Monitoring report form for CDM project activity
(Version 07.0)

MONITORING REPORT		
Title of the project activity	14.7 MW Bundled Wind Power Project in the state of Maharashtra and Rajasthan, India	
UNFCCC reference number of the project activity	7370[1]	
Version number of the PDD applicable to this monitoring report	01.7	
Version number of this monitoring report	01	
Completion date of this monitoring report	23/08/2019	
Monitoring period number	03	
Duration of this monitoring period	02/01/2017 to 30/06/2019 (both days included)	
Monitoring report number for this monitoring period	01	
Project participants	M/s Gangadhar Narsingdas Agrawal, (HUF) Belektron d.o.o.	
Host Party	India	
Applied methodologies and standardized baselines	Methodology: AMS I.D – Grid connected renewable electricity generation – version 17 Standardised Baseline: Not applicable	
Sectoral scopes	Sectoral Scope 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**
	0 tCO_2e	37,553 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	60,554 tCO_2e	

[1] https://cdm.unfccc.int/Projects/DB/KBS_Cert1348206213.9/view

SECTION A. Description of project activity

A.1. General description of project activity

The project activity consists of electricity generation from renewable wind power. It comprises of seven Wind Turbine Generators (WTG) of a total capacity of 14.7 MW in the state of Maharashtra and Rajasthan. The WTGs used in the project activity are manufactured by Suzlon Energy Limited. It is a bundled project consisting of three WTGs of 2.1 MW capacity (3x2.1MW) located in Maharashtra and other four WTGs of 2.1 MW (4x2.1MW) capacity in Rajasthan. The project activity is promoted by Gangadhar Narsingdas Agrawal (HUF) (hereinafter referred to as GNA), Agrawal Minerals (Goa) Private Limited (herein after referred to as AMG) and Kamala Properties Limited (herein after referred to as KPL). GNA is the nodal point of contact for this particular project activity.

Brief description of the installed technology and equipments:

The technical specifications of the S-88 Suzlon 2100 WTGs are as follows:

Parameters	**Specification**
Rotor:	
Installed electrical output	2100 kW
Diameter	88 m
Cut in wind speed	4 m/s
Rated wind speed	14 m/s
Rotor material	Epoxy bonded fiber glass
Regulation	Pitch
Rotor Swept Area	6082 m^2
Cut-out wind speed	25 m/s
Rotational speed	15.4 RPM
Generator:	
Pitch system	Pitch regulated, electrical
Type	Asynchronous generator, 4 Poles with slip ring
Rates Output	2100 kW
Rotational speed	1010/1515 RPM
Operating voltage	690/ 600 V
Frequency	50/60 Hz
Insulation Class	H
Cooling system	Air cooled
Gear Box:	
Manufacturer	Winergy
Type	3 stage (1 planetary and 2 helical)
Gear Ratio	1:98.8/1:118.1
Nominal Load	2200kW
Cooling	Air cooled
Yaw System:	
Drive	3 electrical driven planetary drives
Bearing	Polyamide slide
Safety System:	
Mechanical brake	Hydraulic disc brake

The Commissioning dates, capacity, location number, location for all the WEGs of the project activity for each WEG is provided in table below:

Ownership	WTG Capacity	WTG No.	Site	Start date of the project activity	Commissioning Date	Registration of project activity under CDM
GNA	2.1 MW	C-61	Chakla	22/09/2010	30/07/2011	01/10/2012
		C-31			31/03/2011	
		C-10			29/03/2011	
AMG		MK-61	Mokla		25/01/2011	
AMG		MK-62			25/01/2011	
KPL		MK-4			25/01/2011	
GNA		SKD-192	Tejuva		31/03/2011	

Total emission reductions achieved in this monitoring period:

During the reported monitoring period 02/01/2017 to 30/06/2019 (First and last date included) the project activity has supplied 39,368 MWh of electricity, and thus contributing to the GHG reductions of 37,553 tCO2e.

A.2. Location of project activity

The project activity is located at Serawa village in Jaisalmer district of Rajasthan, Gangapur and Vasdare villages in Nandurbar district in Maharashtra.

The geographical location of the project site is described in the table below:

WTG ID No.	Site	State	Latitude	Longitude
C-61	Chakla	Maharashtra	21° 14’ 49.40” N	74° 17’ 32.28” E
C-31			21° 17’ 37.34” N	74° 16’ 25.22” E
C-10			21° 18’ 39.17” N	74° 17’ 55.96” E
MK-61	Mokla	Rajasthan	27° 11’ 34.63” N	70° 39’ 36.77” E
MK-62			27° 11’ 27.99” N	70° 39’ 54.48” E
MK-4	Tejuva		27° 10’ 53.56” N	70° 37’ 54.32” E
SKD-192			27° 12’ 9.99” N	70° 36’ 35.55” E

A.3. Parties and project participants

Party involved	Project participants	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
India	Gangadhar Narsingdas Agrawal, (HUF)	No
United Kingdom of Great Britain and Northern Ireland	Belektron d.o.o.	No

A.4. References to applied methodologies and standardized baselines

According to APPENDIX B of “Simplified modalities and procedures for small-scale clean development mechanism project activities” the type and category of project activity are given below:

Title : Grid connected renewable electricity generation[2]
Reference : AMS - I.D.
Version : 17
Tool : "Tool to calculate the emission factor for an electricity system" Version 02.2.1EB 63 Annex 19[3]

A.5. Crediting period type and duration

Type of crediting period	Fixed
Crediting period from	15/10/2012 - 14/10/2022
Length of the Crediting Period	10 Years
Current Monitoring period from	02/01/2017-30/06/2019
Length of the Monitoring Period	Days

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The total installed capacity of the project is 14.7 MW, which comprises in total 7 no. Wind Turbine Generator (WTG) at Maharashtra and Rajasthan. The technology used for the project activity is of Suzlon Energy Limited. The commissioning date of all the WTGs of the project activity is given below.

WTG Owner	WTG No.	Capacity MW	Site	District	Commissioning Date
GNA	C-61	2.1	Chakla	Nandurbar	30/07/2011
	C-31	2.1			31/03/2011
	C-10	2.1			29/03/2011
AMG	MK-61	2.1	Mokla	Jaisalmer	25/01/2011
	MK-62	2.1			25/01/2011
KPL	MK-04	2.1			25/01/2011
GNA	SKD-192	2.1	Tejuva		31/03/2011

All the WTGs have run successfully during the reported monitoring period. All the physical and technical features as stated in the registered PDD are in place and project has been operated as described in the registered PDD.

No events or situations happened during the reported monitoring period which can alter the applicability of the applied methodology.

B.2. Post-registration changes

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

There is no request for deviation applied during this monitoring period.

B.2.2. Corrections

Not Applicable.

[2] http://cdm.unfccc.int/UserManagement/FileStorage/V9LRSXKP24Q7YT6HZDUBO3C0ING8AJ
[3] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf

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

There has not been any change in the monitoring plan during the current monitoring period

B.2.6. Changes to project design

There has not been any change in the project design during the current monitoring period.

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

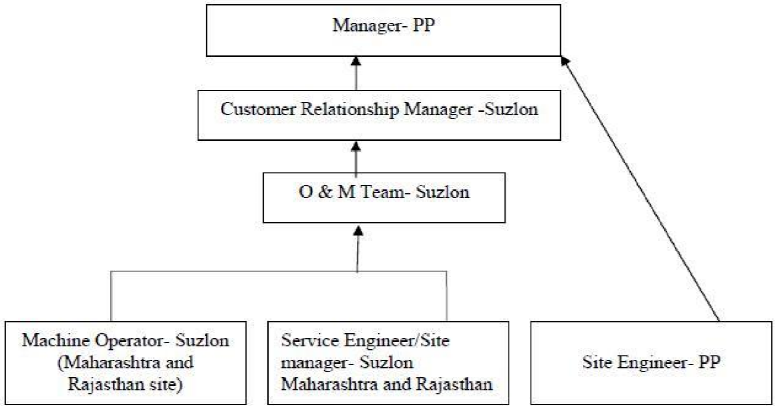
Not Applicable.

SECTION C. Description of monitoring system

Monitoring plan for both sites

Organisational Structure

The operational and management structure implemented by PPs and Suzlon Infrastructure & Service Limited is as follows:



The entire wind power machines are under the supervision of Manager of the respective PPs.

Maintenance Procedure

The Operations & Maintenance Team of Suzlon is responsible for time to time review, check, internal audit, authorize & forward monitoring data to Manager of respective PPs (GNA, AMG and KPL) through Suzlon customer Relations Manager (CRM) and web portal. The Manager of respective PP reviews& suggests immediate corrective action as and when required. A service engineer in operation and maintenance of major mechanical and electrical equipment has been appointed as Site Manager by Suzlon. A site engineer from PP at the site shall supervise the wind power plant operating under the guidance of the Site Manager and independently report to Manager of concerned PP. The Site Manager shall be responsible for the Operation &

Maintenance of all wind turbines, maintaining logbooks, archiving of recorded values, preparing periodic summary break down reports and also for maintaining and issue various spare parts and consumables.

Training

Technology supplier Suzlon is rendering Operation & Maintenance of WTGs supplied Suzlon Personnel's are well-trained in Operation & Maintenance as Suzlon Group is an ISO certified organisation (Environment Management System Certificate as per ISO14001:2004 standard; Quality Management System Certificate as per ISO 9001:2008 standard; Occupational Health and Safety Management System Standard as per OSHAS 18001:2007;

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff is trained. The site personnel are trained in equipment operation, data recording, operation and maintenance and emergency procedures in compliance with the monitoring plan. O&M Service provider is responsible for the training of the staff.

Calibration of meters

The meters at substation are installed by the state electricity board and calibrated once in three years regularly. In case, the meters are found to be outside the acceptable limits of accuracy or if not functioning properly, necessary action will be taken and the meters will be repaired or replaced immediately. No such incidence occurred during current monitoring period.

Data collection and archiving

The daily data at the site is collected in electronic form. Monthly data is also collected and maintained in plant log books. The project proponent shall keep complete and accurate records of all the data as a part of monitoring for at least a period of 2 years after the end of the crediting period or the last issuance of CERs for the project activity, whichever occurs later.

Metering arrangement for the Maharashtra site:

The generated electricity is measured through a two-step procedure wherein the first metering is carried out at the controller of the machine with on-board meter. The monitoring of all these wind turbines is done from a Central Monitoring Station (CMS) as a part of central monitoring system. The system consists of a state- of- the- art controlling and monitoring and well trained staff personnel of O&M contractor. At the CMS, a daily report is generated (Daily Progress Report, DPR) and sent to the Customer Relationship Management (CRM) division. The CRM division keeps a record of the DPRs and compiles them into a monthly Excel Spreadsheet. This information is available to the project proponent.

- O&M service provider takes meter reading at the project proponent WTG controller meter ($\mathbf{EG_{controller,PP}}$). Service provider also takes reading of other WTG controller meter in the wind farm ($\mathbf{EG_{controller,ALL}}$)
  The second metering is carried out sub-station at the feeder to which the WTGs are connected to, wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC.
- Apportioning of the net electricity supplied to MSEDCL by all the WTGs connected to the feeder between all promoters is done by MSEDCL, while Suzlon provides data for the electricity generation of individual WTG at the controller meter.

The net electricity exported (EG y to the feeder by project activity is referred from monthly Joint meter readings recorded by MSEDCL representative and a representative from Suzlon. The various WTGs in the site are connected to feeder by which the power is exported to nearest substation. The summation of all the WTG meter reading on the feeder gives the gross amount of

electricity generated (EG Controller, All). The power generated by individual WTGs is recorded at the central monitoring system (CMS). The summation of power generated by the WTG owned by the project proponent gives the amount of power exported by the project activity to the feeder ($EG_{Controller, PP}$). The main meter of accuracy class of 0.2s at substation feeder, records total export ($EG_{y\ exp}$), and total import ($EG_{y\ imp}$) by all the connected WTGs to the feeder. The electricity export & import by WTGs of PP is then calculated by using the following formulae as given below. This is the billable reading against which the PP raises invoice to the MSEDCL.

Total Electricity exported by Project activity $EG_{p\ export} = (EG_{Controller\ PP}/EG_{Controller\ ALL})*(EG_{y\ exp})$ Total Electricity imported by Project activity $EG_{p\ import} = (EG_{Controller\ PP}/EG_{Controller\ All})*(EG_{y\ imp})$

$EG_y = EG_{p\ export} - EG_{p\ import}$

Where:

$EG_{p\ export}$ = *Electricity exported to the electricity grid by the project activity.*

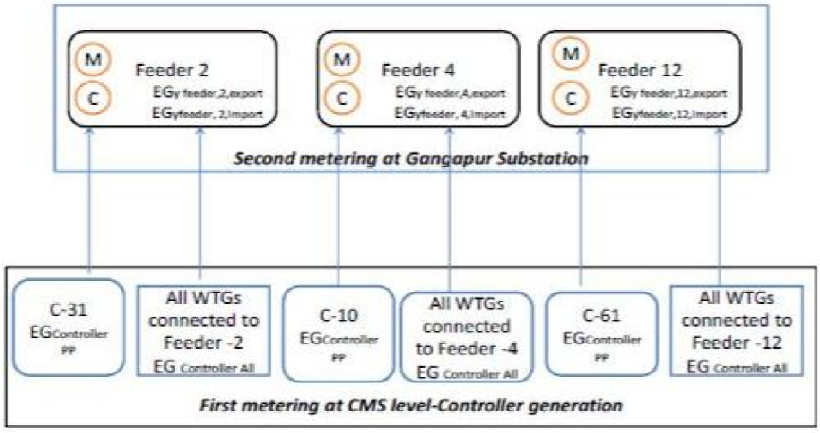
$EG_{Controller\ PP}$ = *Total electricity generated by the project activity.* The electricity generated at each individual WTG is measured using an integrated electronic meter which monitors the data. The total electricity generated is obtained by adding individual meter values from CMS controller. The data is also recorded in the log books on a monthly basis and is archived electronically by O&M service provider.

$EG_{Controller\ All}$ = *Total electricity generated by all the WTGs (including WTGs of other project promoters, if any) connected to the feeders.* It is measured using integrated electronic meters at each WTG which monitor the data. The total electricity generated is obtained by adding individual meter values.

$EG_{y\ exp}$ = *Total export by all WTGs (including WTGs of other project promoters, if any) connected at the feeder.* The electricity exported to the substation is measured by electronic meters at the substation feeder end. These readings are jointly recorded every month by MSEDCL representative and a representative of GNA/Suzlon as Joint Meter readings.

$EG_{y\ imp}$ = *Total import by all WTGs(including WTGs of other project promoters, if any) connected at the feeder.* The electricity imported to the substation is measured by electronic meters at the substation feeder end. These readings are jointly recorded every month by MSEDCL representative and a representative of GNA/Suzlon as Joint Meter readings.

Based on the apportioned value, MSEDCL issues Energy Share Certificate which is used by the project proponent to raise invoice from MSEDCL. Diagram on Metering arrangement for 2.1 MW WTGs connected to Gangapur Substation in Maharashtra is presented below:



Metering arrangement for the Rajasthan site:

The generated electricity is measured through a three step procedure.

First metering:

The first metering is carried out at the controller of the machine with on-board meter. The monitoring of all these wind turbines is done from a Central Monitoring Station (CMS) as a part of central monitoring system. From this CMS of following parameters are sourced

1. $EG_{controller, ALL}$
2. $EG_{controller, ALL\ WTG, feeder,}$
3. $EG_{controller, individual}$

At the CMS, a daily report is generated (Daily Generation Report, DGR) and sent to the Customer Relationship Management (CRM) division. This information is available to the PP.

Second metering:

The second metering is carried out at feeder, wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. This metered reading is the input parameter to calculate the line losses till 33kV feeder metering point. The JMR gives both the "export" and "import" of the electricity to/ from the grid. This metering point records the following parameters

4. $EG_{Feeder, export}$
5. $EG_{Feeder, import}$

Similarly JMR is carried out at all feeders of this wind farm connected to the Mokla sub-station. The following parameters are calculated from JMR's of feeders connected to wind farm.

6. $EG_{Feeder, ALL, export}$
7. $EG_{Feeder, ALL, import}$

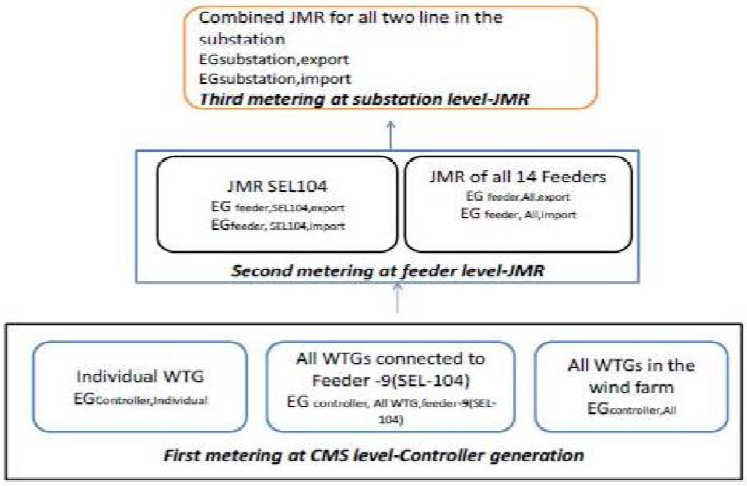
Third metering:

The third metering is carried out at sub-station (220kV side), Amarsagar GSS (Grid substation), wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. Substation has two lines with separate energy meter in each line. The JMR contains combined export and import reading for all the two lines. This JMR is used for calculation of the amount of electricity supplied to the grid against which the utility makes the payment to the project proponent. This metered reading is the input parameter to calculate the line losses from 33kV to 220kV sub-station metering point.

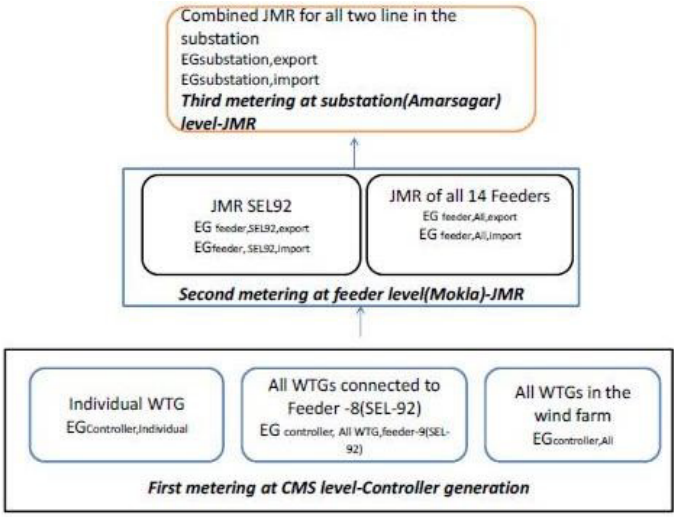
This metering point records the following parameter

8. $EG_{substation, export}$
9. $EG_{substation, import}$

The apportioning of electricity generated and consumed from the various wind turbines is done by the EPC contractor in line with the PPA and the requirements of AVVNL/JVVNL. The apportioning sheet is prepared by the EPC contractor and sent to both AVVNL/JVVNL and PP. This sheet contains the details of power exported/imported to/from the grid by each of the wind turbines connected. Net electricity exported is arrived after discounting the import from the grid and transmission losses. This apportioned value is then used by the PP to raise invoice from AVVNL/JVVNL. Diagram on metering arrangement for Rajasthan WTGs is presented below



Monitoring plan of MK-04 and SKD-192 connected to Mokla Substation in Rajasthan



Monitoring plan of MK-61 and MK-62 connected to Mokla Substation in Rajasthan

Losses calculation

Say, EG controller, ALL is the electricity generated by the all WTGs at controller end in wind farm for a month.

EG_{feeder} is electricity recorded at each feeder.
$EG_{substation}$ is electricity supplied to substation.

Hence total losses accounted at two stages, one feeder and the substation is calculated as follows

$EG_{BL,} = EG_{export, individual} - L_{export} - (EG_{import, individual} - L_{import})$

Hence individual WTG electricity supply from controller end to Feeder

$$(EG_{export,individual}) = \frac{EG_{Feeder.A,export}}{EG_{controller,ALLWTG,feeder.A}} * EG_{controler,individual}$$

Hence losses during electricity supply from Feeder to Substation

$$(L_{export}) = \frac{(EG_{FeederALL,Export} - EG_{substation,export})}{EG_{controller,ALL}} * EG_{controler,individual}$$

Similarly loss in the import is also calculated

Hence individual WTG electricity imported from controller end to Feeder

$$(EG_{import,individual}) = \frac{EG_{Feeder\,A\,import}}{EG_{controller,ALLWTG,feeder\,A}} * EG_{controler,individual}$$

Hence losses during electricity imported from Feeder to Substation

$$(L_{import}) = \frac{(EG_{FeederALL,import} - EG_{substation,import})}{EG_{controller,ALL}} * EG_{controler,individual}$$

Where,

$EG_{controller\ ALL}$ is the electricity generated by the all WTGs connected to substation for a month at controller end (kWh).
$EG_{controller,\ ALLWTG,\ feeder\ A}$ is the electricity generated by all WTGs connected to feeder A at controller end (kWh)
$EG_{controller,\ individual}$ is the total electricity supplied by each project WTG to the feeder (kWh).
$EG_{substation,\ export}$ is the total electricity supplied to the substation by all feeder connected to substation (kWh)
$EG_{substation,\ import}$ is the total electricity imported from the substation by all feeder connect to substation (kWh)
$EG_{Feeder,\ ALL,\ export}$ is the total electricity supplied to the feeder by all WTGs in a wind farm (kWh)
$EG_{Feeder,\ ALL,\ import}$ is the total electricity imported from feeder by all WTGs in a wind farm (kWh)
$EG_{Feeder\ A,\ export}$ is the total electricity exported by A, wherein the WTGs associated to project activity to substation (kWh)
$EG_{Feeder,\ A,import}$ is the total electricity imported by A from substation (kWh)

The voltage level diagram for the both sub project are described in **Annex 2** of the MR.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/parameter:	**$EF_{grid,OM,y}$**
Unit	tCO_2/MWh
Description	This is the operating margin for the NEWNE grid of India
Source of data	CEA database version 6 has been used
Value(s) applied)	0.9942
Choice of data or measurement methods and procedures	Operating Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	The data is used to calculate the combined margin for the NEWNE grid of India as per the procedures laid down in the tool to calculate emission factor for an electricity system, version 2.2.1, Annex 19, EB 63

Data/parameter:	**$EF_{grid,BM,y}$**
Unit	tCO_2/MWh

Description	This is the build margin for the NEWNE grid of India
Source of data	CEA database version 6 has been used
Value(s) applied)	0.8123
Choice of data or measurement methods and procedures	Build Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	The data is used to calculate the combined margin for the NEWNE grid of India as per the procedures laid down in the tool to calculate emission factor for an electricity system, version 2.2.1, Annex 19, EB 63

Data/parameter:	**EF_{CM}**
Unit	tCO_2/MWh
Description	Combined Margin emission factor of the NEWNE grid
Source of data	CEA database version 6 has been used
Value(s) applied)	0.9487
Choice of data or measurement methods and procedures	Combined Margin Emission Factor has been calculated by the Central Electricity Authority using the simple OM approach
Purpose of data	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments	As required by the applied methodology AMS-I.D Version 17 data from the official source need to be used for the calculation of emission factor and emission reduction. To meet this requirement here, emission factor is calculated using EF Grid, OM and EF Grid, BM. Following formula is used in calculation: $EF_{Grid,CM,y} = 0.75 \times EF_{Grid,OM} + 0.25 \times EF_{Grid,BM}$ Data will be kept for crediting period + 2 Years. The emission factor is fixed ex ante for the first crediting period.

D.2. Data and parameters monitored

Data/parameter:	**$EG_{BL,y\ GNA\ Maharashtra}$**
Unit	MWh
Description	Net electricity supplied to the grid by the Project at Maharashtra Site
Measured/calculated/default	Calculated
Source of data	MSEDCL Electricity Sharing Certificate
Value(s) of monitored parameter	18,124.33 MWh
Monitoring equipment	Energy meters are used for monitoring.
Measuring/reading/recording frequency:	Continuous monitoring, hourly measurement and monthly recording
Calculation method (if applicable):	$EG_y = EG_{p\ export} – EG_{p\ import}$
QA/QC procedures:	Energy meters at the substation are the property of respective state electricity boards and calibration of the meters are carried out by them once in three years. The quantity of net electricity supplied can be cross-verified from the invoice raised on respective SEB by the project proponent. Further in order to crosscheck energy exported to the grid by the PP WTG as indicated in MSEDCL electricity sharing certificate, the procedure explained in Section C is adopted.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks

Additional comments:	The data (electricity supplied to the grid) is archived on paper. The archive will be kept for the period up to two years after the completion of the crediting period or the last issuance of CERs for the project activity whichever occurs later.

Data/parameter:	**$EG_{BL,y}$ GNA Rajasthan**
Unit	MWh
Description	Net electricity supplied to the grid by the Project
Measured/calculated/default	Calculated
Source of data	Certificate for the net electricity exported to the grid by the WTGs associated with the project activity.
Value(s) of monitored parameter	6,627 MWh
Monitoring equipment	Energy meters are used for monitoring
Measuring/reading/recording frequency:	Measuring frequency: Continuous Recording frequency: Monthly Reading frequency: Monthly
Calculation method (if applicable):	Calculated from Total Energy Export to the Grid, Energy Import from the Grid and the gross generation data at the all WTG controller end. Metering of wind power is done as under: • The first metering is carried out at the controller of the machine with onboard meter. The monitoring of all these wind turbines is done from aCentral Monitoring Station (CMS) as a part of central monitoring system.From this CMS of following parameters are sourced 1. $EG_{controller, ALL}$ 2. $EG_{controller, ALL WTG, feeder,}$ 3. $EG_{controller, individual}$ The second metering is carried out at feeder, wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. This metered reading is the input parameter to calculate the line losses till 33kV feeder metering point. The JMR gives both the “export” and “import” of the electricity to/ from the grid. This metering point records the following parameters 4. $EG_{Feeder, export}$ 5. $EG_{Feeder, import}$ Similarly JMR is carried out at all 14 feeders of this wind farm connected to the Mokla sub-station. The following parameters are calculated from JMR’s of 14 feeders. 6. $EG_{Feeder, ALL, export}$ 7. $EG_{Feeder, ALL, import}$ The third metering is carried out at sub-station (220kV side), Amarsagar GSS (Grid substation), wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. The JMR contains combined export and import reading for all the two lines. This JMR is used for calculation of the amount of electricity supplied to the grid against which the utility makes the payment to the project proponent. This metered reading is the input parameter to calculate the line losses from 33kV to 220kV sub-station metering point. This metering point records the following parameter 8. $EG_{substation, export}$ 9. $EG_{substation, import}$ The net energy is calculated as per the following formulae: $E_{G\ BL,} = EG_{export, individual} – L_{export} – (EG_{import, individual} – L_{import})$

QA/QC procedures:	The data may be cross-checked with the invoices raised for sale of the electricity.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments:	Data archived: Crediting period + 2 yrs

Data/parameter:	**$EG_{BL,y\ AMG}$**
Unit	MWh
Description	Net electricity supplied to the grid by the Project
Measured/calculated/default	Calculated
Source of data	Certificate for the net electricity exported to the grid by the WTGs associated with the project activity.
Value(s) of monitored parameter	7,920 MWh
Monitoring equipment	Energy meters are used for monitoring
Measuring/reading/recording frequency:	Measuring frequency: Continuous Recording frequency: Monthly Reading frequency: Monthly

Calculation method (if applicable):	Calculated from Total Energy Export to the Grid, Energy Import from the Grid and the gross generation data at the all WTG controller end. Metering of wind power is done as under: • The first metering is carried out at the controller of the machine with onboard meter. The monitoring of all these wind turbines is done from a Central Monitoring Station (CMS) as a part of central monitoring system. From this CMS of following parameters are sourced 1. $EG_{controller, ALL}$ 2. $EG_{controller, ALL WTG, feeder,}$ 3. $EG_{controller, individual}$ • The second metering is carried out at feeder, wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. This metered reading is the input parameter to calculate the line losses till 33kV feeder metering point. The JMR gives both the "export" and "import" of the electricity to/ from the grid. This metering point records the following parameters 4. $EG_{Feeder, export}$ 5. $EG_{Feeder, import}$ • Similarly JMR is carried out at all 14 feeders of this wind farm connected to the Mokla sub-station. The following parameters are calculated from JMR's of 14 feeders. 6. $EG_{Feeder, ALL, export}$ 7. $EG_{Feeder, ALL, import}$ • The third metering is carried out at sub-station (220kV side), Amarsagar GSS (Grid substation), wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. The JMR contains combined export and import reading for all the two lines. This JMR is used for calculation of the amount of electricity supplied to the grid against which the utility makes the payment to the project proponent. This metered reading is the input parameter to calculate the line losses from 33kV to 220kV sub-station metering point. This metering point records the following parameter 8. $EG_{substation, export}$ 9. $EG_{substation, import}$ The net energy is calculated as per the following formulae: $EG_{BL,} = EG_{export, individual} - L_{export} - (EG_{import, individual} - L_{import})$
QA/QC procedures:	The data may be cross-checked with the invoices raised for sale of the electricity.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments:	Data archived: Crediting period + 2 yrs

Data/parameter:	**$EG_{BL,y\ KPL}$**
Unit	MWh
Description	Net electricity supplied to the grid by the Project
Measured/calculated/default	Calculated
Source of data	Certificate for the net electricity exported to the grid by the WTGs associated with the project activity.
Value(s) of monitored parameter	6,696 MWh
Monitoring equipment	Energy meters are used for monitoring

Measuring/reading/recording frequency:	Measuring frequency: Continuous Recording frequency: Monthly Reading frequency: Monthly
Calculation method (if applicable):	Calculated from Total Energy Export to the Grid, Energy Import from the Grid and the gross generation data at the all WTG controller end. Metering of wind power is done as under: • The first metering is carried out at the controller of the machine with onboard meter. The monitoring of all these wind turbines is done from a Central Monitoring Station (CMS) as a part of central monitoring system. From this CMS of following parameters are sourced 10. $EG_{controller, ALL}$ 11. $EG_{controller, ALL\ WTG, feeder,}$ 12. $EG_{controller, individual}$ • The second metering is carried out at feeder, wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. This metered reading is the input parameter to calculate the line losses till 33kV feeder metering point. The JMR gives both the "export" and "import" of the electricity to/ from the grid. This metering point records the following parameters 13. $EG_{Feeder, export}$ 14. $EG_{Feeder, import}$ • Similarly JMR is carried out at all 14 feeders of this wind farm connected to the Mokla sub-station. The following parameters are calculated from JMR's of 14 feeders. 15. $EG_{Feeder, ALL, export}$ 16. $EG_{Feeder, ALL, import}$ • The third metering is carried out at sub-station (220kV side), Amarsagar GSS (Grid substation), wherein the Joint Meter Reading (JMR) is carried out. The State Board personnel take reading of power generation every month, along with personnel from the O&M & EPC. The JMR contains combined export and import reading for all the two lines. This JMR is used for calculation of the amount of electricity supplied to the grid against which the utility makes the payment to the project proponent. This metered reading is the input parameter to calculate the line losses from 33kV to 220kV sub-station metering point. This metering point records the following parameter 17. $EG_{substation, export}$ 18. $EG_{substation, import}$ The net energy is calculated as per the following formulae: $EG_{BL,} = EG_{export, individual} – L_{export} – (EG_{import, individual} – L_{import})$
QA/QC procedures:	The data may be cross-checked with the invoices raised for sale of the electricity.
Purpose of data/parameter	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments:	Data archived: Crediting period + 2 yrs

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

As per the approved methodology AMS I.D version 17 baseline emissions for the project activity are calculated by multiplying the net quantity of electricity supplied by this project activity ($EG_{BL,y}$) with the CO_2 baseline emission factor for the electricity displaced due to the project (EF_{CO2}) as follows:

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

Where,

$EF_{CO2,grid,y}$ = Baseline emission factor
= 0.9487 tCO_2e/MWh

$EG_{BL,y}$ = Net electricity supplied to the NEWNE regional grid (MWh)
= 39,368 MWh

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

Since the project activity is a renewable energy project which generates electricity using wind power therefore there are no resulting project emissions.

E.3. Calculation of leakage emissions

No leakage is considered from the project activity as per approved methodology AMS-I.D.

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	Total amount
Total	37,553	0	0	0	37,553	37,553

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)
37,553 tCO_2e	60,554 tCO_2e

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

As per the CDM registered PDD, the amount of CERs generated annually is 37553 tCO_2e.

Therefore, the amount of estimated ex ante for this monitoring period is identified as explained below.

The total number of days in this monitoring period is 910 days.

Hence, the amount of estimated ex ante for this monitoring period = 24,288* (910 /365)
= 60,554 tCO_2e

E.6. Remarks on increase in achieved emission reductions

From E.5 above, we can observe that actual emission reduction for the monitoring is lower than estimated emission reductions by -37.98%, which is due to the lower performance of the wind machines during the current monitoring period.

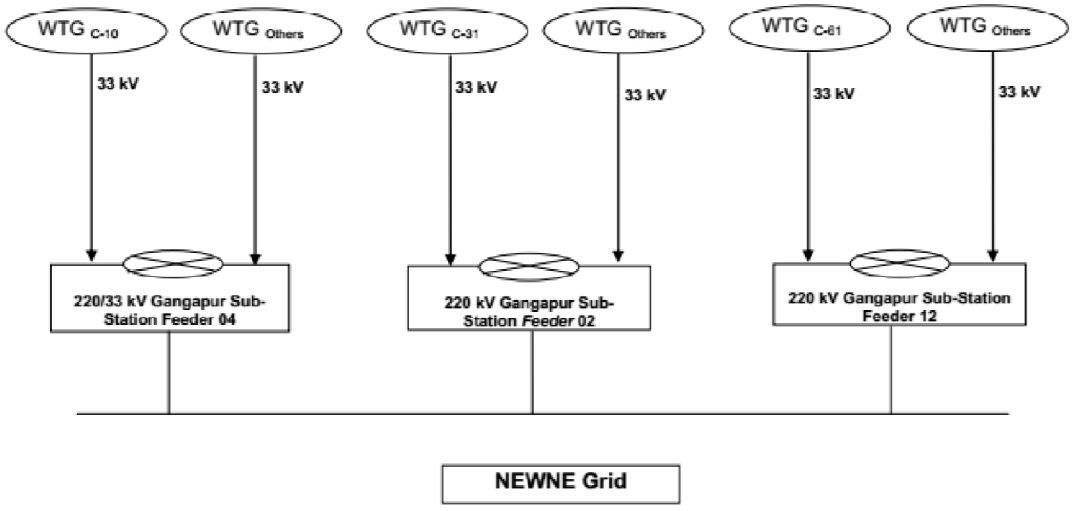
E.7. Remarks on scale of small-scale project activity

Not Applicable

Annex 1

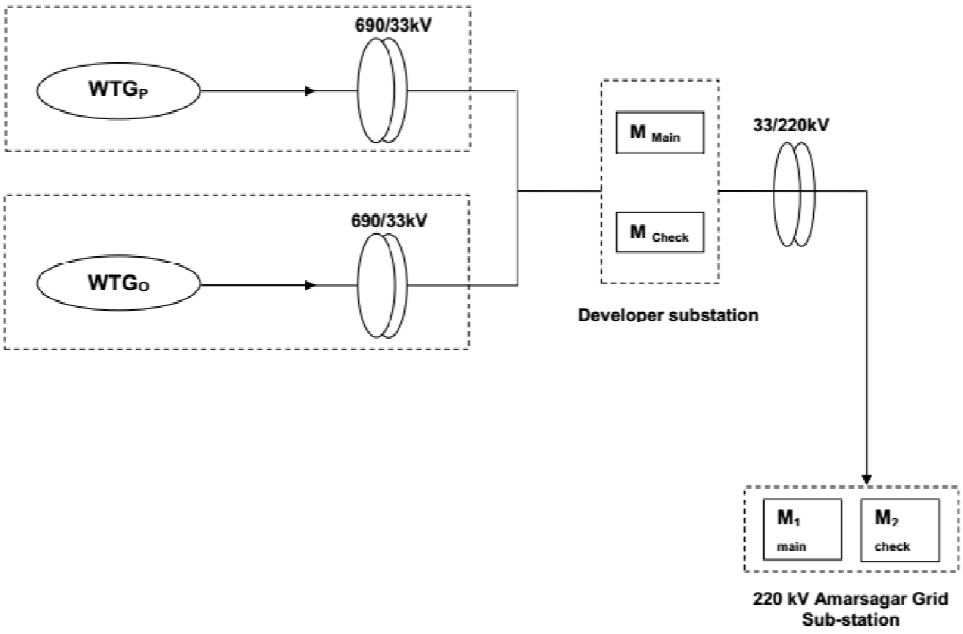
Voltage level diagram for the Maharashtra project:-

The electricity from the WEGs installed under the project activity is connected to 33kV feeder line for transmission of electricity to the common metering point situated at 33kV/ 220kV Feeder 3, 4, and 10 respectively at Gangapur substation. Substation at 33 kV Voltage level energy meter is installed which records the exported and imported of energy from all the WTGs connected at this feeder. This energy is then stepped up to 220 kV, and supplied to NEWNE Grid. Joint meter readings are taken on 1st of every month from the meters located at 33kV voltage level located at feeder No. 02, 4, and 12 of Gangapur Substation. The diagram provided above clearly states the monitoring system and relevant monitoring points.



Voltage level diagram for the Rajasthan project:-

As per the aforementioned line diagram, referring to WTGs, the generated electricity is measured through a step wise procedure wherein the first metering is carried out at the controller of the machine with on-board meter. The monitoring of all these wind turbines is done from a common monitoring station as a part of central monitoring system (CMS). The electricity generated from this site is fed to metering arrangement through 33 kV feeder line at 33kV pooling substation Mokla of Suzlon, after the injection point this is further stepped up to 220 kV voltage level and is further connected to 220 kV Grid Substation at 220kV Amarsagar GSS. The generation reading is collectively displayed by the Main Billing meter at 220kV Amarsagar GSS Line 1.



WTG P	Project Activity WTGs
WTG o	Other Project Activity WTGs
M Main	Sub-station – The 33 kV line transfer at Developer Sub-station, after injection point stepped up to 220kV
M check	Sub-station – The 33 kV line transfer at Developer Sub-station after injection point stepped up to 220kV
M 2 Main	GRID Sub-station – The 220kV line transfer from Developer Substation to Gridsubstation. (This is used for billing purpose)
M2 Check	GRID Sub-station – The 220kV line transfer from Developer Substation to Gridsubstation. (This is used for billing purpose)

- - - - -

Document information

Version	*Date*	*Description*
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.
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).

Version	*Date*	*Description*
01.0	28 May 2010	EB 54, Annex 34. Initial adoption.

Decision Class: Regulatory
Document Type: Form
Business Function: Issuance
Keywords: monitoring report