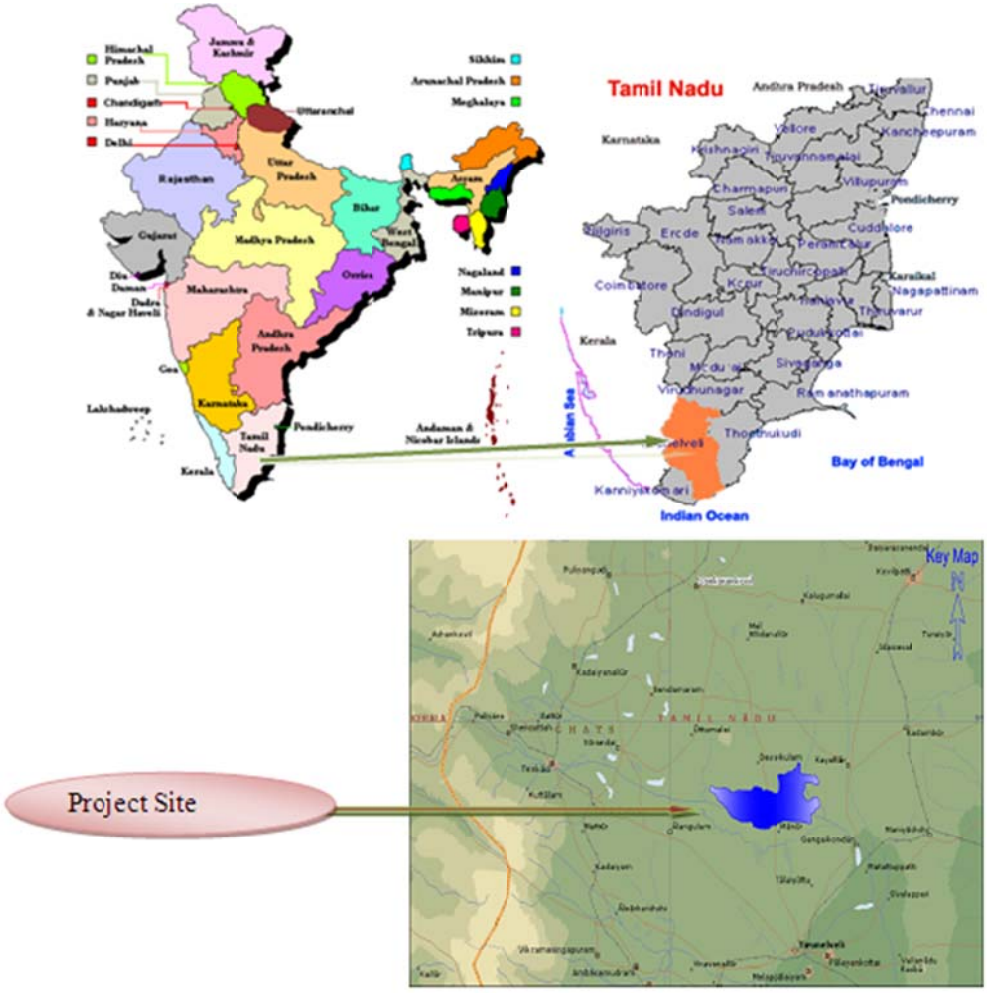
The project consists of 18 numbers of E-53 WECs of 800 kW each. The latitude and longitude of the project activity are given below:

Vagaikulam Site, Tirunelveli District, Tamil Nadu												
Sl. No	Loc. No.					Latitude (N)			Longitude (E)			Commissioning
		HTSC No	Village	Taluka	District	Deg.	Minutes	Seconds	Deg.	Minutes	Seconds	Date
1	V200	3957	Kanarpatti	Tirunelveli	Tirunelveli	8	52	57.09	77	38	51.01	20-Oct-11
2	118	3919	Kattarankulam	Tirunelveli	Tirunelveli	8	55	21	77	40	24.28	29-Sep-11
3	V177	3947	Ettankulam	Tirunelveli	Tirunelveli	8	52	59.92	77	38	12.89	30-Sep-11
4	V98	3914	Kalakudi	Tirunelveli	Tirunelveli	8	53	17.24	77	36	21.54	29-Sep-11
5	V50	3915	Kuruchikulam	Tirunelveli	Tirunelveli	8	52	49.24	77	35	10.4	29-Sep-11

6	V52	3916	Kuruchikulam	Tirunelveli	Tirunelveli	8	52	31.66	77	35	7.49	29-Sep-11
7	SF 141	3917	Kuruchikulam	Tirunelveli	Tirunelveli	8	52	53.03	77	34	59.05	29-Sep-11
8	168	3918	Vagaikulam	Tirunelveli	Tirunelveli	8	54	51.25	77	36	56.19	29-Sep-11
9	117	3949	Ukkirankottai	Tirunelveli	Tirunelveli	8	55	13.76	77	36	36.15	30-Sep-11
10	173	3986	Vagaikulam	Tirunelveli	Tirunelveli	8	55	0	77	37	22.1	10-Jan-12
11	170	3955	Vagaikulam	Tirunelveli	Tirunelveli	8	54	41.45	77	36	37.58	7-Oct-11
12	135	3948	Ukkirankottai	Tirunelveli	Tirunelveli	8	55	4.55	77	36	37.69	30-Sep-11
13	136	3959	Kanarpatti	Tirunelveli	Tirunelveli	8	53	5.5	77	38	45.7	21-Oct-11
14	V76	3954	Kuruchikulam	Tirunelveli	Tirunelveli	8	52	38.92	77	35	38.99	7-Oct-11
15	126	3981	Kattarankulam	Tirunelveli	Tirunelveli	8	55	17	77	41	9.7	28-Dec-11
16	120	3920	Melelanthaikulam	Sankarankoil	Tirunelveli	8	55	36.25	77	40	42.29	29-Sep-11
17	V213	3921	Kanarpatti	Tirunelveli	Tirunelveli	8	53	21.95	77	39	23.63	29-Sep-11
18	V202	3999	Kanarpatti	Tirunelveli	Tirunelveli	8	52	33.8	77	38	56.4	31-Jan-12

The physical location of the project activity is shown below:



A.3. Technologies and/or measures

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The project activity involves 18 numbers wind energy converters (WECs) of (800 KW, E-53) with internal electrical lines connecting the project activity with local evacuation facility. The WECs generate 3-phase power at 400V, which is stepped up to 33 KV. The project activity can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V ± 12.5%. The average life time of the WEC is around 20 years as per the equipment supplier specifications. The WECs are manufactured by WWIL. This technology is manufactured at Daman manufacturing unit in India, operated and maintained by EIL. Hence no technology transfer is involved for project activity.

The other salient features of the state-of-art-technology are:

Turbine model	(E- 53)
Rated power	800 KW
Rotor diameter	52.9 m
Hub height	75 m (Concrete)
Turbine Type	Direct driven, horizontal axis wind turbine with variable rotor speed
Power regulation	Independent pitch system for each blade.
Cut in wind speed	2.5 *m/s*

Rated wind speed	12 *m/s*
Cutout Wind speed	28-34 m/s
Extreme Wind Speed	59.5 *m/s*
Rated rotational speed	29 rpm
Operating range rot. speed	12-29 rpm
Orientation	Upwind
No of Blades	3
Blade Material	Glass Fiber Epoxy reinforced
Gear box type	Gear less
Generator type	Synchronous generator
Braking	Aerodynamic
Output Voltage	400 V
Yaw System	Active yawing with 4 electric yaw drives with brake motor
Tower	74 m (concrete)

The project activity is new 14.4 MW wind power project, which consists of 18 machines of E-53 type Wind Energy Converters (WECs) of 800 KW capacities each. WWIL has secured and facilitated the technology transfer for wind based renewable energy generation from and has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.

In the absence of the project activity the equivalent amount of electricity would have been generated from the connected/ new power plants in the Southern grid, which are/ will be predominantly based on fossil fuels[6], hence baseline scenario of the project activity is the grid based electricity system, which is also the pre-project scenario.

Technology:

In wind energy generation, kinetic energy of wind is converted into mechanical energy and subsequently into electrical energy. The life time of the project activity is 20 years. Wind blowing at high speeds has a considerable amount of kinetic energy. When this kinetic energy passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The generated electricity from this project activity is exported to the southern regional grid/ third party[7]. The technology is a clean technology since there are no GHG emissions associated with the electricity generation. The project activity consists of E-53 WEC's of capacity 18*800 kW. The technical specifications of 800 kW WWIL WEC's is provided above. The baseline for this project activity is southern regional grid. In the absence of this project activity the equivalent amount of power would be generated by the fossil fuel dominated southern regional grid.

The PLF value estimated by the third party is 24.33% for the project activity.

The project activity by displacing fossil fired electricity that is coal dominated also results in reduced emission of pollutants like SOx and solid waste. Hence the project is environmentally safe and has sound technology. The project total installed capacity is 14.4 MW located in Tamil Nadu. The electricity generated by project activity was supplied to Tamil Nadu Generation & Distribution Corporation Ltd. prior to 15/06/2013 and afterwards, electricity will be supplied to SRF Limited through Tamil Nadu state distribution & transmission network. The purpose of the project activity is to utilize renewable wind energy for generation of electricity. The Annual average electricity generation and emission reduction of the project activity 30,690.83 MWh/yr.The project activity is wind power project, which consists of 18 machines of E-53 type Wind Energy Converters (WECs) of 800 KW capacities each

[6] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

[7] Prior to 15/06/2013, the amount of electricity was supplied to southern regional grid (state grid) and from 15/06/2013 onwards, electricity will be supplied to third party (SRF Limited) as per the third party supply agreement.

A.4. Parties and project participants

Party involved (host) indicates host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	Vaayu Renewable Energy (Tapti) Pvt. Ltd. (Private)	No

The contact details of the entity have been provided in Appendix – 1.

A.5. Public funding of project activity

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There is no public funding from Annex 1 countries and no diversion of Official Development Assistance (ODA) is involved in the project activity.

SECTION B. Application of selected approved baseline and monitoring methodology and standardized baseline

B.1. Reference of methodology and standardized baseline

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Title: "Consolidated baseline and monitoring methodology for Grid-connected electricity generation from renewable sources"

Reference: Approved consolidated baseline methodology, ACM0002 (Version 13.0.0, EB 67)

The selected methodology also refers to the following methodological tools as used:

- Tool to calculate the emission factor for an electricity system – Version 2.2.1
- Tool for the demonstration and assessment of additionality – Version 6.0.0

Further information regarding the methodology / tools can be obtained at:

http://cdm.unfccc.int/methodologies/PAmethodologies/approved

B.2. Applicability of methodology and standardized baseline

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The project activity is a wind based power project supplying electricity to state utility/ third party through Tamil Nadu state distribution & transmission network[8], which forms part of the Southern grid. The project activity will displace fossil fuel based electricity generation that would have otherwise been provided by the operation and expansion of the fossil fuel based power plants in Southern grid.

Therefore, the approved consolidated baseline and monitoring methodology applicable for the project activity is ACM0002, Version 13.0.0 and have been justified below:

Applicability Criteria	Applicability to the Project Activity
This methodology is applicable to grid-	The project is installation of new wind

[8] Please refer section A.1 for the details.

connected renewable power generation project activities that: (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	power plant supplying electricity to state utility/ third party through southern grid, hence this methodology is applicable.
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: • Hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir) • Wind power plant/unit, • Geothermal power plant/unit, • Solar power plant/unit, • Wave power plant/unit • Tidal power plant/unit.	The project activity is the installation of new grid connected renewable power generation from wind.
In the case of capacity additions, retrofits or replacements (except for capacity addition projects for which the electricity generation of the existing power plant(s) or unit(s) is not affected): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity addition or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	This condition is not relevant, as the project activity does not involve capacity additions, retrofits or replacements.
In case of hydro power plants: At least one of the following conditions must apply: • The project activity is implemented in an existing single or multiple reservoirs, with no change in the volume of any of reservoirs. • The project activity is implemented in an existing single or multiple reservoirs, where the volume of any of reservoirs is increased and the power density of each reservoir, as per definitions given in the Project Emissions section, is greater than 4 W/m2. • The project activity result in single or multiple reservoirs and the power density of each reservoir, as per definitions given in the project emissions section, is greater than 4 W/m2. In case of hydro power plants using multiple reservoirs where the power density of any of the reservoirs is lower than 4W/m2 after the implementation of the project activity all	This condition is not relevant, as the project activity is not a hydro power plant.

of the following conditions must apply: • The power density calculated for the entire project activity using equation 5 is greater than 4W/m2; • All reservoirs and hydro power plants are located at the same river and were designed together to function as an integrated project1 that collectively constitutes the generation capacity of the combined power plant; • The water flow between the multiple reservoirs is not used by any other hydropower unit which is not a part of the project activity; • The total installed capacity of the power units, which are driven using water from the reservoirs with a power density lower than 4 W/m2, is lower than 15 MW;	
The methodology is not applicable to the following: • Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants; • Hydro power plant that result in new single reservoir or in the increase in existing single reservoir where the power density of the reservoir is less than 4 W/m2.	The project activity does not involve any of the given criteria; hence, the methodology is applicable for the project activity.
In the case of retrofits, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, i.e. to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".	The project activity is a new wind power plant. No replacement, modification or retrofit measures are implemented here. Hence, this criterion is also not relevant to the project activity.

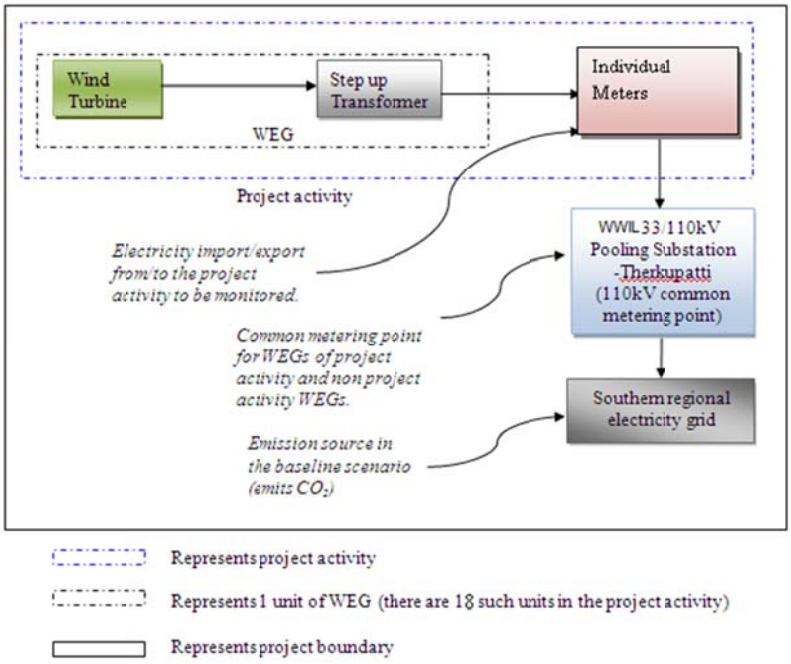
The description provided in table above shows that the project activity satisfies the applicability criteria of the methodology ACM0002, version 13.0.0.

B.3. Project boundary

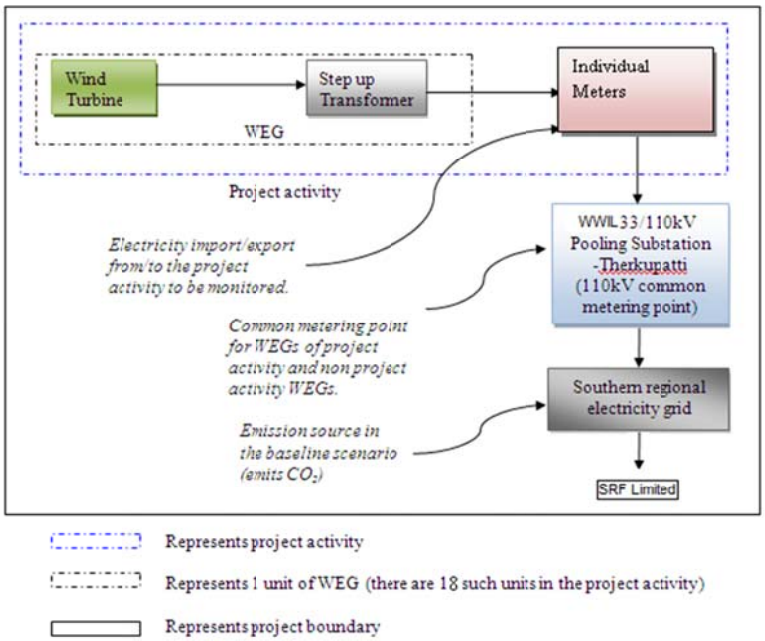
According to the methodology ACM0002, version 13.0.0 the spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

The project boundary includes the WECs of the project activity, transformer, individual meters, WWIL substation & southern grid of India/ third party which is final consumer of generated electricity.

Prior to 15/06/2013:



Post 15/06/2013 scenario:



The baseline study of SOUTHERN grid shows that the main sources of GHG emissions under the baseline scenario are CO_2 emissions from the conventional power generating systems. Other emissions are that of CH_4 and N_2O but both emissions have been excluded for simplification. The project activity generates emission free electricity from renewable sources and hence, emits no greenhouse gases in the atmosphere.

The following table indicates the sources and gases included in the project boundary:

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	In the baseline scenario, the electricity would have been sourced from the Southern grid which in turn would be connected to fossil fuel fired power plants which emit CO_2.
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project scenario	For geothermal power plants, fugitive emissions of CH4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	No	The present project activity is a greenfield wind power project. Hence, not relevant
		CH_4	No	
		N_2O	No	
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	No	The present project activity is a greenfield wind power project. Hence, not relevant
		CH_4	No	
		N_2O	No	
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	The present project activity is a greenfield wind power project. Hence, not relevant
		CH_4	No	
		N_2O	No	

B.4. Establishment and description of baseline scenario

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According to the applied methodology ACM 0002, version 13.0.0, if the project activity is the installation of a new grid-connected renewable power plant/ unit, the baseline scenario is the following:

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

The proposed project activity is installation of new grid connected to renewable power generation through wind power plant, located in the state of Tamil Nadu and the power generated from the project activity will be supplied to the state utility/ third party (SRF Limited)[9] through Southern Grid .

The details of India grid system is described in the table below:

S. No.	Electricity Grid (Present)	Electricity Grid (Earlier)	Geographical Areas Covered
1.	NEWNE Grid	Northern	Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, Uttar Pradesh, Uttarakhand
		Western	Chhattisgarh, Gujarat, Daman & Diu, Dadar & Nagar Haveli, Madhya Pradesh, Maharashtra, Goa
		Eastern	Bihar, Jharkhand, Orissa, West Bengal, Sikkim, Andaman-Nicobar
		North-Eastern	Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura

[9] Please refer to section A.1 for further details.

2.	Southern Grid	Southern	Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Pondicherry, Lakshadweep

The power sector in India including the Southern region largely comprises thermal power stations[10] as can be seen from the table below[11]:

(As on 31-10-11)

SL. NO.	REGION	THERMAL				Nuclear	HYDRO (Renewable)	R.E.S.@ (MNRE)	TOTAL
		COAL	GAS	DSL	TOTAL				
1	Northern	24527.50	4171.26	12.99	28711.75	1620.00	14922.75	3509.56	48764.06
2	Western	33405.50	7903.81	17.48	41326.79	1840.00	7447.50	5937.60	56551.89
3	Southern	20982.50	4690.78	939.32	26612.60	1320.00	11338.03	10128.96	49399.59
4	Eastern	21122.88	190.00	17.20	21330.08	0.00	3882.12	356.42	25568.62
5	N. Eastern	60.00	787.00	142.74	989.74	0.00	1116.00	223.60	2329.34
6	Islands	0.00	0.00	70.02	70.02	0.00	0.00	6.10	76.12
7	All India	100098.38	17742.85	1199.75	119040.98	4780.00	38706.40	20162.24	182689.62

Source: http://www.cea.nic.in/reports/monthly/executive_rep/oct11/8.pdf

It is evident from the above table that the installed capacities in India are predominantly thermal power plants. Thermal power generation is GHG intensive and is a major source of CO_2 emissions. Therefore, in absence of the project activity, the amount of electricity generated would have been generated by the operation of grid-connected power plants and by addition of new generation sources, which are largely based on fossil fuels. Thus, generation from the project activity displaces the electricity generated from existing and planned power plant capacities in the Southern grid whose emission intensities are represented by the Combined Margin Emission Factor of the Southern Grid.

Therefore, as per the methodology, the baseline emission and the emission reduction from project activity have been calculated based on the amount of electricity to be supplied by the project activity to the grid and the Emission Factor of the Southern grid, i.e. Combined Margin emission factor. The Combined Margin (CM) Emission Factor has been calculated as the combination of Operating Margin (OM) and Build Margin (BM) emission factors with the weight age value of 0.75 and 0.25 respectively from the publicly available official database of Central Electricity Authority (CEA), Government of India.

Parameters	SI Unit	Description	Source
$EF_{grid,CM,y}$	tCO_2/MWh	Combined margin CO2 emission factor for the project electricity system in year *y*	Calculated as the weighted average of the operating margin & build margin values, sourced from 'CO_2 Baseline Database for the Indian Power Sector', Version 7.0, 1st January 2012, published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	tCO_2/MWh	Operating margin CO2 emission factor for the project electricity system in year *y*	'CO_2 Baseline Database for the Indian Power Sector', Version 7.0, 1st January 2012, published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	tCO_2/MWh	Build margin CO2 emission factor for the project electricity system in year *y*	'CO_2 Baseline Database for the Indian Power Sector', Version 7.0, 1st January 2012,, published by Central Electricity Authority (CEA), Government of India
$EG_{facility,y}$ (Variable)	MWh	Quantity of net electricity generation supplied to grid /third party by the project activity in a year y.	In PDD for the purpose of validation, estimated quantity of electricity calculated ex-ante has been used. Actual values will be monitored during annual monitoring and verification and will be sourced from TNEB Statement (Records maintained by project proponents)

[10] http://www.cea.nic.in/

[11] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

B.5. Demonstration of additionality

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The project activity has been conceived as a CDM project since its inception. As per EB 62, Annex 13, B. New project activities, Point 2,

"The Board decided that for project activities with a starting date on or after 02 August 2008, the project participant must inform a Host Party DNA and the UNFCCC secretariat in writing of the commencement of the project activity and of their intention to seek CDM status".

The project activity has been conceived as a CDM project since its inception. The project decision was taken on 20 May 2011 as per the board resolution, where the board of the company appraised about the project. The project start date is 30 June 2011, which is project purchase order date of the project activity and the PP has intimated UNFCCC on dated 15 Sep 2011 and DNA on dated 15 Sep 2011 about the project activity initiative within six months of the start date and received the acknowledgment both from UNFCCC & DNA. The acknowledgement from UNFCCC and Indian DNA has been provided to the DoE for verification

The latest Additionality tool, "Tool for the demonstration and assessment of Additionality", version 6.0.0, EB 65, Annex 21, has been used to demonstrate project additionality.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

As per the methodology ACM0002, version 13.0.0, the alternative for the project activity is generation of equivalent amount of electricity by operation of grid-connected power plants and by addition of new generation sources.

Accordingly, the realistic and credible alternatives to the project activity are:

(a) The proposed project is undertaken without being registered as a CDM activity.

(b) No project activity, in which case the equivalent amount of electricity being generated through operation of grid-connected power plants and addition of new generation sources, i.e. continuation of the current situation.

Outcome of Step 1a: Alternatives (a) and (b) above have been identified as realistic and credible alternative scenario (s) to the project activity.

Sub-step 1b: Consistency with mandatory laws and regulations:

Both the alternatives are in compliance with all applicable legal and regulatory requirements.

Outcome of Step 1b: Identification of the realistic and credible alternative scenario (s) to the project activity that are in compliance with mandatory legislation and regulations taking into account the enforcement in the region or country and EB decisions on national and/or sectoral policies and regulations.

Step 2: Investment Analysis

Sub-step 2a: Determine appropriate analysis method:

As per "Tool for the demonstration and assessment of additionality" (version 6.0.0), for financial evaluation of the project, the following three options can be applied:

1. Option I: Simple Cost Analysis
2. Option II: Investment Comparison Analysis
3. Option III: Benchmark Analysis

The simple cost analysis is not applicable as the project activity will result into financial return from the sale of the electricity apart from the revenue availed from CDM. As per paragraph 19 of the "*Guidance on the assessment of investment analysis"*, (Annex 5, EB 62), if the alternative to the project activity is the supply of electricity from a grid, this is not to be considered as an investment. The alternative to the project activity is

continuation of current situation i.e. no project activity, in that case equivalent amount of electricity would have been produced by the grid electricity system. This option will not require capital investment. Therefore, Investment comparison analysis (Option II) is not applicable.

Hence, Option III: *Benchmark Analysis* has been selected for investment analysis by the project proponent.

Sub-step 2b: Option III. Apply benchmark analysis:

The Project Proponent proposes to use **Option III – Benchmark Analysis** and the financial indicator is identified as *post-tax* equity IRR.

The guidance to investment analysis issued in EB 62, Annex 5 (paragraph 12) states that in cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Required/expected returns on equity (Cost of Equity) are appropriate benchmarks for equity IRR.

As per ACM0002, version 13.0.0, the additionality of the project shall be conducted using "tool for demonstration and assessment of additionality" version 6.0.0. The tool for demonstration and assessment of additionality [para-5, sub step 2(b)] states that, in cases where the project has more than one potential developer, the benchmark shall be based on parameters that are standard in the market, considering the specific characteristics of the project type. Accordingly, the cost of Equity applicable to the project type has been considered as the benchmark to be compared against equity IRR.

Further as per para 15 of "Guidelines on the assessment of investment analysis" annex 5 of EB 62, version 5.0;

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". The project participant has chosen option a (values as provided in Appendix A of the guidance on assessment of investment analysis version 5) for calculating cost of equity benchmark.

It may be noted that PP has used the value of 11.75% which is equivalent to rating of Baa3 for bonds issued by Moody. Therefore investment guidance which is effective from the date of its issuance; the default values can be used by the PP for the specific Bond rating issued by Moody's. The bond rating for India Issued by Moody is Baa3 and therefore as per guidance the countries that have rating of Baa3 can use the default values of 11.75% in case of sectoral scopes that falls under group 1. Therefore the benchmark chosen is also in line with para 6 of EB 62 annex 5 which calls for using data that was available to PP in context of decision making.

As per para 7 of the appendix A, "*in situations where an investment analysis is carried out in nominal terms, project participants can convert the real term values provided in the table below to nominal values by adding the inflation rate. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period*".

PP has selected 6% inflation rate based on data published by RBI.
(http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/PREERE14020210.pdf)

As the analysis has been carried out in nominal terms, the default value of expected return on equity (given in real terms in EB 62 Annex 5) has been adjusted with the inflation. The inflation value has been taken as per the forecast by the Reserve Bank of India (RBI).

The benchmark has been calculated as:

Nominal Benchmark = {(1+ Real Benchmark[12])*(1+Expected Inflation Rate) – 1}
= {(1+11.75%)*(1+6%) – 1}
= 18.46%

Hence, the benchmark Cost of equity for the project is calculated as 18.46%.

[12] Default value for expected return on equity of 11.75% published by UNFCCC under investment guidance version 5.0 has been used by PP.

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

The project participant used the following parameters for the investment analysis as per the information available at the time of project decision making. Due to the third party sale agreement, tariff has been changed and accordingly the investment analysis has been revised as shown below:

Assumptions for Financial Model

Capacity of Machines in kW	800		WWIL Offer
Number of Machines	18		WWIL Offer
Project Capacity in MW	14.40		WWIL Offer
Project commissioning date	31-Oct-11		WWIL Offer
Project Cost per MW (Rs. In Millions)	59.34		WWIL Offer
Operations			
Plant Load Factor Base Case	24.33%		Third Party PLF report
Insurance Charges @ % of capital cost	0.12%		Insurance Quote from Insurance provider (As per the insurance quote submitted to the DOE, the insurance rate is 1.2 per thousand/mille. When we convert the same into percentage it will be 0.12%)
Operation & Maintanance Cost base year @ % of capital cost	1.31%		WWIL's offer (6.20 per WEC as per offer letter which is 1.31% of project cost)
% of escalation per annum on O & M Charges	6.0%		WWIL's offer
Service Tax on O&M expenses	10.3%		Income Tax Act (Financial Year 2011-12); http://law.incometaxindia.gov.in/DIT/Income-tax-acts.aspx
Tariff			
Base year Tariff for 20 years - Rs./Kwh[13]	3.39		Tariff Order (2009-2010) (fixed tariff)
Third party sale Tariff- Rs/KWh[14]	5.10		As per third party sale agreement 04 May 2013 (10 years) (Fixed without escalation)
Tariff post term of PPA (third party sale agreement 04 May 2013 (10 years))	cost+19.85 % return on equity		
Project Cost	**Rs Million**		
Land and Infrastructure, Generator & Electrical Equipments, Mechanical Equipments, Civil Works, Instrumentation & Control, Other Project Cost, Pre operative Expenses, etc.			

[13] Tariff applicable prior to third party sale agreement

[14] Tariff applicable post third party sale agreement

Total Project Cost	**854.46**		WWIL Offer
Means of Finance		**Rs Million**	
Own Source	100%	854.46	The project is 100% equity project(As per Board Note & Declaration from CA)
Term Loan	0%	-	
Total Source		854.46	
Income Tax Depreciation Rate (Written Down Value basis)			
on Wind Energy Generators	80%		Income Tax Act (Financial Year 2011-12); http://law.incometaxindia.gov.in/DIT/Income-tax-acts.aspx
Book Depreciation Rate (Straight Line Method basis)			
On all assets	4.50%		http://www.mca.gov.in/Ministry/pdf/Companies_Act_1956_13jun2011.pdf
Book Depreciation up to (% of asset value)	90%		PP has taken 10% as salvage value after the 20 years of useful life of WEC and 90% depreciation. http://www.mca.gov.in/Ministry/pdf/Companies_Act_1956_13jun2011.pdf
Income Tax			
Income Tax rate	30.90%		Income Tax Act (Financial Year 2011-12); http://law.incometaxindia.gov.in/DIT/Income-tax-acts.aspx
Alternate Minimum Tax	19.06%		Income Tax Act (Financial Year 2011-12); http://law.incometaxindia.gov.in/DIT/Income-tax-acts.aspx
Working capital			
Receivables (no of days)	30		Billing Cycle
O & m expenses (no of days)	90		WWIL's Offer

Debt Equity Ratio: The project is 100% equity financed; hence we have considered 100% equity in the financial calculations.

Plant Load Factor: As per EB 48, annex 11, Plant load factor validated by independent third party source can be used for investment analysis. Plant load factor for the project activity is taken from a third party assessment report. The plant load factor for the project site as determined by the third party is 24.330%.

Salvage Value: The project is depreciated up to 90% of the project cost (except for land that is non depreciable item); therefore we have considered land cost and 10% of the remaining value as salvage in the cash flow for computing equity IRR.

The post tax equity IRR for the Project without CDM revenues is 15.88% i.e. less than the benchmark.

Sub-step 2d: Sensitivity analysis (only applicable to Options II and III):

The sensitivity analysis has been done to further illustrate that in favourable scenario also, the financial attractiveness of the project will remain critical under reasonable variations of the critical assumptions as explained below.

As per "Guidance on the Assessment of Investment Analysis", EB 62, Annex 5, paragraph 20 & 21, sensitivity analysis is required to be conducted for those variables which constitute more than 20% of the project cost or revenue. Therefore, the following parameters have been considered for sensitivity analysis:

- Capital Cost
- Tariff
- Plant Load Factor
- O&M cost

Capital Cost

In accordance with the investment guidance, the additionality for the project activity is demonstrated at the time of decision making. The project proponent has considered it appropriate to conduct the sensitivity at the variation of +/- 10% of the project cost.

	10% decrease in Capital Cost	Base case	10% increase in Capital Cost
Post tax Equity IRR	17.73%	15.88%	14.43%

The equity IRR crosses the benchmark at capital cost variation of 13.35% for the project. The actual project cost is INR 792 Million as per purchase order which essentially means that variation in project cost provided in the supplier offer and purchase order is less than 10%. Therefore, the negative variation of 13.35% is not realistic.

Tariff

	10% decrease in Tariff	Base case	10% increase in Tariff
Post tax Equity IRR	14.09%	15.88%	17.59%

"The projects developed under APPC tariff (Average Pooled Power Purchase Cost) structure are eligible for RECs [15] (Renewable Energy Certificates). The project activity under consideration has been proposed under APPC tariff structure. As per paragraph 6 of Annex 3 EB 22, national and/or sectoral policies or regulations that give comparative advantages to less emissions intensive technologies over more emissions-intensive technologies can be termed as E- policies. The national policy on REC provides comparative advantage to less carbon intensive technologies and it came in existence after 11 November 2001. Therefore, REC is an E- policy.

As per paragraph 3 of Annex 32 Eb 53, the assessment has to be conducted to gauge the impact of national and sectoral policies for suitability of tariff and to judge whether the policy/policies are E+ policies or E- policies. Considering the fact that REC is an E- policy, PP has not considered REC impact during the investment analysis and has used tariff of 3.39 INR/kWh approved by Tamil

[15] Post change of ownership, REC is still applicable in case of third party sale. Even entering into an open access merchant sale will make PP eligible for RECs and same can be verified from REC registry web-site at following web-link: https://www.recregistryindia.nic.in/index.php/general/publics/registered_regens.

Nadu state electricity commission which would have otherwise been used for demonstrating additionality in the absence of the E- policy. Since tariff approved by Tamil Nadu state electricity commission is fixed for 20 years, it is not appropriate to conduct sensitivity on tariff.

Post registration of project activity, ownership of project has been changed from 'Vish Wind Infrastructure LLP.' to 'Vaayu Renewable Energy (Tapti) Pvt. Ltd.'. During the change of ownership, PPA of project activity has also been changed. Post change of ownership electricity generated from project activity will be used for third party sale to SRF Limited @5.10 INR./Unit instead of sale to state utility. A third party sale agreement has been signed between new PP 'Vaayu Renewable Energy (Tapti) Pvt. Ltd' & 'SRF Limited'.

PP has analyzed three possible scenarios to calculate applicable tariff after the completion of term (10 years) of third party sale agreement:-

1. Fixed tariff as determined by TNERC (20.3.2009) in its order prevailing at the time of project initiation i.e. 3.39 INR/kWh.

   This is the most likely scenario since TNERC fixed the tariff for 20 years and while going for renewal of PPA with state authority, the applicable tariff would be determined based on the date of commissioning of project activity. Since the project commissioning date falls under the regime of tariff order dated 20.3.2009, applicable tariff after completion of ten years would be 3.39 INR/kWh

2. Renewal of current PPA at tariff as mentioned in third party sale agreement i.e. @ 5.10 INR/kWh.

3. Further as per 'cost + return on equity (19.85%, pre-tax)' approach as mentioned in TNERC tariff order based on which commission calculates tariff and using assumptions that are valid to the project activity. As per this approach, average tariff post end of third party sale agreement comes out to be 8.20 INR/kWh.

PP has analysed all the three options and conservatively maximum IRR of project activity comes out at tariff of 8.20 INR/kWh. However tariff for project is fixed for 10 years term of PPA, though being conservative PP has done +/- 10% sensitivity analysis on tariff throughout the project life (20 Years) and project is still additional. However, IRR crosses the benchmark at the sensitivity of 15.4% in tariff (i.e. at the tariff of 9.45 INR/kWh) post term of third party sale agreement which is not a realistic scenario.

Plant Load Factor

The PLF value estimated by the third party is 24.33% for the project activity. The project proponent has conducted sensitivity at a variation of 10% over the base case.

	10% decrease over the PLF estimated by Third party	PLF (base case)	10% increase over PLF estimated by Third party
Post tax Equity IRR	14.51%	15.88%	17.28 %

The equity IRR crosses the benchmark at effective PLF of 28.81% (variation of 18.40%) for the project activity. The PLF provided by third party is 24.33%, therefore, the variation of 18.40% over the PLF provided by the third party is not realistic. Moreover actual generation achieved for project activity is lower as compared to estimated PLF.

O&M Cost:

The Sensitivity in O&M cost has been conducted after taking into consideration +/-10% variation in O&M Cost.

	10% decrease in O&M cost	Base case	10% increase in O&M cost
Post tax Equity IRR	16.02%	15.88%%	15.75%%

The project does not cross the benchmark even at 100% variation in O & M cost.

Operation and Maintenance Contract will be executed for a period of 10 years from the date of commissioning. O & M will be carried out free of charge for the 1st year and charges for the second year will be Rs. 6.20 lacs per WEC per annum with escalation of 6 % every year over the previous year up to 10th year. The O&M charges shall be payable each quarter in advance.

In the financial analysis, the operating hours from the previous month was considered as WECs were operational from Oct 2011 and for one year the O & M services was free, i.e. till Aug 2012. Therefore working hours from Oct 2012 was considered in the O & M expense calculation.

In order to pay the O&M expenses quarterly in advance to the O&M contractor and there is billing cycle of 30 days, there is requirement of working capital. Therefore working capital has been taken for the project activity.

Outcome of Step 2: From the above analysis, it can be seen that the equity IRR of the project activity remains well below the benchmark even under the sensitivity analysis. Therefore, it can be concluded that the proposed CDM project activity is unlikely to be the most financially/economically attractive and hence, additional.

Step 3: Barrier analysis

Barrier analysis has not been used.

Step 4: Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

Analysis of similar projects within comparable regulatory regime and investment climate:

Regime 1 – Central regime (MNES policy)

- Projects installed prior to September 2001
- Wind power projects were governed by MNES policy with tariff set at INR. 2.25 per unit for the base year 1994-95 with a 5% annual escalation, wheeling and banking charges of 2%, etc.

Regime 2 – State regime (TNEB and TNERC policies / orders)

- Projects installed after September 2001
- Wind power projects were governed by (a) TNEB order of 2001 with fixed tariff of INR. 2.70 per unit, wheeling and banking charged of 5%, etc. (b) TNERC order of 2006 with fixed tariff of INR. 2.9 per unit, etc.

The different tariffs under regime 1 and regime 2 are presented below:

Electricity tariff (INR/kWh)	2006 -07	2007 -08	2008 -09	2009 -10	2010 -11	2011 -12	2012 -13	2013 -14	2014 -15	2015 -16	Averag e
REGIME 1											
MNES Policy	3.60	3.72	3.83	3.94	4.05	4.17	4.28	4.39	4.50	4.62	4.11
REGIME 2											
TNEB order 2001	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
TNERC Order 2006	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90	2.90

Wind projects prior to September 2001 were governed by the MNES policy. However this regime was superseded by the state policy and post September 2001 all project fell into the state regime (regime 2). As can be seen above, Regime 1 projects are of a different regulatory and investment environment and hence cannot be compared to the proposed project activity which falls under the Regime 2.

An analysis of all private wind farm owners with an installed capacity in the range of 7.2MW to 21.6 MW, in the state of Tamil Nadu, under the Regime 2 i.e. after September 2001, has been presented (Details of all the investors for the common practice analysis have been sourced from the Indian Wind Power Directory 11th edition published in year 2011.)

The capacity of project is 14.4 MW. Hence similar project in capacity are considered as those project with capacity range of -/+ 50% of 14.4 MW.

The description of common practice test (Step 4 of Additionality tool version 06.0.0, EB 65, annex 21) requires an analysis of any other activities that are operational and that are similar to the proposed project activity. Projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.

ANALYSIS OF SIMILAR PROJECT ACTIVITIES (project activities having capacity range of -/+ 50% of 14.4 MW and installed after September 2001 i.e. in regime 2)

Sr No	Name of Owner	Similar Activities (MW) (Capacity installed in Regime 2)	CDM/ VCS	Weblinks and Explanation
1	Soundararaja Mills Ltd.	**1.) 8.25 2.) 20**	**Yes**	Installations are under the CDM PDDs titled 1) 10.005 MW captive grid connected wind power project by the members of IWPA at Coimbatore. http://cdm.unfccc.int/UserManagement/FileStorage/3COOHDRDG8SZBFGC437328KXEIBKCV, 2) 40.68 MW grid connected electricity generation project by Indian Wind Power Association at Tirunelveli in Tamil Nadu. http://cdm.unfccc.int/UserManagement/FileStorage/J9R5JA7N8U1SS5YVOAT77VR38US32P, 3) Bundled Wind power project in Tamil Nadu, India, co-ordinated by Tamil Nadu Spinning Mills Association (TASMA-II) http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV, 4) 21.00 MW grid connected electricity generation project by Indian Wind Power Association at Tirunelveli in Tamil Nadu. http://cdm.unfccc.int/UserManagement/FileStorage/UMHY7TQXXEBNNYBUIC017UDWWZXTCT
2	KPR Mill Pvt. Ltd.	**19.8**	**Yes**	1.) 19.8 MW grid connected Wind farm project by KPR Mill Private Limited, Tamil Nadu, India http://cdmindia.nic.in/cdmindia/projects/PCN_474_07.pdf
3	Vishal Export Overseas Ltd	**14.05**	**Yes**	All the installations were envisaged to be CDM projects as reported publicly http://www.projectsmonitor.com/detailnews.asp?newsid=9284 as well as in the company's annual report Page 18 http://vishalexports.co.in/annual%20reports/Annaul%20Report-2005-06.pdf . http://cdm.unfccc.int/filestorage/7/K/I/7KIF6E0R55YEPEH7ANN715FEMB0WYK/PDD-SG%20-%20Badabagh.pdf?t=Z3J8bTZibmNufDB7imN_ronIGjsxWDf5Di8X
4	Grace Infrastructure (P) Ltd.	**1.) 10 2.) 12.5 3.) 16**	**Yes**	Installations under CDM PDD titled "31 MW Wind energy project in, India by Grace Infrastructure Pvt Ltd" http://www.global-warming.de/files/new_mediagallery/2008-05-09Grace.pdf. http://cdm.unfccc.int/Projects/Validation/DB/FFZD3FVFDVCBV7VFLEO18LOFADFR7Z/view.html
5	Madras Cement Ltd.	**1.) 8.25 2.) 16.8**	**Yes**	Installations under the CDM PDD titled "41.6 MW grid connected electricity generation project by Madras Cements Limited in Tamil Nadu." http://cdm.unfccc.int/UserManagement/FileStorage/8VW717YLM7QAINAKXV3USR446DSWZX
6	Premier Fine Yarns Pvt. Ltd.	**8**	**Yes**	The installations are under the CDM PDDs 1) "Premier Group Wind Power Project in the State of Tamil Nadu, India." http://cdmindia.nic.in/cdmindia/projects/PCN_141_06.pdf 2) "Bundled wind power project in Tamil Nadu managed by Enercon India Limited-II" http://cdmindia.nic.in/cdmindia/projects/PCN_785_07.pdf
7	Sapthagiri Distilleries	**21.000**	**Yes**	The installations are under CDM project titled "53.75 MW Bundled wind Power project in Tamil Nadu and Karnataka by KBD Group, India" http://cdm.unfccc.int/UserManagement/FileStorage/QN0BCHDRZ8PI17S2JEMLVW9TYFGO65

8	TCS Textiles Ltd.	**20.750**	**Yes**	The installations are under the PDD titled 1) "Bundled Wind power project in Tamilnadu, India co-ordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG 2) "19.80 MW bundled wind energy project in Tirunelveli and Coimbatore districts in Tamilnadu, India" http://cdm.unfccc.int/UserManagement/FileStorage/F6UP274DD1DCT3XJTKRJCJZDZNPZY7
9	Ashok Leyland Fin. Ltd	**20.025**	**Yes**	The installations are in the CDM PDD titled "56.25 MW bundled wind energy project in Tirunelveli and Coimbatore districts in Tamilnadu, India." http://cdm.unfccc.int/Projects/Validation/DB/37X42BG16GG63VK5L84D6WZ0UM8YGG/view.html
10	NEG-Micon (I) P. Ltd.	**18.550**	**Registered**	CDM reference 1019 and 1015
11	Suzlon Infrastructure Limited	**17.500**	**Yes**	The installations are under the PDDs 1) "16.25 MW grid connected electricity generation project at Coimbatore in Tamil Nadu" http://cdm.unfccc.int/UserManagement/FileStorage/FM6BIMO4FTLNNUKVLSTLYJLM14NRCM 2) "38.75 MW grid connected electricity generation project at Tirunelveli in Tamil Nadu" http://cdm.unfccc.int/UserManagement/FileStorage/Y5UO445ZIR7VMGE34PQUDGRTHCKRSB 4) "23.75MW grid connected electricity generation project at Tirunelveli in Tamil Nadu" http://www.sgsqualitynetwork.com/tradeassurance/ccp/projects/512/PDD%2023.75MW%20grid%20connected%20electricity%20generation%20project%20at%20Tirunelveli%20in%20Tamil%20Nadu..pdf
12	Rasi Seeds (P) Ltd.	**16.250**	**Yes**	The installations arel under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, co-ordinated by Tamil Nadu Spinning Mills Association (TASMA-II)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV 2) "Bundled Wind power project in Tamilnadu, India co-ordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
13	Bannari Amman Spinning Mills Ltd.	**16.200**	**Yes**	The installations are under the CDM PDDs titled 1) "STL Wind Power Project" http://www.dnv.com/focus/climate_change/upload/version%202%20-%20pdd%20%20sept%2005.pdf 2) Eco Friendly Electricity Export to Grid http://cdm.unfccc.int/UserManagement/FileStorage/5YH92G186JW12SR91FFB9RC302T651
14	Arvind A Traders	**15.600**	**Yes**	The installations are under the PDDs titled 1) "16.45 MW bundled grid connected renewable energy project in Tamil Nadu, India" http://www.tuvdotcom.com/pi/web/PinDownload.xml?strUrlId=3&strUserId=&TUVdotCOMID=9105043814&strType=UserManualDownload&strDocumentID=19694&strTypeID=8&menuOption=process&isManualNeeded=true&isPictureNeeded=false&isRatingNeeded=false&isSecureNeeded=false&isIDNeeded=false&isTypeNeeded=true&isHolderNeeded=true 2) 37.6 MW Bundled Wind Power Project in Nagercoil, Tamilnadu http://www.dnv.com/focus/climate_change/Upload/Nagercoil%20PDD.pdf
15	CLP windfarms private limited	**21.450**	**yes**	Grid Connected Wind Power Project in Tamil Nadu; http://cdm.unfccc.int/Projects/Validation/DB/QEJVYBH36RERGDA2GCQSJDVCZH1DK8/view.html
16	Chennai Petroleum Corporatio	**17.600**	**Registered**	CDM reference 3115; http://cdm.unfccc.int/Projects/DB/BVQI1257245548.54/view

	n			
17	DLF Home developers	**34.500**	**Registered**	UNFCCC ref 3642; http://cdm.unfccc.int/Projects/DB/BVQI1270985563.08/view
18	Green Infra Wind Farms Limited	**24.000**	**yes**	http://cdm.unfccc.int/Projects/Validation/DB/KZWCZQ0R5JCEXUHYOZ5SXHKRQU0I46/view.html
19	Shriram EPC	**15.000**	**Registered**	CDM reference 4990; http://cdm.unfccc.int/Projects/DB/RWTUV1310469708.36/view
20	Simran Wind Project Pvt. Ltd	**21.000**	**Registered**	CDM reference 4209; http://cdm.unfccc.int/Projects/DB/DNV-CUK1291798550.29/view
21	Supar wind project Pvt. Ltd	**33.000**	**Registered**	CDM reference 3884; http://cdm.unfccc.int/Projects/DB/DNV-CUK1280379317.22/view
22	Loyal Textile Mills Ltd	**15.350**	**Yes**	The installations are under the PDD titled "22.25 MW Captive Wind Power Project in Tamil Nadu" http://cdm.unfccc.int/UserManagement/FileStorage/TPAONMX73CHPZ69AQ5CSP9BI1UKU99
23	Jayajyoti & Co. Ltd	**15.000**	**Yes**	The installations are under the PDD titled "Bundled Wind power project in Tamilnadu, India co-ordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
24	Lakshmi Machine works	**16.550**	**Yes**	http://cdm.unfccc.int/UserManagement/FileStorage/7LXZLFECVXR5YBOJ5TH8J6XNHIPOCN
25	MRF Ltd	**14.400**	Yes	The installations are under PDD titled "MRF Wind Power Project in Tamil Nadu managed by Enercon India Limited" http://cdm.unfccc.int/Projects/Validation/DB/13DKIX7L6AMFR8O1MGVF4WNG0T52IE/view.html
26	Lakshmi Machine Works Ltd	**13.250**	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/7LXZLFECVXR5YBOJ5TH8J6XNHIPOCN
27	Premier Spg & Wvg Mills Pvt. Ltd	**11.450**	Yes	The installations are under the PDD "Grid connected renewable electricity generation project by M/s. Premier Mills Pvt Ltd in Tamilnadu, India" http://cdm.unfccc.int/Projects/Validation/DB/J0J2B6K3O92EEUAFD3OGYLE03TNZ7I/view.html 2) “Bundled wind power project in Tamil Nadu managed by Enercon India Limited-II” http://cdmindia.nic.in/cdmindia/projects/PCN_785_07.pdf
28	Tamilnadu Newsprint & Paper Ltd	**10.000**	Yes	The installations are under 2 PDDs 1) 13.75 MW Grid connected “Wind Electricity generation Project by Tamilnadu Newsprints and Papers Limited” http://cdm.unfccc.int/UserManagement/FileStorage/9FRZ3F03G7ITG8GU91EXDDDP59DZCL 2) 6.75 MW Small Scale Grid Connected “Wind Electricity Generation Project” by Tamil Nadu Newsprint and Papers Limited http://www.dnv.com/focus/climate_change/upload/websiting%20tnpl%20-%20dnv.pdf
29	Muthoot Fincorp Ltd.	**7.500**	Yes	The installations are under PDDs titled 1) "23.75MW grid connected electricity generation project at Tirunelveli in Tamil Nadu." http://cdm.unfccc.int/Projects/Validation/DB/JGFW5O1TPVDU1AANHSLX8UMW5900BF/view.htmlhttp://www.sgsqualitynetwork.com/tradeassurance/ccp/projects/512/PDD%2023.75MW%20grid%20connected%20electricity%20generation%20project%20at%20Tirunelveli%20in%20Tamil%20Nadu..pdf, 2) "Wind based bundled renewable energy project, Tamilnadu, India" http://cdm.unfccc.int/Projects/Validation/DB/9L8G2GJKZ6MONKE

				LSYYMI9L8QWNM4W/view.html http://www.dnv.com/focus/climate_change/Upload/Wind%20Based%20bundled%20renewable%20energy%20project%20Tamil%20Nadu%20India.pdf
30	Ashol Leyland Ltd	8.625	Yes	http://www.sgsqualitynetwork.com/tradeassurance/ccp/projects/525/Final_PDD_ALWIN_9.75MW_Wind%20Power_For%20Validation.pdf
31	Bannari Amman Sugars Ltd	8.75	Yes	http://cdm.unfccc.int/Projects/DB/BVQI1184188286.2/view
32	Best International	12.4	Yes	The installations are under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, coordinated by Tamil Nadu Spinning Mills Association (TASMAII)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV 2) "Bundled Wind power project in Tamilnadu, India coordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
33	Cheran Spinners ltd	9.9	Yes	The installations are under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, coordinated by Tamil Nadu Spinning Mills Association (TASMAII)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV 2) "Bundled Wind power project in Tamilnadu, India coordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
34	Chola Spinning Mills Pvt Ltd	9.5	Yes	The installations are under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, coordinated by Tamil Nadu Spinning Mills Association (TASMAII)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV 2) "Bundled Wind power project in Tamilnadu, India coordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
35	Coimbatore Polytex Pvt Ltd	7.2	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/I7G3FCWTBEPKMHY1UJRXAV8S6N294Q
36	DCW Limited	11.2	VCS	This project is under VCS. https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=281&lat=12.694358&lon=79.134806&bp=1
37	Ennore Foundries Ltd	7.425	Yes	http://cdm.unfccc.int/Projects/DB/BVQI1150715259.06/view
38	Fair Deal Supplies Pvt Ltd	9.7	Yes	http://www.dnv.com/focus/climate_change/upload/fdspl%20-wind%20power_pdd_050606.pdf
39	Fisher Spinning Mills	7.5	Yes	http://mc.markit.com/brreg/PublicReport.action?getDocumentById=true&document_id=100000000005310 http://cdm.unfccc.int/Projects/DB/SIRIM1304303877.26/view

40	Gangothri Textile Ltd	8.25	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
41	GHCL	8.4	Yes	http://cdm.unfccc.int/Projects/DB/BVQI1161856952.79/view
42	Kandagiri Spinning Mills	9.9	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
43	Kanyakumari Windfarm	7.875	Yes	http://cdm.unfccc.int/Projects/DB/BVQI1173427557.36/view
44	L.S Mills Ltd	9	Yes	http://cdm.unfccc.int/Projects/Validation/DB/NDGRFWYDV2RSMEVKHK5GX0LSAZDCRS/view.html
45	Lakshmi Ring Travellers (CBE) Ltd	7.3	VCS	This project is under VCS. http://www.rsjozone.com/our-projects/vcs/PRO73599349
46	Lanco Infratech Ltd	10	yes	http://cdm.unfccc.int/UserManagement/FileStorage/FG1L6KNUKQXT1QVJJZA75NFBR1FVGY
47	Mani Spinning Mills (P) Ltd	8.1	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
48	Nuclear Power Corpn of India Ltd	10	No	No information available publically
49	Nuziveedu Seeds Ltd	13.2	VCS	This project is under VCS. https://vcsprojectdatabase2.apx.com/myModule/interactive.asp?Tab=Projects&a=2&i=682&lat=10.613775&lon=77.15425
50	Pandian Textile Mills Pvt Ltd	7.5	yes	The installations are under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, coordinated by Tamil Nadu Spinning Mills Association (TASMAII)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV 2) "Bundled Wind power project in Tamilnadu, India coordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
51	Prabhu Spinning Mills (P) Ltd	12.3	yes	The installations are under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, coordinated by Tamil Nadu Spinning Mills Association (TASMAII)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV 2) "Bundled Wind power project in Tamilnadu, India coordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
52	Prime cotton mills Limited	8.25	yes	http://cdm.unfccc.int/UserManagement/FileStorage/QNMRKCP25EHJS67XO1BGTV49ZALF38
53	Rajapalayam Mills Ltd	13.3	VCS	This project is under VCS. https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=669&lat=10.568049&lon=77.416623&bp=1
54	Rajpalyam Mills	8.75	VCS	This project is under VCS. https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=669&lat=10.568049&lon=77.416623&bp=1

55	Raja Steels Pvt Ltd	7.5	VCS	This project is under VCS. http://www.rsjozone.com/download.php?f=uploads/project/PRO13227296/VCS%20-%20PDD.pdf
56	Ramco Industries ltd	12.4	VCS	This project is under VCS. https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=669&lat=10.568049&lon=77.416623&bp=1
57	Ran India Steels Pvt Ltd	7.5	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV
58	Revathi Equipments	8.75	Yes	http://cdm.unfccc.int/Projects/DB/DNVCUK1143050217.74/view
59	RRD Tex Pvt Ltd	8.75	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
60	Sambandam spinning mills	11.175	Yes	The installations are under the PDD titled 1) "Bundled Wind power project in Tamilnadu, India coordinated bythe TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
61	Saravana Spinning Mills ltd	9.35	Yes	http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
62	SCM Creations	12.75	Yes	1) "Bundled Wind power project in Tamilnadu, India coordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
63	Shiva Texyarm Ltd	9.85	Yes	The installations are under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, coordinated by Tamil Nadu Spinning Mills Association (TASMAII)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV
64	Shree Iswarya Textiles Pvt. Ltd	8	VCS	https://vcsprojectdatabase2.apx.com/myModule/Interactive.asp?Tab=Projects&a=2&i=663&lat=11.7805857207035&lon=76.7772177749058&bp=1
65	Shriram City Union Fin	12.8	Yes	http://www.dnv.com/focus/climate_change/upload/karnataka%20125%20mw%20wind.pdf
66	Shriram Investments Ltd	12.2	Yes	http://www.dnv.com/focus/climate_change/upload/karnataka%20125%20mw%20wind.pdf
67	Shriram Transport Finance	8.4	Yes	http://www.dnv.com/focus/climate_change/upload/karnataka%20125%20mw%20wind.pdf
68	Sree Narasimha Textiles Ltd	13.2	Yes	http://cdm.unfccc.int/Projects/Validation/DB/J0J2B6K3O92EEUAFD3OGYLE03TNZ7I/view.html http://cdm.unfccc.int/Projects/Validation/DB/SSPNJ9BYJAJEJV22N2ZX4I4URQ7SXI/view.html
69	Sri Ranganathar Industries P. Ltd	8.75	VCS	This project is under VCS. http://www.rsjozone.com/our-projects/vcs/PRO73599349
70	Sri Vasudeva Textiles	9.15	VCS	This project is under VCS. http://www.google.co.in/url?sa=t&rct=j&q=Sri+Vasudeva+textiles%2BVCSprojectdatabase2&source=web&cd=1&ved=0CCQQFjAA&url=https%3A%2F%2Fvcsprojectdatabase2.apx.com%2FmyModule%2FProjectDoc%2FProject_ViewFile.asp%3FFileID%3D2731%26IDKEY%3Dj903q4jsafkasjfu90amnmasdfkaidflnmdf9348r09dmfa

				sdf93766049&ei=SQh7T43RMc7QrQfXyrWWAg&usg=AFQjCNEv67BLKISpU0zCbpHzMhLiqdbSJg&cad=rja
71	Sudhan Spinning Mills Pvt Ltd	7.5	Yes	The installations are under the CDM PDDs titled 1) "Bundled Wind power project in Tamil Nadu, India, coordinated by Tamil Nadu Spinning Mills Association (TASMAII)" http://cdm.unfccc.int/UserManagement/FileStorage/6QDL0CJW95NYIX8U14H3STGKAF2BEV 2) "Bundled Wind power project in Tamilnadu, India coordinated by the TamilNadu Spinning Mills Association (TASMA)" http://cdm.unfccc.int/UserManagement/FileStorage/AE2042RXII12SBXNF29XDKVT2BCEWG
72	Suzlon Towers & Structures Ltd	8.75	Yes	http://cdm.unfccc.int/filestorage/M/1/G/M1GZYPHTVCD5F9OUXS8WQ4AR0I36LN/Response_Final.pdf?t=eEh8bWF3bjYxfDB9asmOQFZYy3RXPkpk8L54 Suzlon Towers & Structures Ltd is a windmill manufacturing company. This WEC manufacturing company install wind farms with the motive of selling to individual customers at a later date and CDM development may be undertaken under the name of the individual customers. Hence, the above project is excluded from this analysis
73	Thiagarajar Mills Ltd	8.35	yes	http://cdm.unfccc.int/Projects/DB/BVQI1175192736.49/view
74	Tirupur Textiles Pvt Ltd	12.5	yes	http://cdm.unfccc.int/Projects/Validation/DB/X1W2URT6QDN2GVGATM1WN7EXSFH89N/view.html
75	UTI Ltd	10.125	No	No information available publically
76	Velatal Spinning Mills Ltd	9.44	Yes	http://cdm.unfccc.int/Projects/Validation/DB/ZLWGKDKS3Z7HW16Y9CKTBYVC3ZY1EQ/view.html
77	Walden Properties Pvt Ltd	7.75	Yes	http://www.dnv.com/focus/climate_change/upload/bundle%20-%20cdm%20-%20pdd.pdf

There are total 77 project owners and 81 individual wind power projects with capacity in range of 7.2 MW to 21.6 MW in Tamil Nadu.
There are a total of 81 wind power projects with capacity in range of 7.2 MW to 21.6 MW. Out of these 81 projects listed above, 79 projects are either registered with UNFCCC or under validation for registration with UNFCCC or under earning carbon credit under VCS. Thus, there are total of 2 projects which are similar to the proposed CDM project activity.

The data/ information regarding 2 projects could not be accessed from any public available domain data base.

The project activity is a 14.4 MW wind power project set up by Vish Wind Infrastructure LLP in the state of Tamil Nadu and during post registration phase, ownership has been changed to Vaayu Renewable Energy (Tapti) Pvt. Ltd. The project activity supplies electricity to the State utility/ third party through Tamil Nadu state grid. The project is a large scale CDM activity. The applicable tariff for the project prior to the ownership change was determined by the Tamil Nadu Electricity Regulatory Commission. Post ownership change, the project activity supplies electricity to the third party at a fixed price of INR 5.10/unit.

PP has conducted the common practice analysis as per the “Guidelines on common practice”, EB 63, Annex 12. The applicable geographical area as per latest guidance on common practice can be taken as host country. The guideline provides four step approaches for common practice.

Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.

The proposed project activity is 14.4 MW wind power project in the state of Tamil Nadu. Therefore the applicable output range will be from 7.2 MW to 21.6 MW.

Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities and project activities undergoing validation shall not be included in this step.

The range that has been chosen under step 1 includes large scale as well as small scale projects which are in the range of 7.2 MW to 21.6 MW. The CDM registered project activities and project activities undergoing validation does not form the part of the group (N_{all}) in any of the equations that is notified below:

$N_{all} = \{N_S , N_H , N_B , N_W , N_{G/T} , N_T, N_N\}$

Where,

N_{all} : Number of Large scale projects & small scale projects in the range of 7.2 MW to 21.6 MW (other than CDM registered and undergoing validation)

N_S : Number of projects –Solar (other than CDM registered and undergoing validation)

N_H : Number of projects –Hydro (other than CDM registered and undergoing validation)

N_B : Number of projects –Biomass (other than CDM registered and undergoing validation)

N_W : Number of projects –Wind (other than CDM registered and undergoing validation)

$N_{G/T}$: Number of projects–Geo/Tidal based (other than CDM registered and undergoing validation)

N_T : Number of projects –Thermal (other than CDM registered and undergoing validation)

N_N :Number of projects–Nuclear(other than CDM registered and undergoing validation)

Registered CDM project activities and project activities undergoing validation shall not be included in this step.

The Host country, i.e., India has been considered as the applicable geographical area for this project as per the default option as mentioned in the Tool "Demonstration and assessment of additionality", Version 6.0.0. For the analysis all the power plants in the host country India have been considered for the common practice analysis. All the available projects are filtered based on the same applicable output range of 7.2 MW to 21.6 MW calculated in Step 1, based on which, thermal, hydro, solar, biomass, geothermal/tidal, nuclear & wind projects and others have been considered for the analysis.

In this step all plants (N_{all}) that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project have been identified and listed below:-

Technology Area	Projects excluding CDM projects in applicable cap range (7.2 MW to 21.6 MW), (N_{all})*
Thermal	38
Hydro	240
Nuclear	0
Solar	22

Biomass	156
Geothermal/tidal	0
Wind	10
Total	**466**

** Registered CDM project activities and project activities undergoing validation are not included*

It can be seen that , N_{all} = *Thermal projects*[16] *+ Hydro Projects*[17] *+Solar Projects*[18]*+ Biomass Projects* [19]*+ Geothermal/tidal Projects* [20]*+ Nuclear Projects*[21]*+ Wind Projects*[22]

= *38+240+0+22+156+0+10*

= *466*

Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.

The technologies that are different than the technology applied in the proposed project activity can be distinguished based on the following:

Energy Source: The proposed project activity is wind power project and there the technologies that are based on other energy sources such as solar, hydro, biomass, coal, gas, and diesel and nuclear can be termed as different technology.

Therefore,

$N_{diff,ES} = \{N_S , N_H , N_B , N_{G/T} , N_T, N_N \}$

Thus the total no of project under different technology are;

Technology Area	**Projects excluding CDM projects in applicable cap range (7.2 MW to 21.6 MW), (N_{all})***	$N_{diff,ES}$
Thermal	38	38
Hydro	240	240
Nuclear	0	0
Solar	22	22
Biomass	156	156
Geothermal/tidal	0	0
Total	**456**	**456**

Where,

$N_{diff,ES}$: Number of projects of different technology which are different based on energy source (other than CDM registered and undergoing validation)

[16] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm (This is in line with the additionality tool. The data has been taken till the date of project start date.

[17] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm (This is inline with the additionality tool. The data has been taken till the date of project start date.

[18] http://mnre.gov.in/file-manager/annual-report/2011-2012/EN/Chapter%206/chapter_6.htm

[19] http://mnre.gov.in/file-manager/annual-report/2011-2012/EN/Chapter%205/chapter_5.htm,

Annual report-2011-12 of Ministry of New and Renewable energy, Government of India

[20] http://www.eai.in/ref/ae/oce/oce.html & http://www.eai.in/ref/ae/geo/geo.html

[21] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm (This is in line with the additionality tool. The data has been taken till the date of project start date.

[22] Source, Wind Power Directory, dated July, 2011

Investment Climate: One of the parameters based on which the project can be distinguished under investment climate is legal regulations. The regulations in India for renewable energy projects (including wind hydro, biomass and solar) are handled by the respective regulatory commissions that have the responsibility to determine the tariff for the projects that supply electricity to the grid by means of long term PPA executed between the distribution licensee and the project owner. Therefore each state will have the different regulation with respect to procurement and supply of power from renewable energy sources.

The renewable energy technologies other than wind have already been terms as different technology. Furthermore, the wind power projects that are executed in the different regulatory regime[23, 24,25,26, 27,28,29] can be termed as different technology. Therefore wind power projects that are in the state other than Tamil Nadu can be excluded and termed as different technology.

$N_{W,TN}$ represents the wind power projects (other than CDM registered and undergoing validation) in the state of Tamil Nadu.

$N_{W,TN} = 2$

$N_{diff,IC,,W,other}$ represents the wind power projects (other than CDM registered and undergoing validation) in the state other than Tamil Nadu.

$N_{diff,IC,,W,other} =$ 8 projects

Now, we will integrate the number of projects under different technologies:

$N_{diff} = \{N_{diff,ES}, N_{diff,IC,W,other}\}$

$N_{diff} = 456+8 = 464$

N_{diff} is summation of $N_{diff,ES}$, $N_{diff,IC,,W,other}$

Step 4: Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.

$F=1-N_{diff}/N_{all}$

$F= (N_{all} -N_{diff})/N_{all}$

$N_{all} -N_{diff} = N_{W,TN} = 2$

Hence,

$F= (466-464)/466 = 2/466$

$=0.0042$

From the above analysis it is clear $N_{all} -N_{diff} < 3$ & $F < 0.2$, hence the project activity is not a common practice within a sector in the applicable geographical area.

[23] http://www.cercind.gov.in/

[24] http://tnerc.gov.in/

[25] http://www.mercindia.org.in/

[26] http://www.gercin.org/

[27] http://www.rerc.rajasthan.gov.in/

[28] http://www.kerc.org/

[29] http://www.aperc.gov.in/

Sub-step 4b Discuss any similar options that are occurring:

The above additionality discussions show that project activity t is not a common practice and also the project activity is not financially attractive; hence it is additional.
Hence, Sub-steps 4a and 4b are satisfied and it can be concluded that the project activity is additional and investing in wind projects is not a common practice in Tamil Nadu.

B.6. Emission reductions

B.6.1. Explanation of methodological choices

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According to the approved methodology ACM0002 (Version 13.0.0) Emission Reductions are calculated as:-
$ER_y = BE_y – PE_y - LE_y$

Where:

ER_y	Emission Reduction in year *y* (t CO_2e)
BE_y	Baseline Emissions in year *y* (t CO_2e)
PE_y	Project Emissions in year *y* (t CO_2e)
LE_y	Project leakage in year y (t CO_2e)

Estimation of Baseline Emissions:

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that in the absence of the project activity, equivalent amount of electricity 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:

$BE_{y} = EG_{PJ, y} * EF_{grid, CM, y}$

Where:
BE_y = Baseline emissions in year *y* (tCO_2)

$EG_{PJ,y}$ = 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)

$EF_{grid,CM,y}$ = Combined margin CO_2 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” (tCO_2/MWh)

Since the project activity is the installation of a new grid connected renewable power plant the $EG_{PJ,y}$ is calculated as :
$EG_{PJ,y} = EG_{facility,y}$

Where:
$EG_{PJ,y}$ = 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)

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh)

The proposed project activity is in the state of Tamil Nadu which falls under Southern grid which is not part of Annex –I. Therefore as per the applied methodology baseline emission factor is calculated as combined margin, consisting of a combination of operating margin and build margin factors according to the procedures prescribed in the latest tool “Tool to calculate the emission factor for an electricity system – Version 02.2.1 (EB-63, Annex19)”for calculating the emission factor for an electricity system. The steps of calculation are as follows:

STEP 1: Identifying the relevant electricity systems:

The Indian electricity system is divided into two regional grids, viz. (1) Northern, Eastern, Western, North-Eastern and (2) Southern grid. Each grid covers several states. As the regional grids are interconnected, there is inter-state and inter-regional exchange. A small power exchange also takes place with neighboring countries like Bhutan and Nepal.

According to "Tool to calculate the emission factor for an electricity system" version 02.2.1, If a connected electricity system is located partially or totally in Annex-I countries, then the emission factor of that connected electricity system should be considered zero.

The above applicability criteria is not applicable for the project activity since the project activity will supply the electricity to the Southern grid of host country India, which is a not a part of Annex- I country hence the "Tool to calculate the emission factor for an electricity system" is applicable for the project activity. Power generation and supply within the regional grid is managed by Regional Load Dispatch Centre (RLDC). The Regional Power Committees (RPCs) provide a common platform for discussion and solution to the regional problems relating to the grid. Each state in a regional grid meets its demand with its own generation facilities and also with allocation from power plants owned by the Central Sector such as NTPC and NHPC etc. Specific quotas are allocated to each state from the Central Sector power plants. Depending on the demand and generation, there are electricity exports and imports between states in the regional grid. The regional grid thus represents the largest electricity grid where power can be dispatched without significant constraints and thus, represents the "project electricity system" for the project activity. As the project activity is connected to the Southern regional electricity grid, the Southern grid is the "project electricity system".

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

As per the "Tool to calculate the emission factor emission factor for an electricity system" (Version 2.2.1), project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option 1: Only grid power plants are included in the calculation
Option 2: Both grid power plants and off-grid power plants are included in the calculation

Option 1 has been followed for the project activity, i.e. only grid power plants are included in the calculation.

STEP 3: Select a method to determine the operating margin (OM):

According to the tool, the calculation of the operating margin emission factor is based on one of the following methods:

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

Any of the four methods can be used for calculating OM, The simple adjusted OM and dispatch data analysis OM cannot be currently applied in India due to lack of necessary data however, the simple OM method (option a) can only be used if low cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

The Share of Low Cost / Must-Run (% of Net Generation) in the generation profile of the different grids in India in the last five years is as follows:

	2005-06	2006-07	2007-08	2008-09	2009-10
NEWNE	18.0%	18.5%	19.0%	17.4%	15.9%
Southern	27.0%	28.3%	27.1%	22.8%	20.6%
India	20.1%	20.9%	21.0%	18.7%	17.1%

Source: CO2 Baseline Database for the Indian Power Sector – Central Electricity Authority

The above data clearly shows that the percentage of total grid generation by low cost/must run plants (on the basis of average of five most recent years) for the Southern regional grid is less than 50 % of the total generation. Hence the Simple OM method can be used to calculate the Operating Margin Emission factor.

The average operating margin method cannot be applied, as low cost/ must run resources in Southern grid constitute less than 50% of total grid generation.

The project proponents choose an ex ante option for calculation of the OM with a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period.

STEP 4: Calculate the operating margin emission factor according to the selected method:

The simple OM emission factor is calculated as the generation-weighted average CO_2 emissions per unit net electricity generation (tCO_2/MWh) of all generating power plants serving the system, not including low-cost / must-run power plants / units. It may be calculated:

- Based on the net electricity generation, and a CO_2 emission factor of each power unit. (Option A), or
- Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system (option B)

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO_2 Baseline Database provides information about the Combined Margin Emission Factors of all the regional electricity grids in India. The Combined Margin in the CEA database is calculated ex ante using the guidelines provided by the UNFCCC in the "Tool to calculate the emission factor for an electricity system". We have, therefore, used the Combined Margin data published in the CEA database, for calculating the Baseline Emission Factor.

The CEA database uses the option A i.e. data on net electricity generation and CO_2 emission factor for each power unit, the average efficiency of each power unit and the fuel type(s) used in each power unit, to calculate the OM of the different regional grids.
The simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \Sigma (EG_{m,y} \times EF_{EL,m,y}) / \Sigma EG_{m,y}$$

Where:

$EF_{grid,OMsimple,y}$	Simple operating margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m	All power units serving the grid in year y except low-cost / must-run power units
y	The relevant year as per the data vintage chosen in step 3

The emission factor of each power unit m has been determined as follows:

$$EF_{EL,m,y} = (\Sigma FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,I,y}) / EG_{m,y}$$

Where:

$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
$FC_{i,m,y}$	Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO2,I,y}$	CO_2 emission factor of fossil fuel type i in year y (tCO_2/GJ)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
m	All power units serving the grid in year y except low-cost / must-run power units
i	All fossil fuel types combusted in power unit m in year y
y	The relevant year as per the data vintage chosen in step 3

Therefore, in line with this, the simple OM emission factor values have been directly sourced from "CO_2 Baseline Database for the Indian Power Sector", Version 7.0, 1st Jan, 2012 published by Central Electricity Authority (CEA) of India. As per the "Tool to calculate the emission factor for an electricity system" (Version 2.2), the calculation of Operating Margin (OM) has been done following ex – ante approach based on the average of the most recent 3 years' (2008-09; 2009-10; 2010-11) Operating Margin (OM) emission factor

values, which is available at the time of PDD submission for validation. Therefore, there is no requirement to monitor and recalculate this emission factor during the crediting period.

As per the version 7.0 [30]of CEA data base the Simple Operating Margin (tCO2/MWh) for Southern grid is as follows:-

Year	2008-09	2009-10	2010-11
Simple OM (including imports) (tCO_2 / MWh)	0.97292	0.94150	0.94188
Average Operating Margin Emission factor for the last three years	0.95210		

STEP 5. Calculate the build margin (BM) emission factor:

The build margin emission factor has been calculated 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. This option does not require monitoring the emission factor during the crediting period.

The build margin emissions factor is the generation-weighted average emission factor of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = (\Sigma EG_{m,y} \times EF_{EL,m,}) / \Sigma EG_{m,y}$$

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m	Power units included in the build margin
y	Most recent historical year for which power generation data is available

The CO_2 emission factor of each power unit m ($EF_{EL,m,y}$) is determined as per the procedures given in step 4 (a) for the simple OM, using option A1 for *y* most recent historical year for which power generation data is available, and using for *m* the power units included in the build margin.

The value of BM (has been taken from "CO_2 Baseline Database for the Indian Power Sector", Version 7.0, 1st Jan, 2012 published by Central Electricity Authority (CEA), Government of India.

Year	2010-11
Build Margin CO_2Emission Factor (tCO_2e / MWh)	0.73389

STEP 6. Calculate the combined margin emissions factor:

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

(a) Weighted average CM; or
(b) Simplified CM.

Since project activity is located in the state of Tamil Nadu state of India, which is not a Least Developed Country (LDC) or in a country with less than 10 registered projects at the starting date of validation; that's why the weighted average CM method (option A) is preferred option.

The combined margin emissions factor is calculated as follows:

[30] Central Electricity Authority: CO_2 Baseline Database, Version 7.0,1st Jan, 2012;

http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

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

Where:

$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y (tCO_2/MWh)
$EF_{grid,OM,y}$	Operating margin CO_2 emission factor in year y (tCO_2/MWh)
w_{OM}	Weighting of operating margin emissions factor (%)
w_{BM}	Weighting of build margin emissions factor (%)

(where $w_{OM} + w_{BM} = 1$).

According to ACM0002, Version 13.0.0, the weights for OM and BM are 0.75 and 0.25 respectively.

Using the values for operating and build margin emission factor provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 0.89755 tCO_2e/MWh.

Combined MarginCO_2Emission Factor(tCO_2 / MWh)	0.89755

Details of Baseline data:
Data of operating for the three financial years from 2008-09, 2009-10 and 2010-11 and Build Margin for 2010-11 has been obtained from:-

The CO_2 Baseline Database for the Indian Power Sector
Ministry of Power: Central Electricity Authority (CEA)
Version 7
Key baseline information is reproduced in Appendix 3.The detailed excel sheet is available at:
http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Estimation of Project Emissions
The project activity involves harnessing of wind energy and its conversion to electricity. Hence according to ACM0002 Version 13.0.0, there will be no project emissions in the project activity ($PE_y = 0$).

Estimation of Leakage Emissions

As per ACM0002 Version 13.0.0, no leakage has been considered for the calculation of emission reduction ($LE_y = 0$).

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, and transport). Since the project is wind power project, these emissions sources are neglected.

The details on OM, BM and CM estimates as provided by the CEA are shown in Appendix-3.

B.6.2. Data and parameters fixed ex ante

Data / Parameter	$EF_{OM,y}$
Unit	tCO_2e/MWh
Description	Operating Margin Emission Factor of Southern Regional Electricity Grid
Source of data	"CO_2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO_2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) applied	0.95210

Choice of data or Measurement methods and procedures	Calculated by using 3 years vintage (2008-2009, 2009-10& 2010-2011) data obtained from "CO_2 Baseline Database for Indian Power Sector" version 7.0, published by the Central Electricity Authority, Ministry of Power, Government of India, which is based on the tool "Tool to calculate the emission factors for an electricity system"..
Purpose of data	Baseline emission calculation
Additional comment	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data / Parameter	$EF_{BM,y}$
Unit	tCO_2e/MWh
Description	Build Margin Emission Factor of Southern Regional Electricity Grid
Source of data	"CO_2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO_2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) applied	0.73389
Choice of data or Measurement methods and procedures	2010-11 data obtained from "CO_2 Baseline Database for Indian Power Sector" version 7.0, published by the Central Electricity Authority, Ministry of Power, Government of India, which is based on the tool "Tool to calculate the emission factors for an electricity system".
Purpose of data	Baseline emission calculation
Additional comment	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data / Parameter	$EF_{CO2, grid,y}$
Unit	tCO_2e/MWh
Description	Combined Margin Emission Factor of Southern Regional Electricity Grid
Source of data	Combined Margin Emission Factor ($EF_{CM,y}$) is calculated as the weighted average of Operating Margin Emission Factor ($EF_{OM,y}$) and Build Margin Emission Factor ($EF_{BM,y}$). The "CO_2 Baseline Database for Indian Power Sector" published by the Central Electricity Authority, Ministry of Power, Government of India. The "CO_2 Baseline Database for Indian Power Sector" is available at www.cea.nic.in
Value(s) applied	In case of wind power projects default weights of 0.75 for EF_{OM} and 0.25 for EF_{BM} are applicable as per ACM0002, Version 13.0.0. Combined Margin Emission Factor (EFy or $EF_{CM,y}$) : 0.89755 Refer Appendix – 3 for comprehensive calculation of Combined Margin Emission Factor.
Choice of data or Measurement methods and procedures	Combined Margin Emission Factor has been calculated by the Central Electricity Authority in accordance with CDM methodologies: ACM0002, Version 13.0.0 and Tool to Calculate the emission Factor for an Electricity System.
Purpose of data	Baseline emission calculation

Additional comment	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

B.6.3. Ex ante calculation of emission reductions

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Ex-ante calculation of emission reductions is equal to ex-ante calculation of baseline emissions as project emissions and leakage are nil.

The Baseline emission for the project activity has been calculated as below:

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

Where:

BE_y = Baseline emissions in year *y* (tCO_2/yr)
$EG_{PJ,y}$ = 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/yr)
$EF_{grid,CM,y}$= Combined margin CO_2 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" (tCO_2/MWh)

Baseline emission factor (Combined Margin) ($EF_{grid, CM, y}$) = 0.89755tCO_2e/MWh

Since, the project activity is the installation of a new grid - connected renewable power plant,

$EG_{PJ,y} = EG_{facility,y}$

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

Therefore, annual electricity supplied to the grid/ third party by the project ($EG_{facility,y}$) has been calculated as:

$EG_{facility,y}$ = 14.4 * 8,760 * 24.33%
= 30,690.83 MWh/yr

As,
$EG_{PJ,y}$ = $EG_{facility,y}$,
$EG_{PJ,y}$ = 30,690.83 MWh/yr

Therefore, annual Baseline Emissions (BE_y) = $EG_{PJ, y} * EF_{grid, CM, y}$
= $EG_{facility,y} * EF_{grid, CM, y}$
= 30,690.83 MWh x 0.89755 tCO_2e/MWh
= 27,546tCO_2e/yr

Therefore, the Emission Reductions (ERy) for project activity have been calculated as:

$ER_y = BE_y – PE_y - LE_y$

Where,
ER_y = Emission reductions in year, y (tCO2e/y)
BE_y= Baseline Emissions in year, y (tCO2e/y)
PE_y = Project Emissions in year, y (tCO2e/y)
LE_y = Project Leakage in year, y (tCO2e/y)
Since, Project emissions PE_y = 0, LE_y = 0

Hence $ER_y = BE_y$

Hence emission reduction (ER_y) = BE_y
= 27,546tCO_2e/yr

Emission Reductions (ER_y) = BE_y= 27,546 tCO_2e/yr.

The emission reductions per year are estimated to be 27,546 tCO_2e/yr.

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

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
Year 1*	27,546	0	0	27,546
Year 2	27,546	0	0	27,546
Year 3	27,546	0	0	27,546
Year 4	27,546	0	0	27,546
Year 5	27,546	0	0	27,546
Year 6	27,546	0	0	27,546
Year 7	27,546	0	0	27,546
Year 8	27,546	0	0	27,546
Year 9	27,546	0	0	27,546
Year 10	27,546	0	0	27,546
Total	275,460	0	0	275,460
Total number of crediting years	10 years			
Annual average over the crediting period	27,546	0	0	27,546

* Year 1 begins from the date of registration and each year extends for 12 months.

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data / Parameter	$EG_{BL, y}$
Unit	MWh (Mega-watt hour)
Description	Net Electricity Exported to the grid/ third party[31] by the project activity.
Source of data	Monthly statement showing the electricity generated through wind turbines issued by Tamil Nadu Electricity Board (TNEB)/ Tirunelveli Electricity Distribution Circle, Tirunelveli (or TANGEDCO).
Value(s) applied	Annual net electricity exported to the grid/ third party by the Project Activity = 14.4MW (Capacity) x 24.33% (PLF) x 8,760 (hours) MWh = 30,690.83 MWh/yr
Measurement methods and procedures	Net electricity exported by the wind turbines will be calculated by the TNEB and neither the Project Participant nor the Project Participant representatives have any role in the same. Value of $EG_{BL,y}$ is shown in monthly statement provided by TNEB. Net electricity exported ($EG_{BL, y}$) to the grid/ third party value is used in calculation of emission reduction of the project activity.

[31] Prior to 15/06/2013, the amount of electricity was supplied to the state grid. Then, from 15/06/2013, electricity is being supplied to third party (SRF Limited) as per the third party supply agreement.

Monitoring frequency	Monthly basis
QA/QC procedures	The recording frequency will be on monthly basis. The monitoring of the data parameters will be on continuous basis. Cross checking of net electricity export prior to 15/06/2013): Value of EGBL,y as indicated in monthly statement provided by TNEB/TANGEDCO can be crosschecked with the invoices raised by PP to TNEB/TANGEDCO and/or sales receipts either in the form of cheque or the bank statement indicating the payment made by the TNEB. Cross checking of net electricity export post 15/06/2013): The electricity generated by the project activity is supplied to the industrial unit of the third party (SRF Limited), where electricity from other sources is also consumed. Hence, the electricity bill raised by state utility to the third party does not have the figure of net electricity export specifically for the project activity. Bill reflects the cumulative consumption figure by the industrial unit (including the value of the project activity along with other sources of electricity), based on which the invoice is raised (which also shows a cumulative figure). Hence, cross-checking of net electricity export specifically for the project activity through the invoice is not feasible. Further, net electricity export can only be compared with the readings of LCS meters, which are fitted at the controller panel of each WEC and measure the electricity generation of each WEC. However, the aggregate of electricity recorded at LCS meters is always higher than the net electricity export recorded at HTSC meters owing to transmission and transformation loss. Hence, in order to ensure conservativeness, the net export value as mentioned in the monthly statement provided by electricity board (document issued/validated by State Government Authority) would be used for emission reduction calculation.
Purpose of data	Baseline emission calculation
Additional comment	The data will be archived both in electronic and hard paper format for crediting period + 2 years.

Data / Parameter	$EG_{Export,y}$
Unit	MWh (Mega-Watt hour)
Description	Electricity exported by project activity to grid/ third party recorded at 33kV metering point (TNEB meter)
Source of data	Monthly statement showing the electricity generated through wind turbines given by Tamil Nadu Electricity Board (TNEB)/ Tirunelveli Electricity Distribution Circle, Tirunelveli (or TANGEDCO).
Value(s) applied	Annual electricity export to the grid/ third party by the Project Activity

Measurement methods and procedures	• There is a bi-directional tri-vector energy meter (also called as TNEB Meter) of accuracy class 0.2s adjacent to the individual wind turbine. • Apart from the individual TNEB meter, there is a main and check meter of accuracy class 0.2s located at the WWIL pooling station. The main and check meter connected at this pooling station has both, the project activity as well as the non-project activity wind turbines connected to it. • The electricity export as well as the electricity imported by the project activity wind mills are recorded at the TNEB meter as well as at the main and check meter of the WWIL pooling station on a monthly basis, in the presence of representatives of TNEB and the Project Participant. Based on this monthly recording, the TNEB representatives apportion the transmission line losses amongst the various wind turbines (project activity as well as non-project activity) to deduce the net electricity supplied by the individual wind turbines to the grid. The net electricity supplied to the grid/ third party, so deduced, is indicated in the 'Monthly Statement of Energy' issued by TNEB. The procedure for such apportioning is conducted and controlled by the TNEB and neither the Project Participant nor the Project Participant representatives have any role to play in the same. • The metering equipment is duly approved, calibrated and sealed by TNEB and is in complete control of TNEB only. • Based on the 'Monthly Statement of Energy' issued by state utility/ third party, the Project Participant prepares the invoice and submits it to the TNEB for payment. • The payment is made by the state utility/ third party to the Project Participant either in the form of a cheque or online transfer (RTGS transfer). Refer section B.7.3 for an illustration of the provisions for measurement methods.
Monitoring frequency	Monthly basis
QA/QC procedures	All the meters (project activity TNEB meters as well as main & check meter at WWIL pooling sub-station) are calibrated by state utility once in 5 years[32] as per the Power Purchase Agreement & CEA metering code and records are available with PP. The recording frequency will be on monthly basis. The monitoring of the data parameters will be on continuous basis.
Purpose of data	Baseline emission calculation
Additional comment	The data will be archived both in electronic and hard paper format for crediting period + 2 years.

Data / Parameter	$EG_{Import,y}$
Unit	MWh (Mega-Watt hour)
Description	Electricity imported by project activity from the grid recorded at 33kV metering point (TNEB meter)
Source of data	Monthly statement showing the electricity generated imported by the wind turbines as given by Tamilnadu Electricity Board (TNEB)/ Tirunelveli Electricity Distribution Circle, Tirunelveli (or TANGEDCO).
Value(s) applied	Annual electricity import from the grid by the Project Activity

[32] http://www.cea.nic.in/reports/regulation/meter_reg.pdf

Measurement methods and procedures	• There is a bi-directional tri-vector energy meter (also called as TNEB Meter) of accuracy class 0.2s adjacent to the individual wind turbine. • Apart from the individual meter, there is a main and check meter of accuracy class 0.2s located at the WWIL pooling station. The main and check meter connected at this pooling station has both, the project activity as well as the non-project activity wind turbines connected to it. • The electricity export as well as the electricity imported by the project activity wind mills are recorded at the TNEB meter as well as at the main and check meter of the WWIL pooling station on a monthly basis, in the presence of representatives of TNEB and the Project Participant. Based on this monthly recording, the TNEB representatives apportion the transmission line losses amongst the various wind turbines (project activity as well as non-project activity) to deduce the net electricity supplied by the individual wind turbines to the grid. The net electricity supplied to the grid/ third party, so deduced, is indicated in the 'Monthly Statement of Energy' issued by TNEB. The procedure for such apportioning is conducted and controlled by the TNEB and neither the Project Participant nor the Project Participant representatives have any role to play in the same. • The metering equipment is duly approved, calibrated and sealed by TNEB and is in complete control of TNEB only. • Based on the 'Monthly Statement of Energy' issued by state utility/ third party, the Project Participant prepares the invoice and submits it to the TNEB for payment. • The payment is made by the state utility/ third party to the Project Participant either in the form of a cheque or online transfer (RTGS transfer). Refer section B.7.3 for an illustration of the provisions for measurement methods.
Monitoring frequency	Monthly basis
QA/QC procedures	All the meters (project activity TNEB meters as well as main & check meter at WWIL pooling sub-station) are calibrated by state utility once in 5 years[33] as per the Power Purchase Agreement & CEA metering code and records are available with PP. The recording frequency is on monthly basis. The monitoring of the data parameters will be on continuous basis.
Purpose of data	Baseline emission calculation
Additional comment	The data will be archived both in electronic and hard paper format for crediting period + 2 years.

Data / Parameter	T_E
Unit	MWh (Mega-watt hour)
Description	Line loss between the metering point at 33 kV metering points of project activity and the metering point at 110 kV at the WWIL pooling substation.
Source of data	Monthly billing records which is given by Tamilnadu Electricity Board (TNEB)/ Tirnunelveli Electricity Distribution Circle, Tirunelveli (or TANGEDCO).
Value(s) applied	This value will be directly applied.

[33] http://www.cea.nic.in/reports/regulation/meter_reg.pdf

Measurement methods and procedures	Line loss between metering point at 33kV and the metering point at 110kV at WWIL substation is applied to the meter reading taken at meters connected at 33 KV for the project activity. WWIL pooling Substation is connected to the machines of the project activity and the machines commissioned by the other project owners. Therefore Line loss is applied to the project activity by the state utility as reflected in the Monthly billing records taken at 33kV level. Refer Appendix – 4 and Section B.7.3 for an illustration of the provisions for measurement methods.
Monitoring frequency	Monthly basis
QA/QC procedures	In case of electricity supply to the state utility i.e. prior to third party sale, value of TE can be crosschecked from invoice raised on TNEB or state electricity board. While in case of electricity supply to the third party (effective from 15 June 2013) only the value of net electricity export will be compared with LCS data as explained above. QA/QC procedures will be as implemented by Discom/State utility (TNEB) pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD. Refer Appendix – 4 for an illustration of the provisions for QA/QC procedures.
Purpose of data	Baseline emission calculation
Additional comment	The data will be archived both in electronic and hard paper format for crediting period + 2 years.

B.7.2. Sampling plan

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Not applicable

B.7.3. Other elements of monitoring plan

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The Project is operated and managed by WWIL. They follow the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid

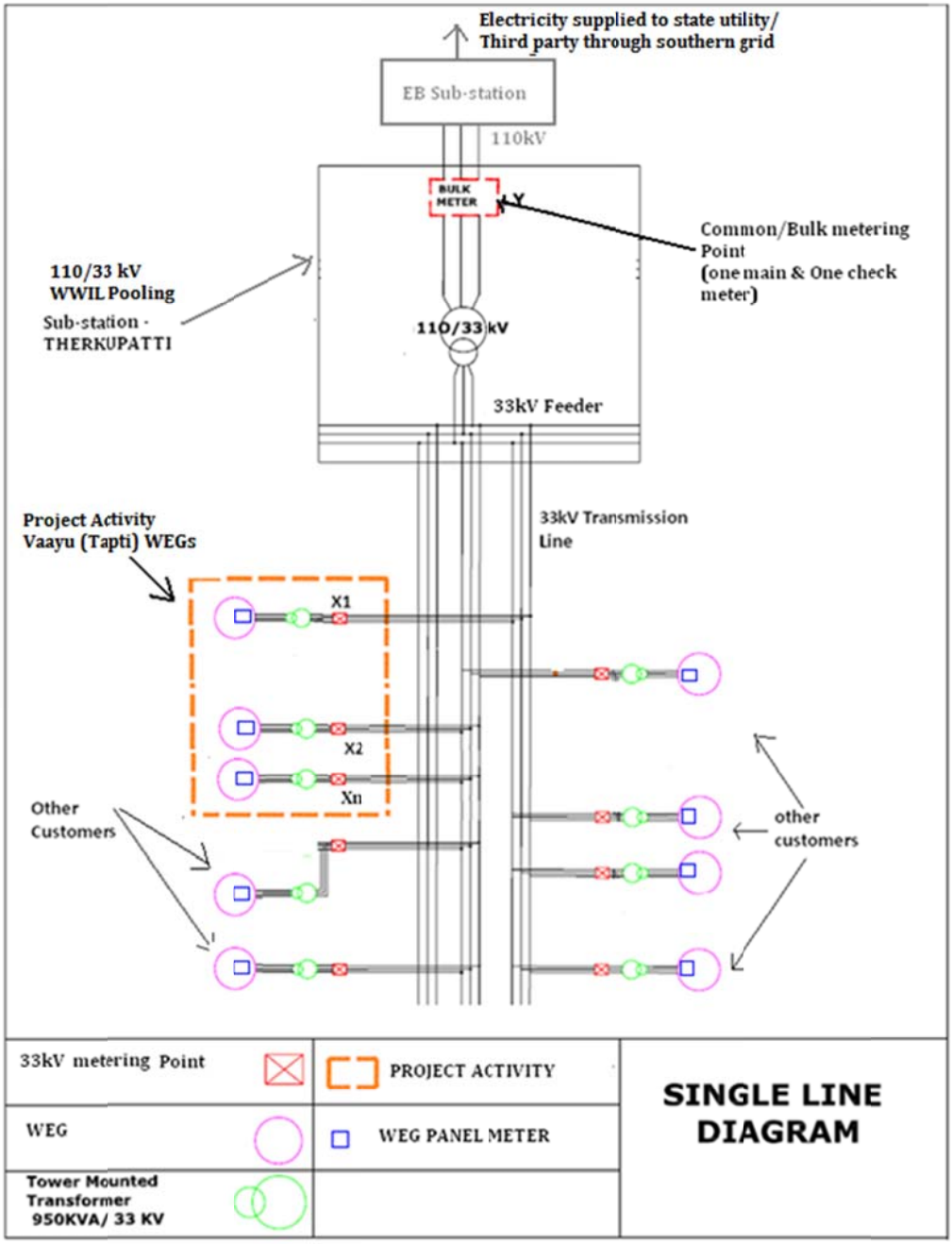
Since, the ex-ante approach has been followed for the project activity, monitoring of the emission factor value is not required. Value of operating margin, build margin & combine margin has been fixed throughout the crediting period.

Further, wind based electricity generation is not associated with any kind of leakages. Hence, the sole parameter for monitoring is the electricity generated by the project and supplied to the grid/ third party.

The Project is operated by WWIL and managed by the PP. The operational and maintenance contract for the project is with WWIL. WWIL is an ISO 9001:2008certified Quality Management system from Germanischer Lloyd. WWIL follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

Description of metering arrangement for project activity:-

Single Line diagram of Metering arrangement for project activity is shown in below picture:-


Electricity supplied to state utility/
Third party through southern grid
EB Sub-station
110kV
BULK METER
Common/Bulk metering Point
(one main & One check meter)
110/33 kV
WWIL Pooling
Sub-station -
THERKUPATTI
110/33 kV
33kV Feeder
Project Activity
Vaayu (Tapti) WEGs
33kV Transmission Line
X1
X2
Xn
Other Customers
other customers
33kV metering Point
PROJECT ACTIVITY
WEG
WEG PANEL METER
Tower Mounted Transformer
950KVA/ 33 KV
SINGLE LINE DIAGRAM

From the above line diagram it is clear metering system for the project activity consists of individual metering points at 33kV at project site. Each 33kV metering points will have one main meter of 0.2s of accuracy class which is exclusively be connected to WECs of the project activity i.e. there will be no WECs of other project owners that are connected to these metering point. There are total 18 individual metering points at 33kV for project activity.

In addition the 33kV metering points there is one set of main & check meter of 0.2s accuracy class at 110kV WWIL Pooling sub-station (common/Bulk metering point) where all the WECs of project activity and non-project activity are connected.

Monitoring information

Monthly statement showing the electricity generated through windmills given by Tamilnadu Electricity Board (TNEB)/ Tirunelveli Electricity Distribution Circle, Tirunelveli) contains the following data:-

1. Electricity Export (EGexport)
2. Electricity Import (EGimport)
3. Line Loss between 33 kV and 110 kV metering points
4. Net Export /Generation to the Grid/ third party by the project WECs

There is a bi-directional tri-vector energy meter (also called as TNEB Meter) of accuracy class 0.2s adjacent to the individual wind turbine. Apart from the individual TNEB meter, there is a main and check meter of accuracy class 0.2s located at the WWIL pooling station. The main and check meter connected at this pooling station has both, the project activity as well as the non-project activity wind turbines connected to it. The electricity export as well as the electricity imported by the project activity wind mills are recorded at the TNEB meter as well as at the main and check meter of the WWIL pooling station on a monthly basis, in the presence of representatives of TNEB and the Project Participant. Based on this monthly recording, the TNEB representatives apportion the transmission line losses amongst the various wind turbines (project activity as well as non-project activity) to deduce the net electricity supplied by the individual wind turbines to the grid/ third party. The net electricity supplied to the grid/ third party, so deduced, is indicated in the 'Monthly Statement of Energy' issued by TNEB. The procedure for such apportioning is conducted and controlled by the TNEB and neither the Project Participant nor the Project Participant representatives have any role to play in the same. Since the substation is under the supervision of WWIL, so during the joint meter reading people of WWIL are also present. The Joint meter reading is taken by the officials of TNEB and based of this JMR, TNEB representatives apportion the transmission line losses amongst the various wind turbines (project activity as well as non-project activity) to deduce the net electricity supplied by the individual wind turbines to the grid. Based on the 'Monthly Statement of Energy' issued by TNEB, the Project Participant prepares the invoice and submits it to the state utility/ third party for payment.

The recording and monitoring of the readings of both the meters i.e. TNEB Meters & Main & Check meters at WWIL Pooling substation is done on monthly basis.

PP will forgo the generation in the calculation of emission reduction for that particular month if the start date of the crediting period does not match with the start date of the energy generation as per the monthly statement and will start the monitoring period from the next monthly statement.

Net electricity exported by the wind mills will be calculated by Electricity Board independently. Either WWIL or PP doesn't have any role or control on calculation of net electricity generation/export.

Procedure for data uncertainty:-

1) In case the main meter at 110kV is not in service due to maintenance, repair, testing, defective display, the same will be either replaced/repaired or calibrated immediately. During this interim period the generation from the Check Meter shall be used during that period.

2) In case the check meter at 110kV is not in service due to maintenance, repair, testing, defective display, the same will be either replaced/repaired or calibrated immediately. However, in that case the recording of the electricity generation will not be affected as it will be taken from the main meter.

3) During the calibration if the main meter at 110kV is found to be outside the permissible limits of the error and if the main meter readings have been used in JMR, the CERs would be calculated by conservative approach by applying an error factor (–ve) on the export value and (+ve) on the import & line loss values as recorded in the monthly statements as identified during the calibration. The error shall be applied for all the measured values taken during the period between the scheduled date of calibration and actual date of calibration. The main meter would be calibrated or replaced immediately with new calibrated meter.

4) During the calibration if the check meter at 110kV is found to be outside the permissible limits of the error and if the check meter readings have been used in JMR, the CERs would be calculated by conservative approach by applying an error factor (–ve) on the export value and (+ve) on the import & line loss values as recorded in the monthly statements as identified during the calibration. The error shall be applied for all the measured values taken during the period between the scheduled date of calibration and actual date of calibration. The check meter would be calibrated or replaced immediately with new calibrated meter.

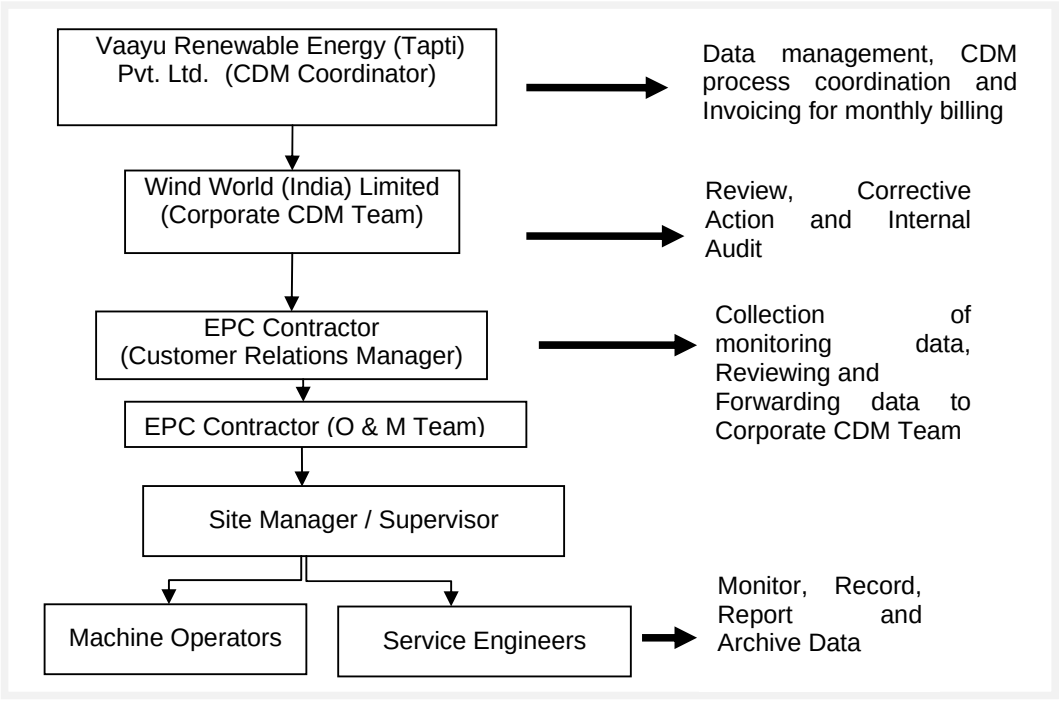
5) During the calibration if both main meter and check meters at 110kV is found to be outside the permissible limits of the error, the CERs would be calculated by conservative approach by applying an error factor (–ve) on the export value and (+ve) on the import & line loss values as recorded in the monthly statements as identified during the calibration. The error shall be applied for all the measured values taken during the period between the scheduled date of calibration and actual date of calibration. The main meter and check meter would be calibrated or replaced immediately with new calibrated meter.

6) During the calibration if the TNEB meter at 33kV is found to be outside the permissible limits of the error, the CERs would be calculated by conservative approach by applying an error factor (–ve) on the export value and (+ve) on the import & line loss values as recorded in the monthly statements as identified during the calibration. The error shall be applied for all the measured values taken during the period between the scheduled date of calibration and actual date of calibration. The TNEB meter would be calibrated or replaced immediately with new calibrated meter.

7) In case the TNEB meter at 33kV is not in service due to maintenance, repair, testing, defective display or operate outside the permissible limit of error, the same will be either replaced/repaired or calibrated immediately and then the net electricity export will be calculated by state utility pursuant to provision of PPA.

Training and maintenance requirements:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WECs), it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that WWIL service staff is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The WWIL Training Academy provides need-based training to meet the training requirements of WWIL projects. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving. The operational and management structure implemented for data monitoring is as follows:



Monitoring roles and responsibilities

PP will be monitoring the data sent by the O&M contractor and the data for electricity generated by the project activity will be kept as records for the period of 10+2 years i.e. 2 years beyond the term of crediting period. WWIL is O&M contractor and will be responsible for data recording.

The Project is operated by WWIL (O&M contractor for the project activity) and managed by the PP. The operational and maintenance contract for the project is with WWIL. WWIL is an ISO 9001:2008 certified Quality Management system from Germanischer Lloyd. WWIL follows the documentation practices to ensure the reliability and availability of the data for all the activities as required from the identification of the site, wind resource assessment, logistics, finance, construction, commissioning and operation of the wind power project.

The accuracy of monitoring parameter is ensured by adhering to the calibration and testing of the metering equipment once in 5 years. WWIL is Operation and Maintenance contractor for the project activity and provides the daily generation report to the Project proponent. The project proponent also maintains the records of daily generation report and joint meter report`

The project proponent is Vaayu Renewable Energy (Tapti) Pvt. Ltd. will be keeping and monitoring the data for electricity generation and calibration reports post project implementation. WWIL will be the O&M contractor who will be having the responsibility of activities such as maintaining electricity generation records, calibration records and maintenance of the WECs (Wind Energy Generators).

Action plan for commitment towards Sustainability Development for CDM project has been explained in attached Appendix 7.

B.7.4. Date of completion of application of methodology and standardized baseline and contact information of responsible persons/ entities

>>

Date of completion: 13/01/2012

Name of responsible person/entity: Vaayu Renewable Energy (Tapti) Pvt. Ltd. (Project Participant)

Contact Details of the project participant has been given in Appendix 1.

SECTION C. Duration and crediting period

C.1. Duration of project activity

C.1.1. Start date of project activity

>>

30/06/2011 (date of placement of purchase order of the project activity).

C.1.2. Expected operational lifetime of project activity

>>

20 Years 0 Months

C.2. Crediting period of project activity

C.2.1. Type of crediting period

>>

The project proponent has selected the fixed crediting period for the project activity.

C.2.2. Start date of crediting period

>>
01/10/2012 or date of registration of project with UNFCCC whichever is later.

C.2.3. Length of crediting period

10 years and 0 months

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>

There is no mention of acquiring Environmental Clearance for Wind Power projects in the latest Notification of Ministry of Environment and Forests (MoEF), Government of India, dated 1st December, 2009[34]. In the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated January 27, 1994 and EIA Notification (S.O 1533) dated 14th September, 2006, a list of activities that require acquiring environmental clearance[35] has been provided. According to those notifications, Environmental Impact Assessment (EIA) is not a regulatory requirement in India for wind energy projects and the PP does not expect any adverse impacts of the proposed CDM project activity on the environment.

The present project activity being a large scale power project using clean and renewable source like wind, does not fall under the list of activities which require Environmental Impact Assessment (EIA). Therefore, the project proponent has not conducted any Environmental Impact Assessment (EIA) for the project activity.

[34] MoEF Notification S. O 3067 (E) dated, 1st December, 2009;http://moef.nic.in/downloads/rules-and-regulations/3067.pdf, Source of Earlier Notification - http://envfor.nic.in/legis/eia/so1533.pdf;

[35] http://envfor.nic.in/legis/eia/so1533.pdf

Although,

Impact of land Use

The land that has been acquired for the project activity is barren and unfertile. The land was unutilized before the project activity. PP has bought the land for the project activity and has obtained necessary approvals for installation of windmills.

Impact of land Use

The quantity of solid / liquid discharge likely to be generated during the construction phase is negligible and has no noticeable impact on soil use

Impact of Air Environment

WEC is a green technology to generate electricity and there is no emission of GHG during any phase of their operation or construction. The only source of possible GHG emission can be the transport vehicles but they are negligible and can be ignored.

Tran's Boundary Environmental or Social Impacts

No trans-boundary effects have been noticed due to the implementation of the project activity

D.2. Environmental impact assessment

>>

The project activity does not fall under the list of the projects requiring Environmental clearance as mentioned in the notification of the Ministry of Environment and Forest, Government of India. Hence, Environmental Impact assessment (EIA) is not required by the host party.

SECTION E. Local stakeholder consultation

E.1. Solicitation of comments from local stakeholders

>>

The comments from local stakeholders were invited through a local stakeholder meeting conducted at Tirunelveli District in Tamil Nadu on 21 October 2011. A local newspaper advertisement was placed on 4 October 2011 inviting the local stakeholders for the meeting.

The meeting was presided over by Mr. Arumugam (Retd. DRO, Tirunelveli), Mr. Rangarajan (V.A.O, Kanarpatti village), Mr. O.N.M. Khaja Mohideen (A.E. Distribution/Rural TANGEDCO.), Ms Anushree Mishra (Asst. Manager, CDM Dept. WWIL), Mr. S. Sivalingam (Commercial Inspector, TANGEDCO Sub-Station, Manur & Mr. D. Muthuraman (WWIL (India) ltd). There were 35 local stakeholders who were present during the meeting.

E.2. Summary of comments received

>>

Overall a positive response was received from the stakeholders. The details of comments/questions were raised during the meeting and the responses provided by the project proponent have been tabulated below:

Name of Villager/ Stakeholder who raised the Query	Query	Reply
Mr. P. Appadurai (Villager)	Will installation of Wind machines affect the groundwater level or water level in lakes/ wells nearby to the project?	The foundation level of the wind mills are in depth upto the maximum of 2 meters only and it will not disturb the level of water in the earth while the depth for installation of earth pit will be maximum of 20 feet only and it also doesn't disturb the water level.

Mr. M. Balasubramnaian (Villager)	What will be the direct and indirect benefits to them from the proposed project activity?	The project would generate local job opportunities, which would help in the overall socio-economic development of the region. Additionally, a number of Corporate Social Responsibility initiatives would be undertaken, which would be identified based on the specific needs of the local populace.

E.3. Report on consideration of comments received

>>
As described above under E.2, there were no negative comments received.

SECTION F. Approval and authorization

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The letter of approval (Host Country Approval letter) has been in the name of new project participant "Vaayu Renewable Energy (Tapti) Pvt. Ltd." dated 04/03/2014 has been submitted to the validating DOE.

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Appendix 1. Contact information of project participants and responsible persons/ entities

Project participant and/or responsible person/ entity	☒ Project participant ☒ Responsible person/ entity for application of the selected methodology (ies) and, where applicable, the selected standardized baselines to the project activity
Organization name	Vaayu Renewable Energy (Tapti) Pvt. Ltd.
Street/P.O. Box	Hare Krishna, Presidency Society, North South Road No. 8, Vile Parle (West)
Building	WWIL Tower
City	Mumbai
State/Region	Maharashtra
Postcode	400 049
Country	India
Telephone	+91-22-67067101
Fax	+91-22-67020083
E-mail	yogesh.mehra@windworldindia.com
Website	
Contact person	
Title	Director
Salutation	Mr.
Last name	Mehra
Middle name	
First name	Yogesh
Department	Corporate
Mobile	
Direct fax	+91-22-6692 1177
Direct tel.	+91-22-6702 2832 extn 7111
Personal e-mail	yogesh.mehra@windworldindia.com

Appendix 2. Affirmation regarding public funding

The project activity does not involve any public funding from parties from Annex 1 countries.

Appendix 3. Applicability of methodology and standardized baseline

Please refer to section B.2.

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

The Operating Margin data for the most recent three years and the Build Margin data for the Southern Grid as published in the "Baseline Carbon dioxide Emission Database"[36], Version 7.0, 1st January, 2012, published by Central Electricity Authority (CEA), Government of India have been used for the estimation of the Baseline Emission. The Operating Margin data for the most recent three years and the Build Margin data for the Southern Grid are as follows:

Simple Operating Margin

	Southern Grid (tCO_2e/MWh)
Simple Operating Margin – 2008-09	0.97292
Simple Operating Margin – 2009-10	0.94150
Simple Operating Margin – 2010-11	0.94188
Average Operating Margin of last three years	0.95210

Build Margin

	Southern Grid (tCO_2e/MWh)
Build Margin- 2010-11	0.73389

Combined Margin Calculations

	Weights	**Southern Grid (tCO_2e/MWh) (Value without weights)**	**Southern Grid (tCO_2e/MWh) (Value with weights)**
	(A)	**(B)**	**(C)= (A) x (B)**
Operating Margin	0.75	0.95210	0.71408
Build Margin	0.25	0.73389	0.18347
Combined Margin			0.89755

Detailed information on calculation of Operating Margin Emission Factor and Build Margin Emission Factor is available at www.cea.nic.in.

[36] http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Appendix 5. Further background information on monitoring plan

Detailed metering information has been provided in section B.7.

Appendix 6. Summary of post registration changes

Following post registration changes are reported in revised PDD:-

- Irrelevant footer (Source, Wind Power Directory, dated July, 2011 (http://www.windpowerindia.com/index.php")) has been removed from every page of registered PDD
- Post registration ownership of project activity has been changed (change of PP) from 'Vish Wind Infrastructure LLP' to 'Vaayu Renewable Energy (Tapti) Pvt. Ltd." as per the purchase order dated 17 May 2013 and same has been reported under section A.1 of revised PDD and same has been corrected throughout the PDD. Further, starting from 15 June 2013 electricity is supplied to SRF Limited (third party) through southern grid under third party sale agreement and same has been reported in revised PDD. Under section A.1 of revised PDD both the scenario (sale to Grid & third party) has been reported. Further, due to third party sale agreement, some of the financial assumptions have been changed and accordingly, investment analysis under section B.5 of PDD has been revised.
- There is a correction in the PDD with respect to change of name of equipment supplier/ O&M contractor. With effect from 01/01/2013 name of Enercon (India) Limited (equipment supplier/ O&M contractor) has been changed to 'Wind World (India) Limited'. Change of name has been reported in revised PDD.
- Under section A.2.4, direction of Northern & Eastern for latitudes and longitudes has been mentioned in the revised PDD
- Under section A.4 of the revised PDD, name of the PP has been revised.
- Under section B.2 of the revised PDD, correction has been made in the applicability of methodology in line with present project scenario.
- Project boundary diagram has been revised under section B.3. considering both the scenario (pre & post sale to third party)
- Under section B.4 and B.5 of the revised PDD, typo error of methodology version has been corrected from 12.3.0 to 13.0.0.
- Footnotes have been separated by commas under step - 3 of the common practice analysis.
- Under Section B.5 at page 18, unnecessary web-link has been removed.
- Typo error in the name of state under 'step-6 -Calculate the combined margin emissions factor' (section B.6.1) has been rectified from Andhra Pradesh to Tamil Nadu.
- Due to change in the project design, QA/QC procedure under section B.7.1 has been updated for more transparency in case of third party sale.
- Under section B.7.1, typo error correction in source of data description for EG_{Import} (correction from generated to imported) has been made.
- Correction has been made under section B.7.3 of PDD to make it more understanding and single line diagram has been corrected.
- Under section B.7.3, Procedure for data uncertainty, correction in O&M structure, Monitoring roles and responsibilities have been revised.
- Under section D.1, typo error of type of the project activity from small scale to large scale has been corrected.
- Consistency in abbreviation of WEC instead WEG/WEC has been done throughout the PDD.
- In Appendix 1, contact information of the new PP has been corrected.
- In Appendix 4, combined margin calculation has been updated in transparent manner with more description.

Appendix 7: Action plan for commitment towards Sustainability Development

Vaayu Renewable Energy (Tapti) Pvt. Ltd has evolved an encompassing culture of social responsibility towards sustainability development that not only benefits the environment but also enriches the lives of the local communities where it implements projects.

As Vaayu Renewable Energy (Tapti) Pvt. Ltd being the new project participant is also taking ahead the project under clean development mechanism (CDM) in Tamil Nadu, they are committed to spend 2% of the CDM revenue for the cause of sustainability development of the region, per se.

The company focuses on three important issues: Education, employment generation & awareness amongst the villagers for good health.

Education:

The company believes education at the basic levels is most important to ensure the foundation of society. Vaayu Renewable Energy (Tapti) Pvt. Ltd is planning to donate for the refurbishment of primary schools in the villages of Tirunelveli District. In addition to this, they have planned for setting up tube wells at the premises of school buildings which do not have a supply for pure drinking water for the students and teachers.

Employment Generation:

The local semi skilled and skilled villagers were provided jobs during the project implementation stage as well as post project implementation to enable proper maintenance of the Wind Turbines.

During the implementation of the project activity, the semi skilled workers had been employed in the construction of roads, pavements, foundations etc.

Post implementation of the project activity, the service team which looks after the Maintenance of these wind turbines have been divided into two teams:

1. Routine Operation and Maintenance Team A (ROM A)
2. Routine Operation and Maintenance Team B (ROMB)

ROM A Team comprises of Technicians and Maintenance staff which are employees of the company. Many locals who were skilled enough have been roped in on the direct pay rolls of WWIL by making them a part of ROM A Team. The ROM A team comprises of 35-40 personnel. ROM B Team comprises of semi skilled and skilled locals who are enrolled to perform tasks which are not covered by ROM A. These tasks are basically non-technical in nature and comprises of the following:

a) Maintenance of Roads (10 Locals from the village)
b) Security staff (Comprising 5 locals from the village)
c) Casual Labors (10 locals from the village)

Many locals have been trained to be employed under ROM B. Therefore the implementation of the project activity has lead to the creation of jobs. This has not only improved the living conditions of the locals, but has also uplifted the overall economic activity in the region.

It is planned that the local population would be continually employed for relevant work objectives in future also.

Health:

Health camps is planned to organized for the awareness generation of the locals on family planning, child health and for primary health check – up. This also comprises of distribution of free medicines which are prescribes during health check ups and facilitation of the vaccination in collaboration with local

administration. Distribution of the materials like phenyl, bleaching powder etc for the improvement of sanitation in the nearby villages has also been planned.

In addition to all these, Vaayu Renewable Energy (Tapti) Pvt. Ltd envisage to shares a hand with the local panchayat for infrastructure development like roads, improvements of sanitation and sewage system in the villages of operation.

The commitment yet not ends up rather, with an aegis of the CDM revenue and urge for a cooperative and substantial living, Vaayu Renewable Energy (Tapti) Pvt. Ltd will continue moving hand in hand with technology and environment, concurrently!

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Document information

Version	*Date*	*Description*
05.0	25 June 2014	Revisions to: • 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)); • Include provisions related to standardized baselines; • 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; • Change the reference number from *F-CDM-PDD* to *CDM-PDD-FORM;* • Editorial improvement.
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.

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Keywords: project activities, project design document