Monitoring report form for CDM project activity

(Version 09.0)

MONITORING REPORT			
Title of the project activity	Wind Power Project by National Enterprises at Tamil Nadu, India		
UNFCCC reference number of the project activity	5678[1]		
Version number of the PDD applicable to this monitoring report	06		
Version number of this monitoring report	02		
Completion date of this monitoring report	18/10/2021		
Monitoring period number	02		
Duration of this monitoring period	11/01/2013 to 31/12/2020 (Inclusive of both dates)		
Monitoring report number for this monitoring period	NA		
Project participants	M/s National Enterprises		
Host Party	India		
Applied methodologies and standardized baselines	Methodology:-AMS I. D. -"grid connected renewable electricity generation" Version 17, EB 61[2] Standardized Baseline: NA		
Sectoral scopes	1 : Energy industries (renewable - / non-renewable sources)		
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by the project activity in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013 until 31 December 2020	Amount achieved from 1 January 2021
	0	37,182 tCO_2e	0
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	54,394 tCO_2e		

[1] https://cdm.unfccc.int/Projects/DB/RINA1326467420.68/iProcess/DNV-CUK1368538014.12/view

2 https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTXFQQOFQQH4SBK

SECTION A. Description of project activity

A.1. General description of project activity

The project activity involves renewable energy generation from two numbers of Wind Turbine Generators (WTGs) with total installed capacity of 3.0 Mega-Watt (MW) each WTGs having Capacity 1.5 MW (1.5 MW * 2) promoted by National Enterprises. The net electricity generated by the WTGs is supplied to the Indian Electricity Grid of India through the nearest grid sub-station. The project activity results in an equivalent amount of GHG emission reduction which otherwise would have resulted primarily from fossil fuel combustion related to electricity generation at the thermal power dominated grid as per the generation mix of the grid. There is no wheeling arrangement of the electricity generated by the project promoter.

Prior to this project activity there was no other kind of occupancy in terms of any other industrial project, dwelling of local people at the project site. Hence, in the pre-project scenario there was barren unoccupied land where the WTGs stand now.

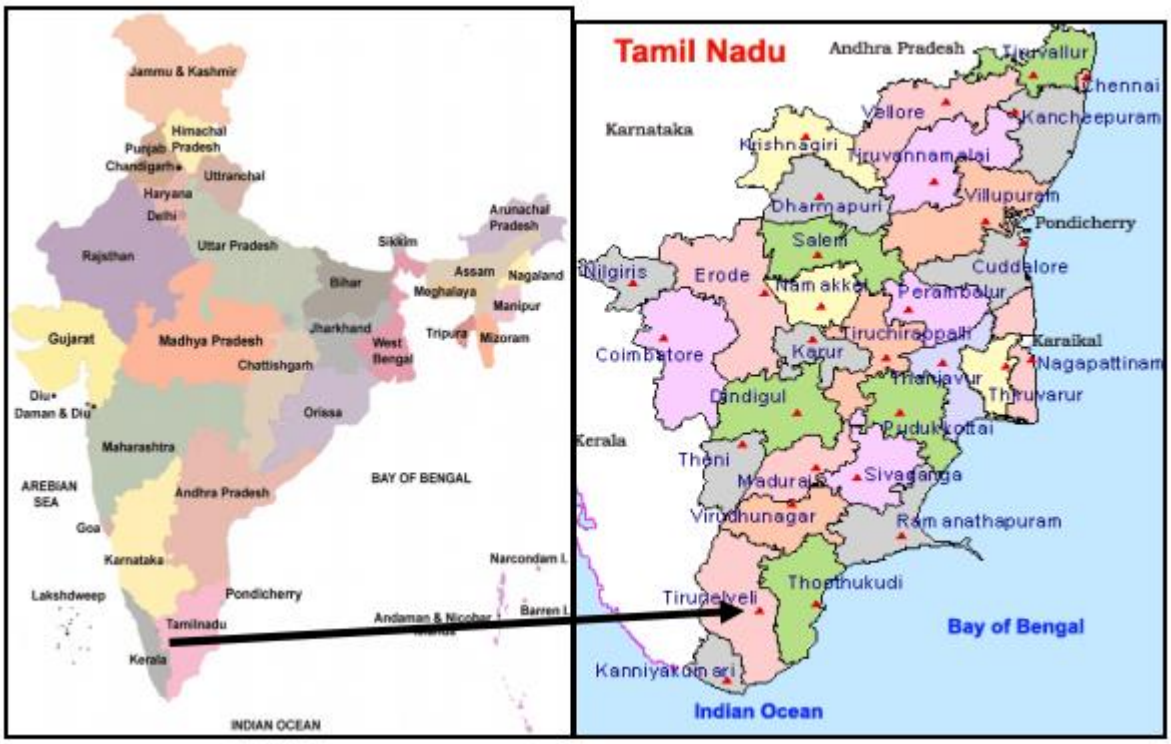
The project activity harnesses wind energy to generate and supply electricity to the Indian electricity grid of India. The project activity results in an equivalent amount of GHG emission reduction which otherwise would have resulted primarily from fossil fuel combustion related to electricity generation at the thermal power dominated grid as per the generation mix of the grid.

A.2. Location of project activity

Host Party : India
Village : Balapathiraramapuram
Taluka : V K Puthur
District : Tirunelveli
State : Tamil Nadu
Country : India

Sl.No.	WTG Capacity(MW)	HTSC No.	Village	Taluka, District	Longitude	Latitude
1.	1.5	2849	Balapathiraramapuram	V K Puthur, Tirunelveli	$77^0$33’ 23.3”	9^0 03’ 26.9”
2.	1.5	2848	Balapathiraramapuram	V K Puthur, Tirunelveli	$77^0$34’ 37.8”	9^0 02’11.6”

The physical location of the site is shown in the maps depicted below:



A.3. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India	M/s. National Enterprises (Private entity)	No

A.4. References to applied methodologies and standardized baselines

Project Type: I – Renewable Energy Projects

Project Category: D – Grid connected renewable electricity generation (Version 17, EB 61)[3]

Reference: General guidelines to SSC CDM Methodologies i.e. 'indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories', EB 61, Annex 21[4]

"Tool to calculate the emission factor for an electricity system", (Version 02.2.1, EB 63)[5]

A.5. Crediting period type and duration

Type	- Fixed
Monitoring Period Number	- 02
Start date of Crediting Period	- 13/01/2012
Length of Crediting Period	- 10 Years
Duration of Crediting Period	- 13/01/2012 to 12/01/2022
Current Monitoring Period	- 11/01/2013 to 31/12/2020

[3] http://cdm.unfccc.int/UserManagement/FileStorage/V9LRSXKP24Q7YT6HZDUBO3C0ING8AJ

[4] http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid06.pdf

[5] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf

SECTION B. Implementation of project activity

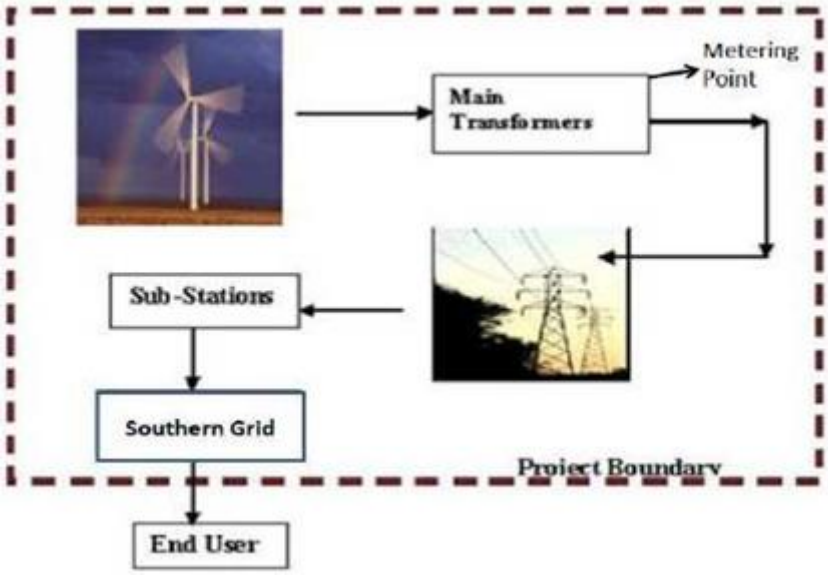
B.1. Description of implemented project activity

The project is currently operational and it has been implemented as described in the registered PDD. The monitoring plan was implemented in compliance with the registered PDD and the project has not applied for any post registration changes.

The project was commissioned on 30/05/2009 and subsequently registered with UNFCCC on 13/01/2012. The current monitoring period for the project activity is 11/01/2013 to 31/12/2020. The project was under continuous operation since the commissioning date.

The project activity under consideration involves renewable energy generation from two numbers of Wind Turbine Generators (WTGs), which is a clean source of energy and results in 37,182 tCO_2e of GHG emission reductions in this monitoring period.

The project utilizes wind power generation technology 2*1.5 MW (Model: S 82) to generate electricity – technology developed by M/s Suzlon Energy Limited. The generator is of induction type.



Wind turbines produce electricity by using the naturally occurring kinetic energy of wind to drive a generator. Wind has considerable amount of kinetic energy at high speeds. When this kinetic energy is transmitted to the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the generator coupled with the same shaft as the turbine also rotates, thereby producing electricity.

The technology is a clean and environmentally safe technology since there are no GHG emissions associated with the electricity generation. The project envisages the utilization of a state-of-the-art wind power generation technology 1.5 MW (S 82) to generate electricity – technology developed by M/s Suzlon Energy Limited.

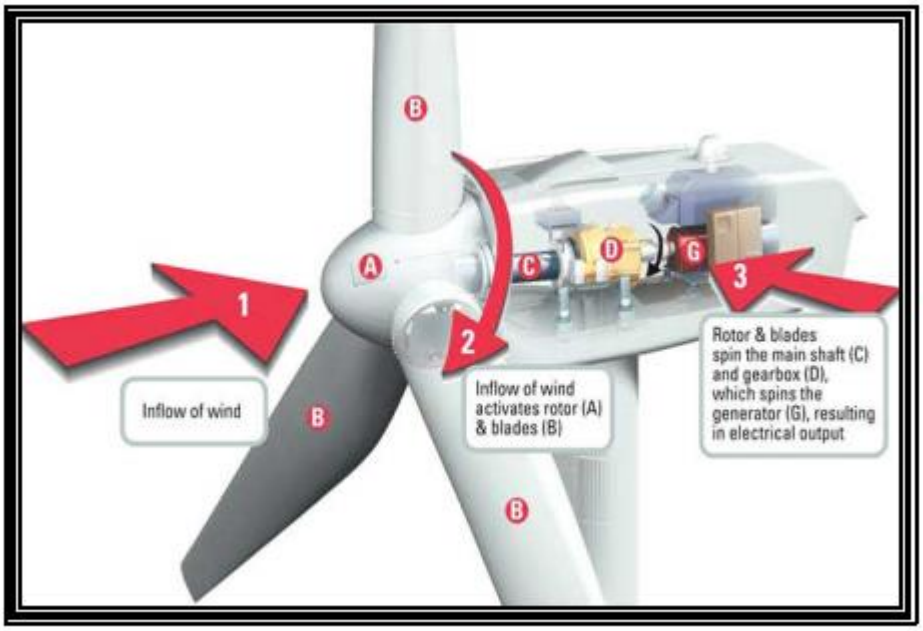


Figure: Working of a Wind Turbine

The important parts of a windmill are:

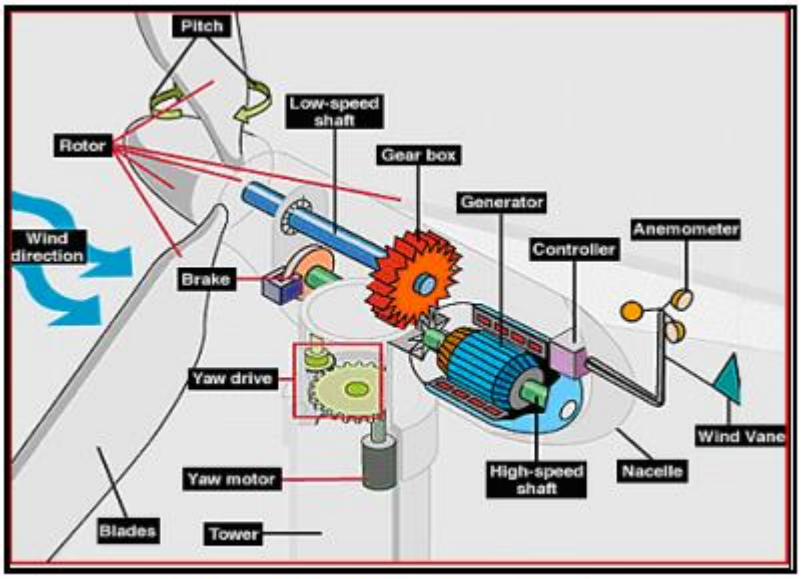


Figure : Major Mechanical Parts of a Wind Turbine

I. Main Tower

This is a very tall structure having Hub Height 78.5 m with a door and inside ladder at the bottom. The door is used to enter into the tower for operation and maintenance.

II. Blades

The WTGs are provided with three blades. The blades are self supporting in nature made up of Fiber Reinforced Polyester. The blades are mounted on the hub.

III. Nacelle

The Nacelle is the one which contains all the major parts of a WTG. The nacelle is made up of thick rugged steel and mounted on a heavy slewing ring. Under normal operating conditions, the nacelle would be facing the upstream wind direction.

IV. Hub

The Hub is an intermediate assembly between the wing and the main shaft of the wind turbine. Inside the hub, a system to actuate the aerodynamic brake is fitted. The hub is covered with nose cone.

V. Main Shaft

The shaft is to connect the gear box and the hub. Solid high carbon steel bars or cylinders are used as main shaft. The shaft is supported by two bearings.

VI. Gear Box, Bearing and Housing

The gearbox is used to increase the speed ratio so that the rotor speed is increased to the rated generator speed. Oil cooling is employed to control the heating of the gearbox. Gearboxes are mounted over dampers to minimize vibration. The main bearings are placed inside housing.

VII. Brake

Brake is employed in the WTGs to stop the wind turbine mainly for maintenance check. Brakes are also applied during over speed conditions of the wind turbine. The brakes are placed on the high speed shaft.

VIII. Generator

The generator is of induction type. The generators are provided with monitoring sensors in each phase winding to prevent damage to the generators.

Salient Features of 1500 KW (S 82) WTG

Features of WTG		
Sl.No.	**Particulars**	**Specifications**
Rotor		
1.	Rotor diameter	82 m
2.	Hub Height	78.5 m
3.	Installed electrical output	1500 kW
4.	Rotor swept area	5281 m^2
5.	Regulation	Pitch regulated
Operational Data		
6.	Cut-in wind speed	4 m/s
7.	Rated wind speed	14 m/s
8.	Cut-out wind speed	20 m/s
Generator		
9.	Type	Asynchronous Generator, 4 poles
10.	Rated output	1500 kW
11.	Rotational speed	1511 rpm
12.	Rated voltage	690 V
13.	Frequency	50 Hz
14.	Insulation class	H
15.	Cooling system	Air cooled
16.	Enclosure Class	IP 54
Gear Box		
17.	Type	Integrated 3-stage gearbox, 1 planetary & 2 helical.
18.	Gear ratio	1:95.09
19.	Nominal load	1650 kW
20.	Type of cooling	Oil cooling, forced lubrication
Yaw Drive		
21.	Yaw drive system	Active electrical yaw motors

22.	Yaw bearing	Polyamide slide bearing
Operating Breaks		
23.	Aerodynamic brake	3 independent systems with blade pitching
24.	Mechanical brake	Hydraulic disc brakes

Commissioning details of the Plant

WTG Id	Capacity	HTSC No.	Location	Commissioning date
TDA 74	1.5 MW	2849	Village-Balapathirarampuram, Dist-Tirunelveli, Tamilnadu	30/05/2009
TDA 76	1.5 MW	2848	Village-Balapathirarampuram, Dist-Tirunelveli, Tamilnadu	30/05/2009

B.2. Post-registration changes

B.2.1. Temporary deviations from the registered monitoring plan, applied methodologies, standardized baselines or other methodological regulatory documents

Not Applicable

B.2.2. Corrections

Not Applicable

B.2.3. Changes to the start date of the crediting period

Not Applicable

B.2.4. Inclusion of monitoring plan

Not Applicable

B.2.5. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

Not Applicable

B.2.6. Changes to project design

Not Applicable

B.2.7. Changes specific to afforestation or reforestation project activity

Not Applicable

SECTION C. Description of monitoring system

The project activity essentially involves generation of electricity from wind; the employed WTGs can only convert wind energy into electrical energy and does not require any other input fuel for electricity generation. Thus no special ways and means are required to monitor leakage from the project activity.

- The proposed project activity requires evacuation facilities for sale to grid and the evacuation facility is essentially maintained by the state power utility.
- The electricity generation measurements are required by the state utility and the investors to assess electricity sales revenue.

- The project activity has therefore envisaged two independent measurement systems to monitor generated electricity from the wind turbines.

- The joint measurement is carried out once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties sign the recorded reading.

- Metering equipment - Metering is carried out through electronic tri-vector meters of accuracy class 0.5% required for the project. The main meter is installed and owned by State utility. The metering equipment is maintained in accordance with electricity standards.

- Meter readings - The monthly meter reading of the main meter at the project site is taken simultaneously and jointly by the parties on a pre-determined day of the following month. At the conclusion of meter reading, an appointed representative of the state utility and the company signs a document indicating the number of kWh exported to the grid.

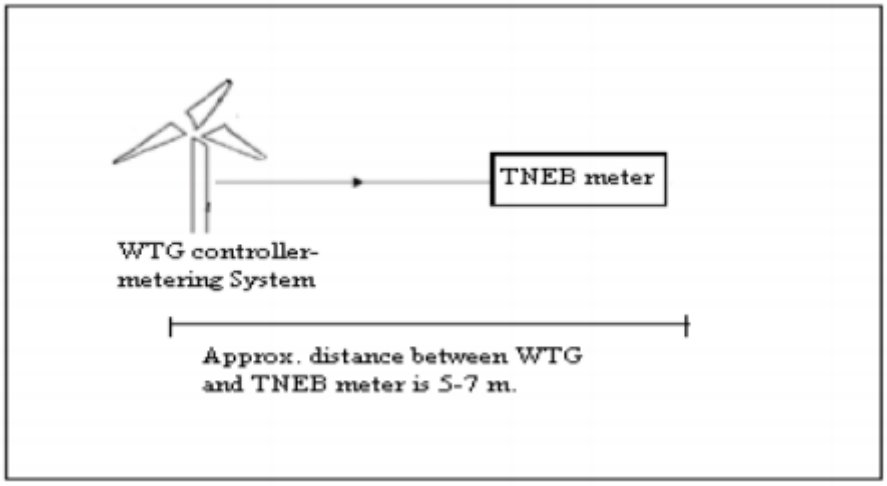
- The secondary monitoring, which is done at the individual WTGs. Each WTG is equipped with an integrated electronic meter. These meters are connected to the Central Monitoring Station (CMS) of the entire wind farm through a wireless Radio Frequency (RF) network (PLC). The generation data of individual turbine can be monitored as a real-time entity at CMS.

- In case the JMR date is not matching with the start / end of monitoring period, the generation units shall not be considered for emission reductions for that particular period. Moreover, in-case the main meter gets defected, the corresponding data for emission reduction calculation shall also not be considered.

<u>The monitoring system consists of monitoring of two parameters:-</u>

- Reading of electricity import & export at the WTG controller.

- Reading of electricity import & export at the metering point of TNEB, located approximately 5 - 7 m. from the WTG. Each WTG has its individual EB meter, installed by the State utility.



Hence there is no need to apportion electricity generation in case of WTGs located in Tamil Nadu.

The import & export figure at WTG controller & EB meter will be recorded by the O & M contractor on a daily basis. This data will be preserved electronic form. The summary of the generation will be submitted by them to the PP on a weekly & monthly basis.

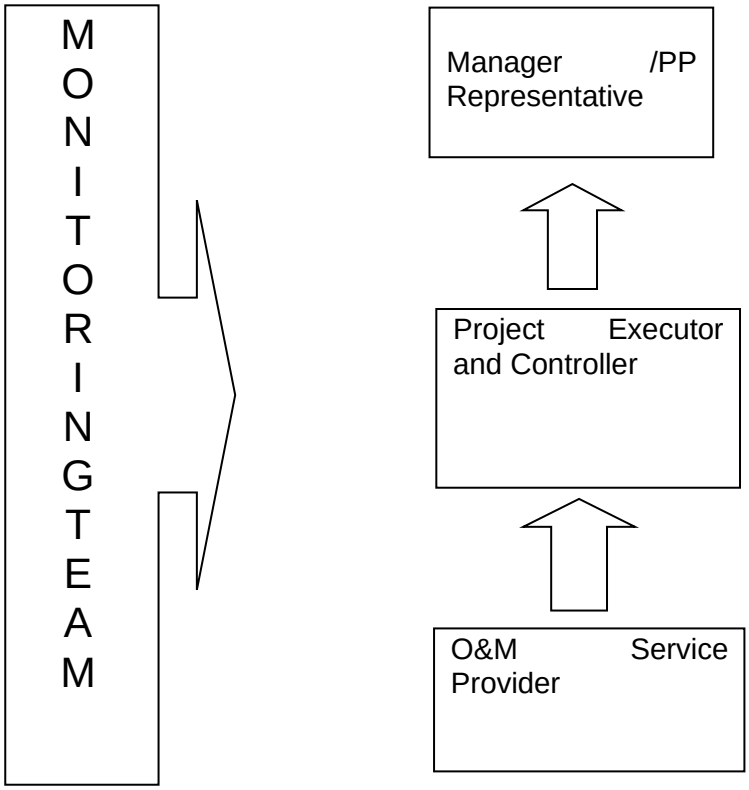
The TNEB meter will be the main source for monitoring net export to the grid. On 10th -15th day of each month the reading from the TNEB meter will be recorded by the engineers of the state utility in presence of the O & M contractor. Subsequently the JMR will be prepared.

Hence at TNEB metering point,

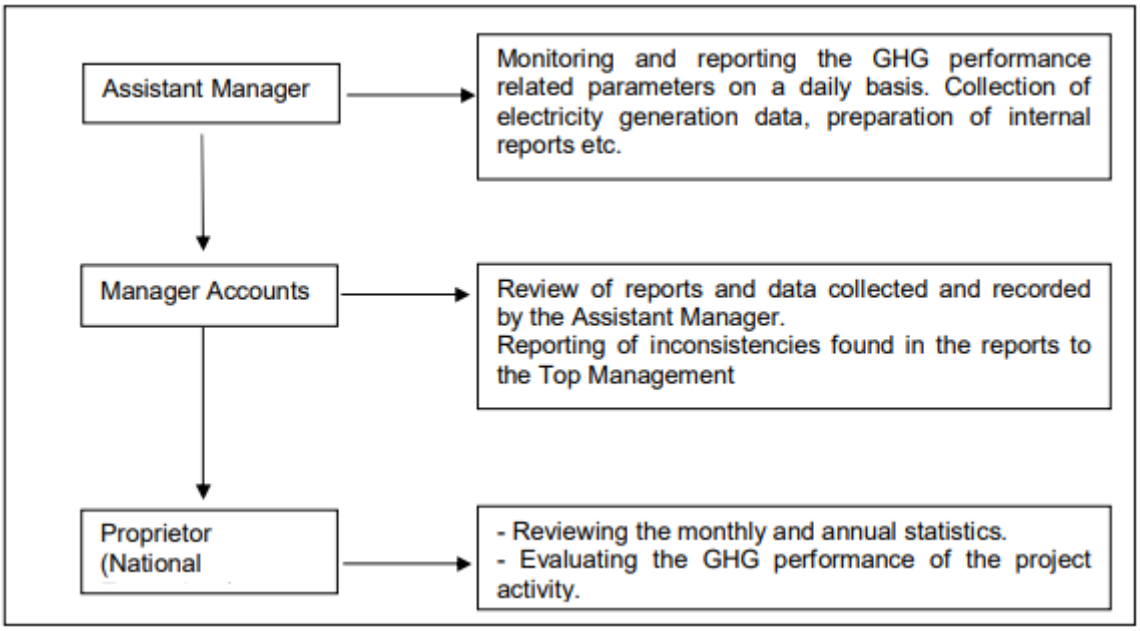
$$E_{Net,y} = E_{export,y} - E_{import,y}$$

The TNEB meters are scheduled to be calibrated once in a year or whenever required. The entire responsibility of this task lies with the state utility. The meters have an accuracy class of 0.5 %. TNEB has an on-site testing & calibration arrangement; hence there is no need to dismantle the meter for calibration. In case the meters are found faulty and hard to calibrate against the prescribed accuracy class the meter will be replaced by the state utility.

Reading at WTG controller is recorded as a secondary & failsafe measure in case of malfunctioning of the TNEB meter. The site engineer cross check & review the generation at controller & TNEB meter on a daily basis, in case of any deviation, he reports to the O & M in-charge & the state utility. The data is archived in electronic form.



Team Hierarchy – Project Promoter



The representation shown above states the hierarchy followed by the CDM Monitoring Team for the project activity.

The responsibilities of CDM monitoring team is presented below:

Designation	Responsibilities
Manager Wind Projects (PP)	• Holds complete control over monitoring aspects pertaining to the project • Frequency of management review to be conducted at the site is once in a year
Project Executer and Controller	• Operation • Recording • Verification of data • Site visit to check authenticity of data and take corrective action, wherever necessary • Storage of data
Operation and Maintenance service provider	• Operation, Monitoring and Verification of data • Data recording • Storage of data

Routine Maintenance Services:

The project proponent has signed an "Operation and Maintenance" agreement with the supplier of the wind turbines for the operation of the wind farm which will be applicable from the beginning of the 2nd year from the date of commissioning. Till then according to the purchase order agreement, the operation and maintenance of the wind farm shall be managed by the wind farm supplier all free of cost for a period of 1 year from the date of commissioning. The O & M management structure is as follows:

Routine Maintenance Labour Work involves making available suitable manpower for operation and maintenance of the equipment and covers periodic preventive maintenance, cleaning and upkeep of the equipment including –

a) Tower Torquing
b) Blade Cleaning
c) Nacelle Torquing and Cleaning
d) Transformer Oil Filtration
e) Control Panel & LT Panel Maintenance
f) Site and Transformer Yard Maintenance

Security Services: This service includes watch & ward and security of the wind farm and the equipment.

Management Services:

a) Data logging in for power generation, grid availability, machine availability.
b) Preparation and submission of monthly performance report in agreed format.
c) Taking monthly meter reading jointly with utility of power generated at wind farm and supplied to grid from the meter/s maintained by utility for the purpose and co-ordinate to obtain necessary power credit report/ certificate.

Technical Services:

a) Visual inspection of the WTG and all parts thereof.
b) Technical assistance including checking of various technical, safety and operational parameters of the equipment, trouble shooting and relevant technical services.

Annual and monthly training schedules are organized by the manufacturers and suppliers of the wind turbines.

Training:

Training of staff operating and maintaining the WTGs is carried out by the WTG manufacturer and supplier (Suzlon Energy Limited.) Special emphasis is given to the training of the employees to enable them to develop their skills to meet changing WTG technology and to provide efficient and effective O&M services. There is an initial learning program as well as continuous learning programs for all employees. All newly-hired employees are required to attend an intensive two- to four-week, fulltime training program to familiarize them with business and operations.

Besides the usual training programs for their staff Suzlon Energy Limited (SEL) conducts specific familiarization capsules for customers, such that they are fully aware of the capabilities of the highly sophisticated WTGs of SEL. The training program focuses mainly on the management, monitoring and maintenance, and safety and reliability aspects of wind power. The objectives include:

1. Understanding the various stages and aspects in the management of Wind Power systems
2. Understanding the importance of monitoring and maintenance of Wind Power systems and hence the various tasks involved in this
3. Understanding the importance of safety and reliability aspects involved with Wind Power and the measures taken.
4. Managing generation and other data for future reference.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	Simple operating margin emission factor (inclusive of imports) - $\mathbf{EF_{grid,OM,y}}$
Unit	tCO_2/MWh
Description	Simple Operating Margin CO_2 emission factor of the grid
Source of data	CO_2 Baseline Database for the Indian Power Sector, User Guide (Version 5, Date: November, 2009)
Value(s) applied	0.9871
Choice of data or measurement methods and procedures	Information available from authorised government agencies – National standard value has been calculated by Central Electricity Authority (CEA) as per guidelines of the 'Tool to calculate the emission factor for an electricity system, Version 02.2.1, EB 63'

Purpose of data/parameter	Calculation of Baseline Emission
Additional comments	The calculation of baseline emission has been done ex ante its value will remain fixed for the entire crediting period.

Data/Parameter	Build margin emission factor- **$EF_{grid,BM,y}$**
Unit	tCO_2/MWh
Description	Build Margin CO_2 emission factor of the grid
Source of data	CO_2 Baseline Database for the Indian Power Sector, User Guide (Version 5, Date: November, 2009)
Value(s) applied	0.8179
Choice of data or measurement methods and procedures	Information available from authorised government agencies – National standard value has been calculated by Central Electricity Authority (CEA) as per guidelines of the 'Tool to calculate the emission factor for an electricity system, Version 02.2.1, EB 63'
Purpose of data/parameter	Calculation of Baseline Emission
Additional comments	The calculation of baseline emission has been done ex ante its value will remain fixed for the entire crediting period.

Data/Parameter	Combined margin emission factor- **$EF_{grid,CM,y}$** (for Southern Regional Grid)
Unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor of the grid
Source of data	Calculated as per formulae and procedures provided in Section B.6.3 of this PDD
Value(s) applied	0.9448
Choice of data or measurement methods and procedures	The **$EF_{grid,CM,y}$** calculation is based on the guidelines in "Tool to calculate the emission factor for an electricity system" (Version 02.2.1, EB 63)
Purpose of data/parameter	Calculation of Baseline Emission
Additional comments	The calculation of baseline emission has been done ex ante its value will remain fixed for the entire crediting period.

D.2. Data and parameters monitored

Data/Parameter	Net Electricity supplied to Southern Regional Grid; **$EG_{BL,y}$**
Unit	MWh/year
Description	Net Electricity supplied to Southern Regional Grid
Measured/calculated/ default	Calculated
Source of data	Joint Meter Reading (JMR) which is prepared in the presence of SEB personnel and a representative from the O & M contractor
Value(s) of monitored parameter	39355.291
Monitoring equipment	The energy generated by each WTG is measured using the 'energy meters' installed at the WTG site and the total electricity generated by the WTGs is calculated by adding the individual WTGs readings.
Measuring/reading/recording frequency	The measuring/ reading/ recording frequency of energy generated by each WTG: Frequency of Measuring & recording (by CMS): Continuous Frequency of Reading: Monthly Frequency of energy meter Calibration: Once in a year

Calculation method (if applicable)	The data would be measured by calculating the difference between the total electricity export and total electricity import by the main meters of Tamil Nadu State Electricity Board located near to the WTGs. The main meters will be calibrated and maintained by State Electricity Board. The meter readings from the main meters will be cross checked by the controller panel located at the Central Monitoring Station (CMS) maintained by Suzlon Energy Limited. Invoices pertaining to the sale of the electricity to the grid will be used as evidence. The manager of the WTGs will be responsible for verifying the quantum of electricity exported to the grid vis-à-vis the net electricity generated from the wind power generating unit within the same time period.
QA/QC procedures	The calibration of the electricity quantum measuring meters is under the purview of the state electricity authorities as per its calibration schedule. The meters are calibrated once in a year by the authority. Monthly electricity sale payment receipts would be used as a cross check of the data recorded.
Purpose of data/parameter	Emission Reduction calculation.
Additional comments	The parameter would be monitored ex-post and used for emission reduction computation. The relevant data will be recorded in electronic form and the same along with the electricity bills will be archived for two years beyond the crediting period.

Data/Parameter	**$EG_{export,y}$**
Unit	MWh/year
Description	Total export from the WTG at TNEB meter in a year y
Measured/calculated/ default	Measured
Source of data	Monitored through meters. For emission reduction calculations this is taken from the Monthly statement of TANGEDCO prepared based on Joint Meter Reading (JMR) which is taken in the presence of TNEB personnel and a representative from the O & M contractor.
Value(s) of monitored parameter	39895.525
Monitoring equipment	The energy generated by each WTG is measured using the 'energy meters' installed at the WTG site and the total electricity generated by the WTGs is calculated by adding the individual WTGs readings.
Measuring/reading/recording frequency	The measuring/ reading/ recording frequency of energy generated by each WTG: Frequency of Measuring & recording (by CMS): Continuous Frequency of Reading: Monthly Frequency of energy meter Calibration: Once in a year
Calculation method (if applicable)	The value of total export will be taken from the TNEB meter adjacent to the WTG.
QA/QC procedures	The calibration of the electricity quantum measuring meters is under the purview of the state electricity authorities as per its calibration schedule. The meters are calibrated once in a year by the authority. Monthly electricity sale payment receipts would be used as a cross check of the data recorded.
Purpose of data/parameter	Emission Reduction calculation
Additional comments	Data will be archived during the whole crediting period + 2 years

Data/Parameter	**$EG_{import,y}$**
Unit	MWh/year
Description	Total import from the WTG at TNEB meter in a year y
Measured/calculated/ default	Measured

Source of data	Monitored through meters. For emission reduction calculations this is taken from the Monthly statement of TANGEDCO prepared based on Joint Meter Reading (JMR) which is taken in the presence of TNEB personnel and a representative from the O & M contractor.
Value(s) of monitored parameter	420.283
Monitoring equipment	The energy generated by each WTG is measured using the 'energy meters' installed at the WTG site and the total electricity generated by the WTGs is calculated by adding the individual WTGs readings.
Measuring/reading/recording frequency	The measuring/ reading/ recording frequency of energy generated by each WTG: Frequency of Measuring & recording (by CMS): Continuous Frequency of Reading: Monthly Frequency of energy meter Calibration: Once in a year
Calculation method (if applicable)	The value of total export will be taken from the TNEB meter adjacent to the WTG.
QA/QC procedures	The calibration of the electricity quantum measuring meters is under the purview of the state electricity authorities as per its calibration schedule. The meters are calibrated once in a year by the authority. Monthly electricity sale payment receipts would be used as a cross check of the data recorded.
Purpose of data/parameter	Emission Reduction calculation
Additional comments	Data will be archived during the whole crediting period + 2 years

D.3. Implementation of sampling plan

Not Applicable

SECTION E. Calculation of emission reductions or net anthropogenic removals

E.1. Calculation of baseline emissions or baseline net removals

Baseline emissions are given as:

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

Where:

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

$EF_{CO2,grid,y}$= CO_2 Emission Factor in year 'y '= $EF_{grid,CM,y}$

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

BE_y= 39,355.291 MWh*0.9448 tCO_2e/MWh

BE_y=37,182 tCO_2e (round-down to nearest integer)

Hence

BE_y= 37,182 tCO_2e

E.2. Calculation of project emissions or actual net removals

As the project activity is a wind power project, there are no anthropogenic emissions by sources of GHGs within the project boundary as a result of the project activity. Hence there are no project emissions to be considered.
Thus, $PE_y=0$

E.3. Calculation of leakage emissions

There are no anthropogenic emissions identified by sources outside the project boundary due to the project activity. Furthermore, the equipments (WTGs) used by the project activity are newly procured and hence not transferred from another project. Thus, there are no leakage emissions attributable to the project activity.
Thus, $LE_y=0$

E.4. Calculation of emission reductions or net anthropogenic removals

	Baseline GHG emissions or baseline net GHG removals (t CO_2e)	Project GHG emissions or actual net GHG removals (t CO_2e)	Leakage GHG emissions (t CO_2e)		GHG emission reductions or net anthropogenic GHG removals (t CO_2e)		
				Before 01/01/2013	From 01/01/2013 until 31/12/2020	From 01/01/2021	Total amount
Total	37,182	0	0	0	37,182	0	37,182

E.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the registered PDD

Amount achieved during this monitoring period (t CO_2e)	Amount estimated ex ante for this monitoring period in the PDD (t CO_2e)
37,182	54,394

E.5.1. Explanation of calculation of "amount estimated ex ante for this monitoring period in the PDD"

Considering the annual average emission reductions as per the registered PDD which is 6,818 tCO_2e per year, the number of days covered during the current monitoring period comes out to be 2912 days, based upon which the estimated emission reductions attributed to this monitoring period comes out to be 54,394 tCO_2e. The detailed calculation can be referred from the emission reduction sheet.

E.6. Remarks on increase in achieved emission reductions

It is to be noted here that as per the estimated emission reduction to be achieved from the project activity for the current monitoring period is 54,394 tCO_2e, whereas actual emission reductions achieved are 37,182 tCO_2e, which is approximately 32% lower than the estimated emission reductions. This is due to low PLF achieved during the current monitoring period as compared to the PLF in the registered PDD.

E.7. Remarks on scale of small-scale project activity

The project Activity remains as a Small –Scale project activity for the entire monitoring period.

Appendix-1

Meter Calibration Details

WTG HTSC No.	Meter Type	Meter Make	Meter Serial No.	Meter Accuracy Class	Date of Calibration
2848	Main	Secure	X0369793	0.2s	16/02/2021
2849	Main	Secure	X0369644	0.2s	16/02/2021

Note: - As per previous verification, calibration is done on 23/02/2013 as per the monitoring plan next calibration is due till 22/02/2014, Error factor will not be applied till Feb 2014. Error factor has been applied due to delay in calibration applied from 22/02/2014 with accuracy class 0.5s till 13-12-2017. Meter has been changed on 14-12-2017 with meter accuracy class 0.2s. No error factor has been applied till 13-12-2018. Error factor has been applied with accuracy class 0.2s from 13-12-2018 onwards due to delay in calibration till 31-12-2020.

Appendix 2

Breakdown Details

Gen. Date	Site	Loc. No.	Breakdown Remark	Breakdown Hrs.
07-Apr-13	Balapathiramapuram	TDA 74	Pitch EmergencyRun	18.7
08-Aug-13	Balapathiramapuram	TDA 74	Elec SafetyChainStop	24.0
13-Nov-13	Balapathiramapuram	TDA76	Battery Charger2 Disconnected	17.2
23-Dec-13	Balapathiramapuram	TDA 74	Elec FB GeneratorFan	21.2
25-Feb-14	Balapathiramapuram	TDA76	DFIG Inverter Fault Shutdown	17.2
15-May-14	Balapathiramapuram	TDA76	Damper FullLoad Osc Stop	18.5
30-Jul-14	Balapathiramapuram	TDA76	Pitch EmergencyRun	21.0
04-Aug-14	Balapathiramapuram	TDA 74	Rep Pitch FreqConvPitch3 ErrStop	19.6
08-Sep-14	Balapathiramapuram	TDA 74	DFIG Invrtr CANFail	24.0
15-Nov-14	Balapathiramapuram	TDA 74	Damper FullLoad Osc Stop	21.2
16-Feb-15	Balapathiramapuram	TDA76	Rep Pitch EmergencyRun	23.0
15-May-15	Balapathiramapuram	TDA76	Rep Pitch FreqConvPitch1 ErrStop	24.0
23-Aug-15	Balapathiramapuram	TDA76	Rep Pitch FreqConvPitch1 ErrStop	24.0
24-Nov-15	Balapathiramapuram	TDA76	Rep Pitch FreqConvPitch1 ErrStop	23.9
03-Dec-15	Balapathiramapuram	TDA74	Elec FB GeneratorFan	19.6
04-Feb-16	Balapathiramapuram	TDA74	DFIG Inverter Fault Shutdown	24.0
27-Mar-16	Balapathiramapuram	TDA74	Pitch EmergencyRun	21.2
28-May-16	Balapathiramapuram	TDA 76	Rep Pitch FreqConvPitch3 ErrStop	23.0
29-Sep-16	Balapathiramapuram	TDA 76	DFIG Invrtr CANFail	24.0
11-Oct-16	Balapathiramapuram	TDA 76	Pitch EmergencyRun	24.0
31-Dec-16	Balapathiramapuram	TDA 76	Rep Pitch FreqConvPitch3 ErrStop	24.0
01-Mar-17	Balapathiramapuram	TDA 74	DFIG Invrtr CANFail	23.9
02-Apr-17	Balapathiramapuram	TDA 76	Damper FullLoad Osc Stop	19.6
03-Jun-17	Balapathiramapuram	TDA 74	Rep Pitch EmergencyRun	24.0
17-Nov-17	Balapathiramapuram	TDA 76	Pitch EmergencyRun	18.7
21-Dec-17	Balapathiramapuram	TDA74	Elec SafetyChainStop	24.0
25-Jan-18	Balapathiramapuram	TDA74	Battery Charger2 Disconnected	17.2
26-Apr-18	Balapathiramapuram	TDA76	Elec FB GeneratorFan	21.2
28-May-18	Balapathiramapuram	TDA76	Rep Pitch FreqConvPitch1 ErrStop	17.2
12-Jul-18	Balapathiramapuram	TDA76	Rep Pitch FreqConvPitch1 ErrStop	21.0
20-Aug-18	Balapathiramapuram	TDA76	Elec FB GeneratorFan	19.6
21-Oct-18	Balapathiramapuram	TDA 74	DFIG Inverter Fault Shutdown	24.0
25-Dec-18	Balapathiramapuram	TDA74	Pitch EmergencyRun	18.7
16-Jan-19	Balapathiramapuram	TDA 76	Rep Pitch FreqConvPitch3 ErrStop	24.0
17-Mar-19	Balapathiramapuram	TDA 76	Damper FullLoad Osc Stop	17.2
20-May-19	Balapathiramapuram	TDA 74	Rep Pitch EmergencyRun	21.2
28-Jul-19	Balapathiramapuram	TDA 76	Pitch EmergencyRun	19.6
20-Aug-19	Balapathiramapuram	TDA 74	Elec SafetyChainStop	24.0
25-Sep-19	Balapathiramapuram	TDA 76	Battery Charger2 Disconnected	18.7
26-Nov-19	Balapathiramapuram	TDA 74	Elec FB GeneratorFan	16.5
27-Feb-20	Balapathiramapuram	TDA 74	Rep Pitch FreqConvPitch1 ErrStop	17.2
05-Apr-20	Balapathiramapuram	TDA 74	Rep Pitch FreqConvPitch1 ErrStop	24.0

06-Jul-20	Balapathiramapuram	TDA 76	Pitch EmergencyRun	17.2
16-Sep-20	Balapathiramapuram	TDA 76	Rep Pitch FreqConvPitch3 ErrStop	21.2
15-Oct-20	Balapathiramapuram	TDA 74	DFIG Invrtr CANFail	18.0
28-Dec-20	Balapathiramapuram	TDA 76	Pitch EmergencyRun	24.0

Document information

Version	*Date*	*Description*
09.0	8 October 2021	Revision to: • Ensure consistency with version 03.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN).
08.0	6 April 2021	Revision to: • Reflect the "Clarification: Regulatory requirements under temporary measures for post-2020 cases" (CDM-EB109-A01-CLAR).
07.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Add a section on remarks on the observance of the scale limit of small-scale project activity during the crediting period; • Add "changes specific to afforestation or reforestation project activity" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R project activities between two commitment periods; • Make editorial improvements.
06.0	7 June 2017	Revision to: • Ensure consistency with version 01.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.

Version	*Date*	*Description*
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB 70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

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