



16.45 MW BUNDLED GRID CONNECTED RENEWABLE ENERGY PROJECT IN TAMILNADU, INDIA



Document Prepared by EKI Energy Services Limited

Project Title	16.45 MW Bundled Grid Connected Renewable Energy Project in Tamilnadu, India
Version	02
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Project ID	678 ¹
Monitoring Period	19-October-2008 to 18-October-2014 (first and last date included)
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¹ <https://registry.terra.org/app/projectDetail/VCS/678>

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1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project activity generates electricity from wind mills. The capacity of the project is 16.45 MW. This project activity is located in Tirunelveli District, Tamilnadu. The project activity established a cluster of 13 nos. of Suzlon and NEG Micon make Wind Electricity Generators (WEGs) of different capacities of 0.75 MW, 1.25 MW and 1.65 MW, aggregating to a total installed capacity of 16.45 MW.

The capacities of the project activity of each project developers are as follows.

SL. No.	Name of the Company	Installed Capacity
1.	Arvind. A. Traders	7.5 MW (1.25 MW X 6 nos.)
2.	R. Aswatha	0.75 MW (0.75 MW X1 no.)
3.	Asian Handlooms	3.3 MW (1.65 MW X 2 no.)
4.	Allied Textiles	0.75 MW (0.75 MW X1 no.)
5.	Sri Rama Vilas Weaving Factory	1.25 MW (1.25 MW X1 no.)
6.	R.K. Textiles	1.25 MW (1.25 MW X1 no.)
		1.65 MW (1.65 MW X1 no.)

The generated power from this project is supplied to southern regional grid dominated by the fossil fuel based power Generation. The Generated electricity is being GHG neutral

Brief description of the installed technology and equipment:

S.No.	Particulars	Technical specification for 1250 KW WTG Supplied by Suzlon	Technical specification for 750 KW WTG Supplied by NEG Micon	Technical specification for 1650 KW WTG Supplied by NEG Micon
1	Cut In Wind Speed	3 m/s	4 m/s	3.5 m/s
2	Cut out wind speed	22m/s	25/s	20m/s
3	Hub Height	74m	55m	78 m
4	Gearbox Type	Integrated 3 stage 1 planetary 2 Helical	Planetary Parallel Axle –	Planetary Parallel Axle –
5	Gear Ratio	1: 74.917	1:67.5	1:70.2
6	Rated Power Output	1250KW	750KW	1650KW
7	Tower Type	Tubular Tower	Conical Steel Painted	Conical Tubular
8	Tower Height	74m	53.6m	75.2m
9	No of blades	3	3	3
10	Rotor Diameter	66m	48.2m	82m
11	Brake System	Aerodynamic	Hydraulic	Hydraulic

The relevant implementation dates

The following table shows the details of the implementation status of WTGs of the project activity:

Sl. No.	HTSC No.	Name of Companies	Commissioning Date
1	1940	Arvind. A. Traders	14-July-2006
2	1943		14-July-2006
3	1957		26-July-2006
4	1994		16-September-2006
5	2005		20- September-2006
6	2006		20- September-2006
7	1697	R. Aswatha	28-March-2006
8	1522	Asian Handlooms	22-December-2005
9	1524		27-December-2005
10	1810	Allied Textiles	31-March-2006
11	1981	Sri Rama Vilas Weaving Factory	29-August-2006
12	1938	R.K. Textiles	14-July-2006
13	1520		06-December-2005

The total GHG emission reductions or removals generated in this monitoring period.

The total emission reductions achieved in this monitoring period i.e. from 19-October-2008 to 18-October-2014 (first and last days included) is 193,618 tCO₂ e.

1.2 Sectoral Scope and Project Type

Project Type: I – Renewable Energy Projects

Sectoral Scope: 1 Energy industries (renewable - / non-renewable sources)

Project Category: ACM0002 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” Version 10, EB 47²

Project is not grouped project activity as per VCS guidelines.

1.3 Project Proponent

Organization name	Arvind. A. Traders
Contact person	Mr. T. Balachandran
Title	Director
Address	52, 5 th cross Sengunthapuram, Karur, Tamil Nādu, 639002
Telephone	+91- 4324 231515, 231717
Email	arvind@arvindas.co.in

1.4 Other Entities Involved in the Project

² <https://cdm.unfccc.int/UserManagement/FileStorage/NF9EDAQV5K382HW0JR14GS7XYQUMCP>

Organization name	EKI Energy Services Limited
Role in the Project	Project Consultant
Contact person	Barun Sharma
Title	DGM
Address	EnKing Embassy, Office No. 201, Plot 48, Scheme 78, Part 2, Vijay Nagar, Indore- 452010 Madhya Pradesh, India
Telephone	9015615247
Email	barun@enkingint.org , registry@enkingint.org

1.5 Project Start Date

The starting date of the project activity is 06-December-2005 (Commissioning Date for R.K .Textiles 1.65 MW WEG. It is the Earliest Commissioning Date of this bundled project activity)

Project Start date: 06-December-2005

1.6 Project Crediting Period

Project Crediting Period Start date: 28-March-2006

Project Crediting Period End date: 27-March-2016

Total Crediting Period: 10 Years (Fixed).

1.7 Project Location

The project activity is located in Taluka Veerakeramputhur, Tirunelveli district of Tamil Nadu.

The specific coordinates of Suzlon turbines in the project are:

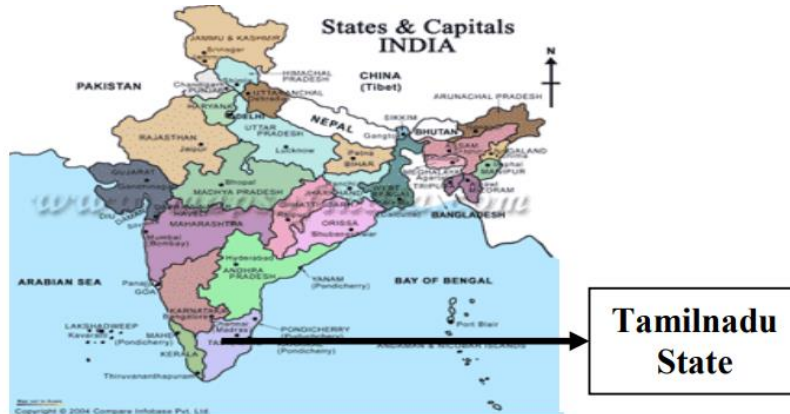
S.No	Name of Investor	Survey No.	HT. Sc. No	Capacity of WTG	Latitude	Longitude
1	Arvind. A. Traders	484/2A	1957	1.25 MW	9° 00' 07"	77° 32' 48"
		430/1,2,3B P	1943	1.25 MW	8° 59' 39"	77° 32' 22"
		121/2P	2006	1.25 MW	8° 59' 11"	77° 31' 07"
		715/1P	1940	1.25 MW	8° 59' 15"	77° 33' 23"
		29/2P	2005	1.25 MW	8° 59' 24"	77° 31' 06"
		431/3,4B,4C P	1994	1.25 MW	9° 00' 12"	77° 32' 25"
2	R.K. Textiles	21 / 3 P	1938	1.25 MW	8° 57' 07"	77° 34' 10"
3	Sri Rama Vilas Weaving Factory	435 / 3 P	1981	1.25 MW	9° 00' 26"	77° 32' 20"

The specific coordinates of NEG Micron turbines in the project are:

S.No	Name of Investor	Survey No.	HT. Sc. No	Capacity of WTG	Latitude	Longitude
1	R.K.Textiles	120/1A,115/2B	1520	1.65 MW	8° 58' 44"	77° 28' 07"
2	Asian Handlooms	63/2,3,4,5, 6	1522	1.65 MW	8° 59' 11"	77° 28' 33"
		91/1(P), 2(P)	1524	1.65 MW	8° 59' 05"	77° 28' 57"
3	R. Aswatha	608 / 1,2 P	1697	0.75 MW	8° 58' 46"	77° 26' 51"
	Allied Textiles	304 / 1 / P	1810	0.75 MW	8° 59' 37"	77° 26' 37"

The physical location of the project is shown in the following map.

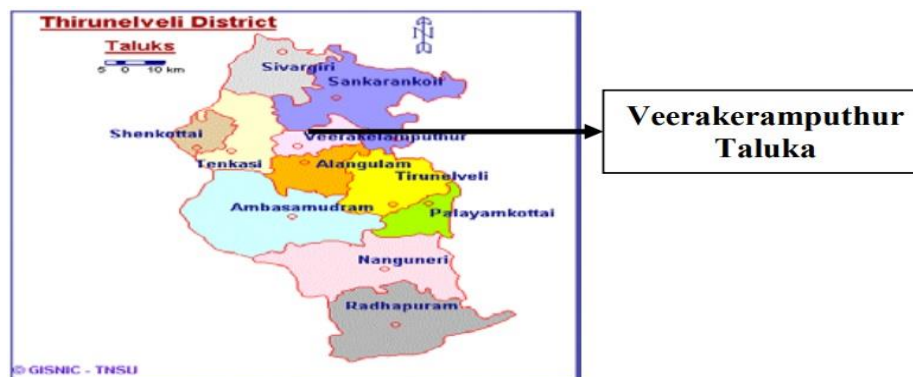
Country Map



State Map



District Map



1.8 Title and Reference of Methodology

Title: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”

Reference: Approved consolidated baseline methodology ACM0002 (Version 10, EB 47)³

1.9 Participation under other GHG Programs

The project has participated in UNFCCC under Clean Development Mechanism program, Registration reference number is 3406⁴.

The project has not completed any CDM verification. The Current VCS verification is for period 19-October-2008 to 18-October-2014. PP will claim credits only from VCS for current monitoring period and there will not be any double accounting.

1.10 Other Forms of Credit

Emission Trading Programs and Other Binding Limits:

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

Also, the project activity is not availing any REC benefits and the same can be confirmed from publicly available link of REC generators.

The project proponent provided undertaking that there is no double accounting of emission reduction with any other GHG program during the current VCS monitoring period.

1.11 Sustainable Development

The project participants obtained all clearances from stakeholders hence no legal risks are anticipated. The project activities contribution towards sustainable development in terms of society, environment, and economy (both direct and indirect impacts) are stated below:

Economic Impacts:

- Creates employment opportunities in the project vicinity during erection & commissioning
- Employment creation both temporary and permanent
- Improving the local infrastructure like roads
- Improved power supply

Social Impacts:

- Promotes self-employment among the unemployed youth (eg., civil contractors, spare parts shops)
- Connectivity improvements in the local area through improved local transportation;

³ <https://cdm.unfccc.int/UserManagement/FileStorage/NF9EDA0V5K382HW0JR14GS7XYQUMCP>

⁴ <https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1265822233.39/view>

Environmental Impacts:

The environmental footprint of Wind Turbine Generators is minimal, since:

- Wind is one of the cleanest forms of renewable energy and, power generation does not involve any fossil fuels
- Produces electricity without GHG emissions.
- The materials used in the WTGs are non-hazardous in nature
- Impact on land, air and water is minimum since there are no discharges or Emissions during the project lifetime.

Technological well-being:

There is continuous research and development on the geometry of the wind blades, height of towers, diameters of towers, etc., which augurs well for the technological wellbeing in the development of wind energy to produce clean electricity. Also, the generated electricity from the project activity is connected to the grid. The project activity improves the supply of electricity with clean, renewable wind power while contributing to the regional/local economic development. Wind energy plants provide local distributed generation, and provide site-specific reliability and transmission and distribution benefits including:

- improved power quality.
- reactive power control.
- mitigation of transmission and distribution congestion,

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

2 SAFEGUARDS

2.1 No Net Harm

According to Indian regulation, the implementation of the wind park does not require an environmental impact assessment. The Ministry of Environment and Forests (MoEF), Government of India notification dated 14-September-2006 regarding the requirement of Environment Impact Assessment (EIA) studies as per the Environment Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) MINISTRY OF ENVIRONMENT AND FORESTS) states that any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. Wind parks are not included in this list and thus an EIA is not required. The project activity has no significant impact on the environment.

2.2 Local Stakeholder Consultation

All the WTGs of this project activity were supplied by Suzlon and NEG Micron. The project promoters signed an operation and maintenance contract with Suzlon and NEG Micon.

The project promoters conducted a stakeholder consultation meeting on 29-November-2007 at project site in Tirunelveli District, with the local people and residents of the neighboring villages, Local employees, Representative of TNEB, Social workers active in the local region.

The project promoter and WTG supplier explained the various features, benefits and the eco-friendly nature of the project. In that meeting project promoter distributed the questionnaire to all participants and there is no negative comment received from the stakeholders. The local village people also agreed that due to this project activity the employment opportunities have increased. The project proponent has already established good relationship with local people who ensure co-operation for the successful and continuous operation of this project. The local people also agreed that their infrastructure facility like road and transportation was improved due this project activity. There is no negative comment received from the stakeholders.

As a part of continuous feedback from stakeholders, there were no other major comments or protest raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region. The PP also placed a grievance register onsite in where the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately.

During the current monitoring period, positive feedback are received regarding site operation. No negative grievance received during the current monitoring period, therefore, no mitigation measures are required. In case of grievances, the nature of probable resolution is discussed with the plant head office and implemented by the site in charge.

2.3 AFOLU-Specific Safeguards

The project activity deals with generation of electricity using wind energy by Wind Turbine Generator (WTG) and not from AFOLU projects. Hence not applicable.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project has been commissioned and the commissioning details of the project are as follows

Sl. No.	HTSC No.	Name of Companies	Commissioning Date
1	1940	Arvind. A. Traders	14-July-2006
2	1943		14-July-2006
3	1957		26-July-2006
4	1994		16-September-2006
5	2005		20-September-2006
6	2006		20-September-2006
7	1697	R. Aswatha	28-March-2006

8	1522	Asian Handlooms	22-December-2005
9	1524		27-December-2005
10	1810	Allied Textiles	31-March-2006
11	1981	Sri Rama Vilas Weaving Factory	29-August-2006
12	1938	R.K. Textiles	14-July-2006
13	1520		06-December-2005

All the WTGs are running satisfactorily during the reported monitoring period. There are no special events occur during the reported monitoring period. Hence, no impact occurs on the GHG reduction from the project activity.

3.2 Deviations

3.2.1 Methodology Deviations

There is no request for methodology deviation applied during current monitoring period.

3.2.2 Project Description Deviations

There is no Project description deviations applied during current monitoring period.

3.3 Grouped Projects

This project activity is not a grouped project activity. Hence not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	EF _{OM,y}
Data unit	tCO ₂ e/MWh
Description	Operating Margin Emission Factor of Southern Grid
Source of data	"CO ₂ Baseline Database for Indian Power Sector", version 4 ⁵ published by the Central Electricity Authority, Ministry of Power, Government of India.
Value applied	0.998157296
Justification of choice of data or description of measurement methods and procedures applied	The data has been taken from official government website of the host country India, which is publicly available. Hence can be trusted as an authentic source of information.
Purpose of Data	Baseline Emission Calculation

⁵ https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_4.zip

Comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.
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Data / Parameter	$EF_{BM,y}$
Data unit	tCO ₂ e/MWh
Description	Build Margin Emission Factor of Southern Grid
Source of data	“CO ₂ Baseline Database for Indian Power Sector”, version 4 ⁶ published by the Central Electricity Authority, Ministry of Power, Government of India.
Value applied	0.71331778
Justification of choice of data or description of measurement methods and procedures applied	The data has been taken from official government website of the host country India, which is publicly available. Hence can be trusted as an authentic source of information.
Purpose of Data	Baseline Emission Calculation
Comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ e/MWh
Description	Combined Margin Emission Factor of Southern Grid
Source of data	Combined Margin Emission Factor Southern grid is calculated as per “Tool to calculate the emission factor for an electricity system, version 01.1, EB 35, Annex 12 ⁷ ”. The combined margin emissions factor is calculated by weights of 75% on OM and 25% on BM are applied while calculating CM.
Value applied	0.92694742
Justification of choice of data or description of measurement methods and procedures applied	This is a calculated value based on the data that have been taken from official government website of the host country India, which is publicly available. Hence can be trusted as an authentic source of information.
Purpose of Data	Baseline Calculation
Comments	The value is calculated on ex-ante basis and it will remain same throughout the crediting period.

⁶ https://cea.nic.in/wp-content/uploads/baseline/2020/07/database_4.zip

⁷ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf>

4.2 Data and Parameters Monitored

Data / Parameter	EG _{facility,y}																														
Data unit	MWh / yr																														
Description	Quantity of net electricity generation supplied by the project plant to the grid in year y. Net quantity of electricity generation supplied by the project activity to the grid = Export of net electricity measured by the energy meter - Import of electricity measured by the energy meter (Both export and import value are measured by the single energy meter.)																														
Source of data	TNEB Monthly Statement.																														
Description of measurement methods and procedures to be applied	The electronic meters installed at the grid interconnection point by the TNEB will be used to measure the electricity supplied to the grid on a monthly basis. Every month these meter readings will be recorded by the officers of the TNEB.																														
Frequency of monitoring/recording	Monitoring: Trivector meter will be used for monitoring Data Type: Measured Frequency: Continuously measured Recording: Monthly from joint meter Archiving Policy: Paper & Electronic Responsibility: Project Head would be responsible for regular calibration of the meter. Calibration Frequency: Once in three year. Calibration details are provided below and error factor 0.5% has been applied where delay in calibration occurred. <table><tr><th>HTSC No.</th><th>Make</th><th>Class</th><th>Serial No.</th><th>Calibration Date</th><th>Calibration Date</th></tr><tr><td>1940</td><td>Elster</td><td>0.5</td><td>04804679</td><td>30-August-2008</td><td>07-November-2011</td></tr><tr><td>1943</td><td>Elster</td><td>0.5</td><td>04804672</td><td>30-August-2008</td><td>07-November-2011</td></tr><tr><td>1957</td><td>Elster</td><td>0.5</td><td>04804717</td><td>19-November-2008</td><td>07-November-2011</td></tr><tr><td>1994</td><td>Elster</td><td>0.5</td><td>04804675</td><td>19-November-2008</td><td>07-November-2011</td></tr></table>	HTSC No.	Make	Class	Serial No.	Calibration Date	Calibration Date	1940	Elster	0.5	04804679	30-August-2008	07-November-2011	1943	Elster	0.5	04804672	30-August-2008	07-November-2011	1957	Elster	0.5	04804717	19-November-2008	07-November-2011	1994	Elster	0.5	04804675	19-November-2008	07-November-2011
HTSC No.	Make	Class	Serial No.	Calibration Date	Calibration Date																										
1940	Elster	0.5	04804679	30-August-2008	07-November-2011																										
1943	Elster	0.5	04804672	30-August-2008	07-November-2011																										
1957	Elster	0.5	04804717	19-November-2008	07-November-2011																										
1994	Elster	0.5	04804675	19-November-2008	07-November-2011																										

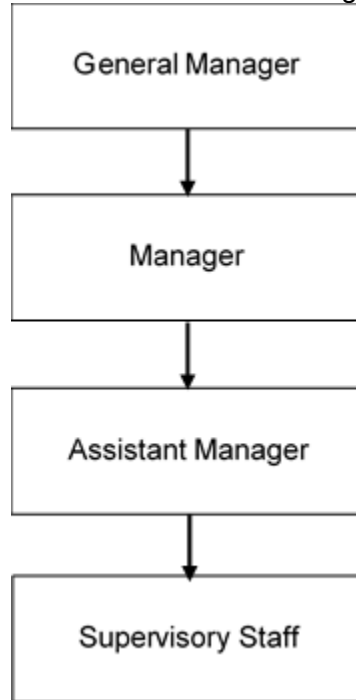
	2005	Elster	0.5	04862825	19-November-2008	07-November-2011
	2006	Elster	0.5	04862888	19-November-2008	07-November-2011
	1697	Elster	0.5	04804527	05-January-2008	07-November-2011
	1522	Elster	0.5	04721952	28-March-2008	07-November-2011
	1524	Elster	0.5	04725655	28-March-2008	07-November-2011
	1810	Elster	0.5	04804537	14-October-2008	07-November-2011
	1981	Elster	0.5	04862789	19-November-2008	07-November-2011
	1938	Elster	0.5	04804673	30-August-2008	07-November-2011
	1520	Elster	0.5	04721934	28-March-2008	07-November-2011
Value monitored	208,879.86					
Monitoring equipment	The meter detail is provided in Appendix I of this document.					
QA/QC procedures to be applied	The project revenue is based on the net units displaced as measured by main metering system installed at the interconnection point (substation point). The meters used are calibrated periodically by state electricity utility with 0.5 class accuracy. Sales record to the grid and other records are used to cross check this data and hence ensure consistency.					
Purpose of the data	Baseline emission calculation					
Calculation method	Taken from TNEB Monthly Statement.					
Comments	Data will be archived during the whole crediting period + 2 years.					

4.3 Monitoring Plan

For the purpose of monitoring, the project participant has entered into an operation and maintenance agreement with the supplier of the machines NEG Micon (India) Private Ltd and Suzlon Energy Ltd. As per the provisions of the contract, all the parameters associated

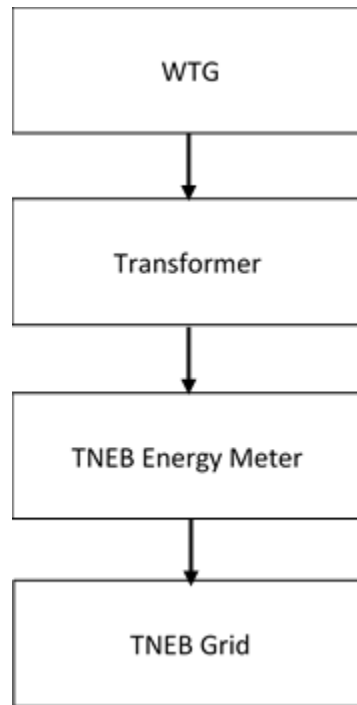
with performance of the WEG, safety in operation, scheduled maintenance service records, breakdowns and other running repair records are maintained by the supplier.

The operation and maintenance structure with respect to the implementation of the project has been given below. The operators also record monthly energy output of each WTG and prepare reports on the performance of wind farm indicating turbine wise production.



Metering:

The delivered Energy shall be metered by the TNEB at the high voltage side of the step up transformer installed at the project site. The project revenue is based on the net units displaced as measured by main metering system installed at the interconnection point (substation point). The meters used are calibrated periodically by state electricity utility with 0.5 class accuracy. Sales record to the grid and other records are used to cross check this data and hence ensure consistency.



Quantity of net electricity generation exported to the grid by the project plant is measured by the Trivector energy meter. Each WEG is connected to an individual energy meter and others WTG are not connected in this meter. The above line diagram shows the metering arrangement for each WTG. This meter installed at the grid interconnection point after the step up transformer, hence there is no loss in the net electricity generation exported to the grid. This energy meter records the electricity generated on a continuous basis.

Monthly Meter Reading:

The electronic meters installed at the grid interconnection point by the TNEB will be used to measure the electricity supplied to the grid monthly. Every month these meter readings will be recorded by the officers of the TNEB. These records will be archived for crosschecking yearly figures. The meters at the grid interconnection point will be two-way meters and will be owned by SEB. SEB will take the readings from these meters and the same reading may be used to determine the net power wheeled to the user and determine the extent of mitigation of GHG over a period. Thus, the above-mentioned monitoring procedures for metering are only for WTGs of this project that are connected to the grid.

Calibration:

Calibration of energy meters will be done once in three years by TNEB with 0.5 class accuracy. If inaccuracy found more than the allowed error, the meter will be changed. The metering equipment shall have sufficient accuracy so that any error resulting from such equipment shall not exceed 0.5% of full-scale rating, which is permissible limits of error for a meter and is said to be the allowed error.

Measurement Frequency

Frequency of measurement by TNEB - Once in a month
Calibration of the Energy Meter - This is carried out by TNEB (Once in three year).

Data Collection and Archiving

The monthly data of electricity generation is collected in both logbook and electronic form. However, the data in electronic form is archived throughout the lifetime of the project. The electricity records are maintained regularly by the team at the site. Hence, the monitoring at the ground level is done by the O & M service providers, which in case of the project activity are the same as the suppliers of the WTGs. Also, as per the contract, a monthly generation report is made available to the WTG owner with gross and net energy generation from the wind electric generators.

Monitoring report:

Every year the project promoter will prepare a monitoring report showing all emission reduction calculations as per monitoring plan.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline emissions are to be calculated as follows:

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

Where

- BE_y = Baseline Emission in year y (tCO₂/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 CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂/MWh)

Emission Factor for Southern grid, $EF_{grid,y} = 0.92694742$ tCO₂/MWh

Monitoring Period: 19-October-2008 to 18-October-2014

The year wise net electricity supplied to the grid is shown below:

Year	Net Electricity Supplied(MWh)
2008	5,021.712
2009	41,866,048
2010	37,661.334
2011	32,853.496
2012	40,439.213
2013	26,920.696
2014	24,117.361
Total	208,879.86

Electricity Supplied to the Southern Grid, $EG_y = 208,879.86$ MWh

Year wise baseline emission is shown below:

Year	Baseline Emission(tCO ₂ e)
2008	4,654
2009	38,807
2010	34,910
2011	30,453
2012	37,485
2013	24,954
2014	22,355
Total	193,618

Baseline Emission in Monitoring Period, $BE_y = 193,618$ tCO₂

5.2 Project Emissions

This project activity is grid connected wind power generation. Hence there is no project emission from the project activity.

$PE_y = 0$

5.3 Leakage

The project activity engages neither transferring the energy generating equipment from another activity, nor is the existing equipment transferred to another activity. So, the leakage emissions are not applicable and hence not considered.

$LE_y = 0$

5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2008	4,654	0	0	4,654
2009	38,807	0	0	38,807
2010	34,910	0	0	34,910
2011	30,453	0	0	30,453
2012	37,485	0	0	37,485
2013	24,954	0	0	24,954
2014	22,355	0	0	22,355
Total	193,618	0	0	193,618

The estimated emission reduction to be achieved from the project activity for the current monitoring period is 219,208 tCO₂e (the basis of calculation is unitary method using annual

emission reduction in the registered PDD), whereas actual emission reductions achieved are 193,618 tCO_{2e}, which is approximately 11.67% decrease in the ERs from the estimated ones in the PDD.

And the ex-post ERs were higher than the ex-ante ERs for year 2009 and 2012 is 38,807 & 37,485 respectively, because the generation of electricity depends upon many other climatic conditions, which are not within the control of the project participant.