Monitoring report form for CDM project activity
(Version 06.0)

MONITORING REPORT		
Title of the project activity	27.3 MW Wind energy farm at Mokla Rajasthan by HZL	
UNFCCC reference number of the project activity	7873[1]	
Version number of the PDD applicable to this monitoring report	03	
Version number of this monitoring report	01	
Completion date of this monitoring report	18/04/2019	
Monitoring period number	01	
Duration of this monitoring period	01/12/2013 to 31/12/2016 (inclusive of both dates)	
Monitoring report number for this monitoring report	Not Applicable	
Project participants	Hindustan Zinc Limited	
Host Party	Government of India	
Sectoral scopes	1 : Energy industries (renewable - / non-renewable sources)	
Applied methodologies and standardized baselines	Methodology: ACM0002 Version 12.3.0 (EB 66) "Consolidated baseline methodology for grid connected electricity generation from renewable sources" Standardized Baseline: Not Applicable	
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	1,10,273 tCO_2e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	1,37,794 tCO_2e	

[1] http://cdm.unfccc.int/Projects/DB/DNV-CUK1351155785.18/view

SECTION A. Description of project activity

A.1. General description of project activity

Hindustan Zinc Ltd. (HZL), a vertically integrated natural resources enterprise, headquartered at Udaipur, Rajasthan having broad operations ranging from exploration, mining, ore processing to smelting of nonferrous metals is the owner and project proponent of the proposed project activity.

Purpose of the Project Activity
The project activity primarily aims at reducing Green House Gas (GHG) emissions through utilization of renewable energy technology for generation of electrical energy. The electricity generated from the project site displaces equivalent electricity generation in grid connected power plants. The project activity reduces the anthropogenic GHG emissions associated with the equivalent amount of electricity generation from the fossil fuel based grid connected power plants.

Measures Implemented within the Proposed Project Activity
The project activity has installed thirteen Suzlon make 2.1 MW Wind Turbine Generators (WTGs) by Hindustan Zinc Limited (HZL) in the state of Rajasthan. The cumulative capacity of the project activity is 27.3 MW. The electricity generated from the project activity is exported to regional Grid (now Indian Grid)

Baseline Scenario
The project activity is a Greenfield wind power project, supplying electricity to the fossil fuel dominated NEWNE grid system (now Indian Grid). In the absence of the project activity equivalent amount of electricity would have been generated in the NEWNE grid. Since the wind power project is a Greenfield project, there is no difference between the pre-project scenario and the baseline scenario.

During the current monitoring period the project has resulted in emission reductions of 1,10,273 tCO_2e.

No major breakdown occurred during the current monitoring period except for the scheduled shut down for maintenance.

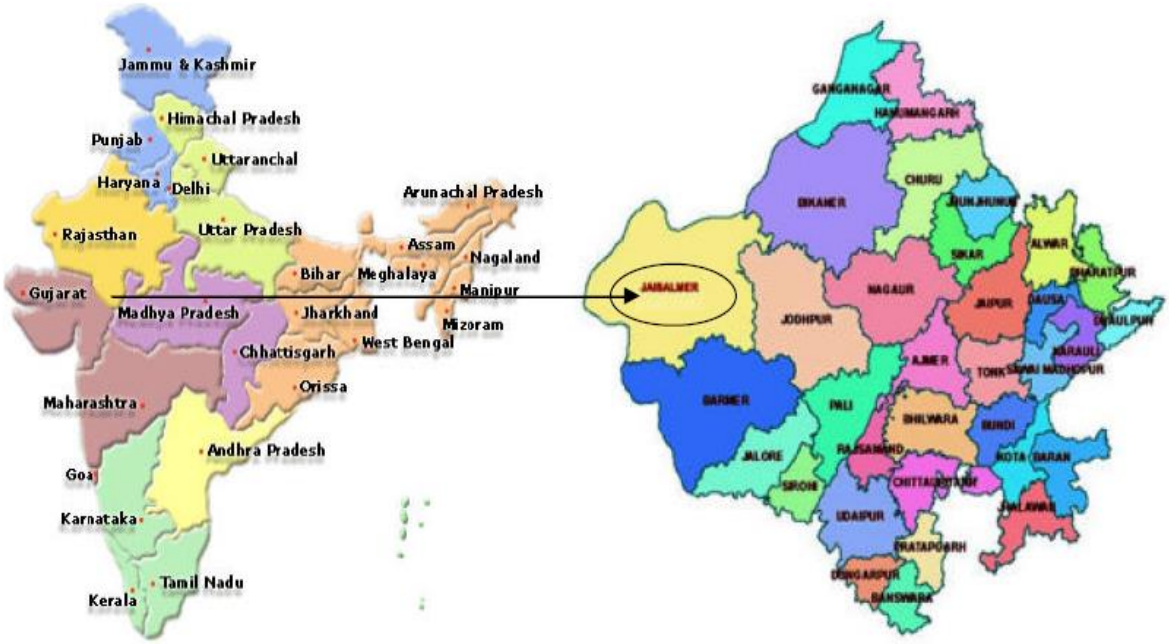
A.2. Location of project activity

The project activity consists of thirteen 2.1 MW wind turbines in the state of Rajasthan. Details of the location of the project activity:

Sr No.	WEG No.	Latitude	Longitude
1	MK 221	N27^{0}15’09.6”	E70^{0}39’49.8”
2	MK 44	N27^{0}10’46.2”	E70^{0}40’02.3”
3	MK 29	N27^{0}07’46.5”	E70^{0}46’38.1”
4	MK 23	N27^{0}08’29.6”	E70^{0}44’03.6”
5	MK 216	N27^{0}14’36.9”	E70^{0}41’12.8”
6	MK 217	N27^{0}14’43.6”	E70^{0}40’55.1”
7	MK 31	N27^{0}08’27.5”	E70^{0}45’52.8”
8	SKD 186	N27^{0}12’32.1”	E70^{0}37’03.6”
9	MK 178	N27^{0}14’14.6”	E70^{0}40’29.1”
10	MK 179	N27^{0}14’08.7”	E70^{0}40’49.1”
11	MK 180	N27^{0}14’02.0”	E70^{0}41’06.7”

12	MK 181	N27^{0}13'55.4"	E70^{0}41'24.5"
13	MK 215	N27^{0}14'30.3"	E70^{0}41'30.4"

The location of the project activity is delineated in the maps 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)
Government of India (Host Country)	Hindustan Zinc Limited (Private Entity)	No

A.4. Reference to applied methodologies and standardized baselines

Title of the approved baseline and monitoring methodology: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".

Reference: ACM0002, Version 12.3.0 (EB 66), Sectoral Scope: 01[2]

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM website (http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html)

The following tools and guidance's have been followed (References):

1. Tool to calculate the emission factor for an electricity system (Version 02.2.1)[3]
2. Tool for the demonstration and assessment of additionality (Version 06.00)[4]

[2] http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD

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

[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.0.0.pdf

A.5. Crediting period type and duration

Type of crediting period	Renewable
Crediting period from	01 Dec 13 - 30 Nov 20
Length of the Crediting Period	7 Years
Monitoring period from	01/12/2013 to 31/12/2016 (both days included)
Length of the Monitoring Period	1,127 days

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

The project activity involves installation and operation of thirteen Suzlon make 2.1 MW Wind Electric Generators (WEGs) by Hindustan Zinc Limited (HZL) in the state of Rajasthan. The cumulative capacity of the project activity is 27.3 MW. The electricity generated from the project activity is exported to regional Grid.

The technology employed by the project activity converts kinetic energy in wind to mechanical energy and mechanical energy to electrical energy using wind turbine generators (WEGs). In this process, there are no greenhouse gas emissions or burning of any fossil fuels. The electricity is generated through sustainable means without causing any negative effect to the environment and therefore the technology is environmentally safe and sound.

Wind turbines produce electricity by using the natural power of wind to drive a generator. Wind has considerable amount of kinetic energy when blowing at high speeds. When this kinetic energy passes through the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The Project activity envisages installation of WEGs of S-82 Suzlon make (1500 kW WEGs). The WEGs generate 3-phase power at 400V, which is stepped up to 33 KV. The project can operate in the frequency range of 46–54 Hz and in the voltage range of 400 V ± 20%.

The technical specifications of the WTGs are as below:

WEG (S88, 2.1 MW, 50 Hz) TECHNICAL DATA

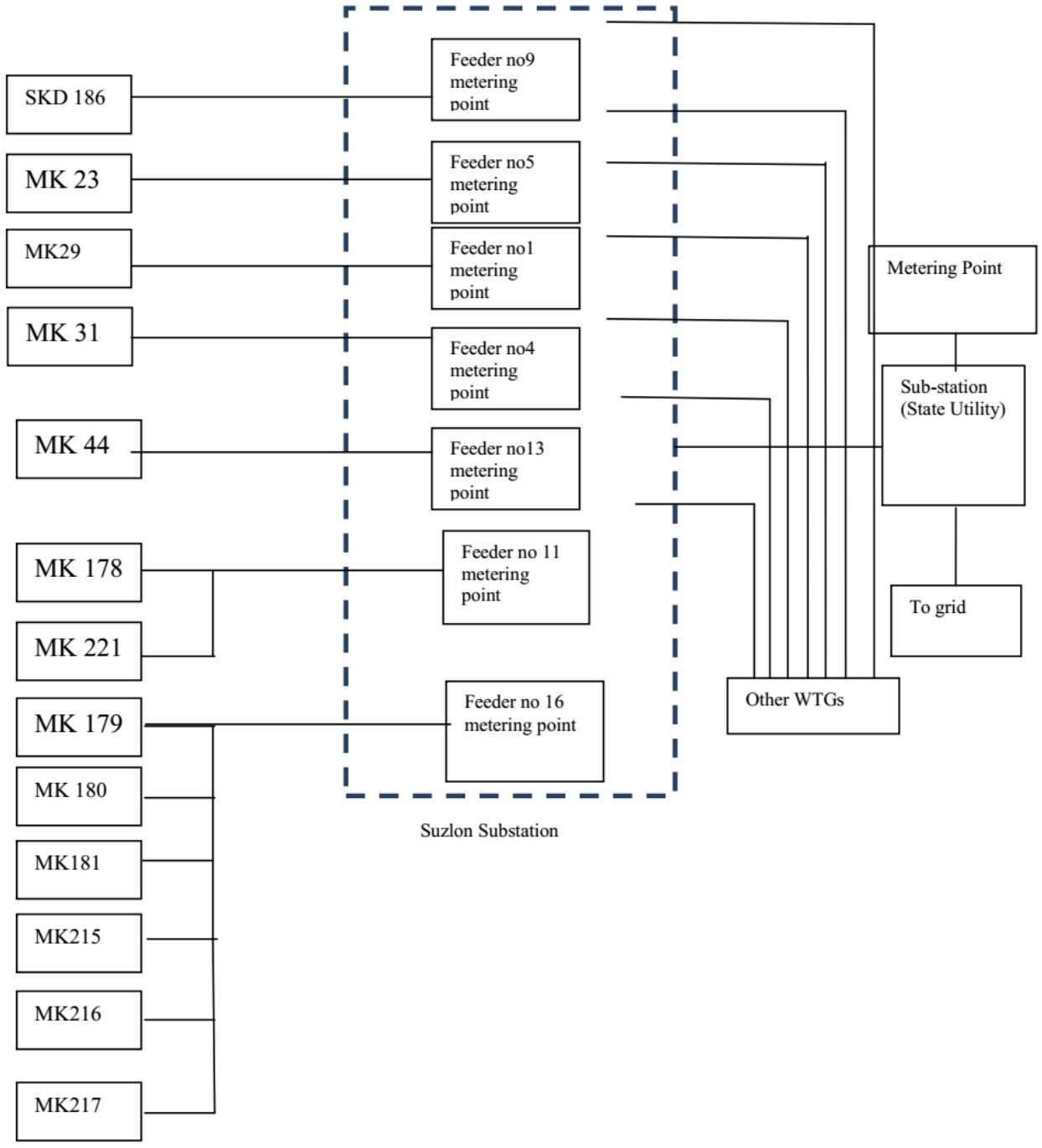
Rated capacity: 2100 kW
Rotor diameter: 88 m
Hub height: 80 m

Rotor with Pitch Control
Type: Upwind rotor with active pitch control
Number of blades: 3
Swept area: 6082 m²
Blade material: The rotor blades are made of high grade GRP and manufactured by using Resin Infusing Moldings (RIM) technology
Rotor speed: 15.47 rpm
Tip speed: 71 m/s

Generator:
Type: Single fed Induction Generator with slip-rings, variable rotor resistance with SUZLON-FLEXI-SLIP control system.

Hub:	Cast spherical hub
Bearings:	High tensile double-row ball-bearing
Braking System:	3 independent Aero Brakes with power back up supply.
Yaw Control:	Active through adjustment gears, friction damping
Tower:	Steel Tubular, 77.5 m height

The schematic diagram of project activity and its interconnection with state electricity board is depicted below:-



B.2. Post-registration changes

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

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

B.2.2. Corrections

There have not been any corrections to project information or parameters fixed at validation during the current monitoring period.

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

The start date of crediting period has been changed from 01 Dec 12 - 30 Nov 19 to 01 Dec 13 – 30 Nov 20[5].

B.2.4. Inclusion of monitoring plan

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

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

Not Applicable.

B.2.6. Changes to project design

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

SECTION C. Description of monitoring system

The purpose of the monitoring plan is to define the organizational structure of the monitoring team, monitoring practices, QA and QC procedures and archiving procedures. The monitoring plan will ensure that the emission reductions from the project activity is reported accurately and transparently.

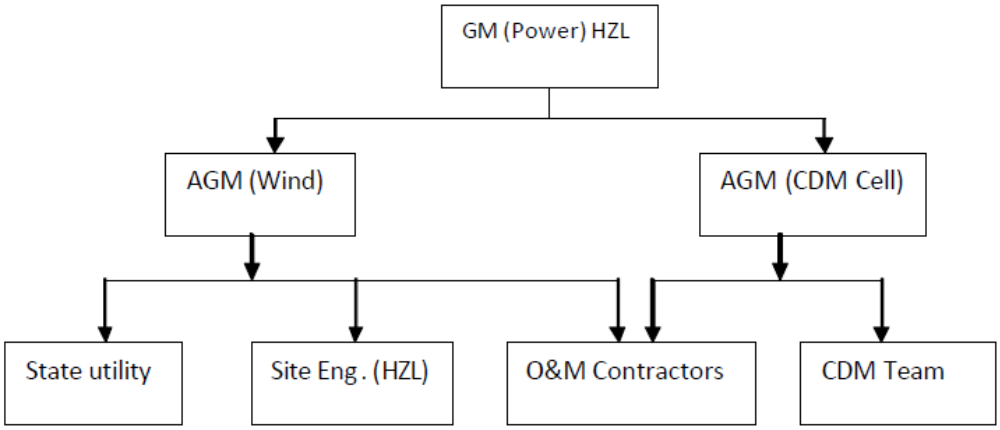
Roles and Responsibilities of the Monitoring Team

The responsibility of project management as well as monitoring, measurement and reporting lies with HZL. The project proponent has formulated a Monitoring Team to ensure proper and continuous monitoring of the emission reductions as well as performance of turbines and generation of power.

To ensure trouble free operation of all the wind turbines, HZL has entered into a comprehensive Operation and Maintenance agreement with the manufactures of the turbines. The contractor, Suzlon Infrastructure Limited, would be responsible for the operation and maintenance of the WTGs. The O&M personnel are qualified engineers and are trained at the WTG manufacturing facility of Suzlon Infrastructure Limited.

The monitoring team will interact with the O&M contractors as well as the State Utility officials for executing the monitoring plan. The structure of the Monitoring Team is as follows:

[5] https://cdm.unfccc.int/Projects/DB/DNV-CUK1351155785.18/view



Monitoring Team	Roles & Responsibilities
General Manager (Power), HZL	• Communication with CDM EB • Communication with state utility
AGM (CDM Cell), HZL	• Overall coordination with monitoring team and DOE for verification activities • Maintaining data records, documentation and archiving
CDM Team	• Assisting the General Manager (Wind) with overall coordination and with maintaining data records, documentation, archiving etc.
AGM (Wind) HZL	• Coordinating with Site Engineer, O&M operators, and State Utility
Site Engineer, HZL	• Overseeing monitoring, operation and maintenance activites at site • Interacting with State Utility and O&M contractors for JMRs and calibration
O&M contractors	• Carrying out operation & maintenance of WEGs • Carrying out joint meter readings with state utility
State Utility	• Carrying out joing meter readings with representative of project proponent (O&M contractors) • Calibration of energy meters

The site engineer from HZL supervises the wind power plant operations under the guidance of the Manager. The Site Engineer of HZL also interact with the O&M contractors and ensure that the WTG generation reports and JMR statements are forwarded to the Manger for review and electronic archiving. The O&M contractors is responsible for forwarding monitoring data to Manager of HZL. The Manager review the monitoring records and suggest corrective action as and when required. The Manager – Commercial ensure that records of payments for sale of electricity to the state utility are maintained and archived electronically. HZL management have a CDM review meeting on a bi-annual basis for review of the emission reductions and performance of the project activity.

Metering Arrangements and Procedures

The general conditions set out for metering, recording, meter readings, meter inspections, Test & Checking and communication shall be as per the PPA (power purchase agreement). The electricity

exported from the sub-station will be metered using electronic trivector meters. A main and check meter of 0.2s accuracy class is being installed for every feeder and also at the sub-station of the state utility (RVPN / DISCOM). On a monthly basis, a joint meter reading is being carried out in the presence of the state utility officials and representatives of the project promoters.

The WTGs are connected to different feeders, and each feeder have a corresponding metering point. Each feeder have several WTGs connected to it, some of which may not be part of the project activity. Also, the power from all feeders is being exported to the sub-station of the state utility, from where it is exported to the grid. An apportioning procedure is being carried out to calculate electricity exported from the HZL project activity. This procedure is described below:

Apportioning Procedures for calculation of Net Electricity Exported from Project Activity

The net electricity exported to the grid by project activity is recorded in JMR statements. The main billing meter at substation records total export, and total import by all the connected WEGs to the particular feeder. Additionally, the O&M contractors maintain records of the electricity generation from individual WTGs which is monitored through the SCADA system. This data is used for the apportioning of electricity export and import to individual WTGs.

The electricity export and import by the WTGs of HZL is being calculated by using the following methodology.

Parameter	Figure	Unit
Gross electricity generated by all WTGs connected to feeders and hence substation	X	MWh
Gross electricity generated by all WTGs owned by PP in project activity	Y	MWh
Share of all WTGs owned by PP in project activity in gross generation	(Y/X) %	%
Total electricity exported to the grid measured at the substation	A	MWh
Total electricity imported from the grid measured at the substation	B	MWh
Share of all WTGs owned by PP in project activity in total export	(Y/X) % * A	MWh
Share of all WTGs owned by PP in project activity in total import	(Y/X) % * B	MWh
Net export of all WTGs owned by PP in project activity	**[**(Y/X) % * A] – [(Y/X) % *B]	MWh

In case of any discrepancy between the calculated net electricity export and the net electricity export reported in invoices / JMR Statements / Statements on Break-up of Net Export Units prepared by the O&M Service provider, the conservative value has been applied.

Quality control and Quality Assurance procedures:

Calibration Procedures:

Main meters and check meters are installed for monitoring the energy exported. The main and check meters are tested for accuracy every calendar year with reference to a portable standard meter. The meters is deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. The data registered by the main meter alone is adopted for the purpose of calculation as long as the error in the main meter is within permissible limits. If during the annual accuracy tests, the main meter is found to be within the permissible limit of error and

the corresponding check meter is beyond the limits, the main meter reading shall be considered as usual. However, the check meter shall be calibrated immediately. If the main meter is found to be beyond the permissible limits of error, but corresponding check meter is within limits, then the check meter reading shall be adopted for that period. The main meter shall be calibrated immediately.

Apportioning Procedures in case the dates of monitoring period do not match with billing cycle dates

The monitoring period for the project activity may start from a date that does not coincide with the date of the initial reading of the respective JMR statement. For instance the monitoring period may start on the 20th of the month whereas the JMR Statement may report the net electricity generation data from the first of the month to the first of the next month. In such a scenario, the net electricity generation data from the start of the monitoring period to the first date of the next month (the apportioning period) is determined as follows:

Apportioned Net Electricity Generation = Apportioning Ratio X Net Electricity Generation as per JMR Statement

The apportioning ratio would be determined as the ratio of the electricity generation at the WTG for the apportioning period to the electricity generation at the WTG for the entire period covered under the JMR statement. This procedure would only have to be followed for the first and last month of the monitoring period if the start and end dates do not coincide with the date of the joint meter readings of the energy meters.

Data collection and archiving

The daily data on electricity generation from WTGs at the site is collected in electronic form. Monthly JMR statements, invoices and break up sheets are collected and maintained in hard copy, and archived electronically. 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.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

<table>
<tr><td>Data/Parameter</td><td>$EF_{grid,OM,y}$</td></tr>
<tr><td>Unit</td><td>tCO2/MWh</td></tr>
<tr><td>Description</td><td>Operating Margin emission factor for NEWNE grid</td></tr>
<tr><td>Source of data</td><td>Referred from CO_2 Baseline Database Version 6.0 for the Indian Power Sector prepared by Central Electricity Authority.</td></tr>
<tr><td>Value(s) applied</td><td>0.9942 tCO_2/MWh</td></tr>
<tr><td>Choice of data or measurement methods and procedures</td><td>The operating margin emission factor has been published by CEA in accordance with the ‘Tool to calculate the emission factor for an electricity system 02.2.0” The option of ex ante calculation based on Simple Operating Margin Method have been applied using a three year generation weighted average (2007-08, 2008-09 and 2009-10) as given below:
<table>
<tr><th colspan="2">Operating Margin Estimation for NEWNE Grid (tCO2 / MWh)</th></tr>
<tr><td>OM, 2007-08</td><td>0.9999</td></tr>
<tr><td>OM, 2008-09</td><td>1.0066</td></tr>
<tr><td>OM, 2009-10</td><td>0.9777</td></tr>
<tr><td>Net Electricity Generated (GWh), 2007-08</td><td>401642</td></tr>
<tr><td>Net Electricity Generated</td><td>421803</td></tr>
</table>
</td></tr>
</table>

	(GWh), 2008-09 | Net Electricity Generated (GWh), 2009-10 | 458043 **Average OM ($EF_{grid, OM,y}$)** | **0.9942**
Purpose of data/parameter	For the calculation of Baseline emission
Additional comments	This value is determined ex-ante and is fixed for the crediting period.

Data/Parameter	**$EF_{grid,BM,y}$**
Unit	tCO_2/MWh
Description	Build Margin emission factor for NEWNE grid
Source of data	Referred from CO_2 Baseline Database Version 6.0 for the Indian Power Sector prepared by Central Electricity Authority
Value(s) applied	0.8123 tCO_2/MWh
Choice of data or measurement methods and procedures	The build margin emission factor has been published by CEA in accordance with the 'Tool to calculate the emission factor for an electricity system." The build margin is calculated as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin has been taken corresponding to the year 2009-10, the latest year for which data is available.
Purpose of data/parameter	For the calculation of Baseline emission
Additional comments	This value is determined ex-ante and is fixed for the crediting period.

Data/Parameter	$EF_{grid,CM,y}/EF_{CO2,grid,y}$
Unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor for NEWNE grid
Source of data	Calculated based on values given in the CO_2 Baseline Database Version 6.0 for the Indian Power Sector prepared by Central Electricity Authority
Value(s) applied	0.9487 tCO_2/MWh
Choice of data or measurement methods and procedures	The combined margin emission factor has been determined based on data published by the CEA, applying a 75% weightage for $EF_{grid, OM,y}$ and 25% for $EF_{grid,BM,y}$ in accordance with the 'Tool to calculate the emission factor for an electricity system." **Combined Margin Estimation for NEWNE Grid (tCO_2/MWh)** **Operating Margin**($EF_{grid,OM,y}$) | **0.9942** **Build Margin (**EFgrid, BM, y) | **0.8123** **Combined Margin** (**$EF_{CO2,grid,y}$**) | **0.9487**
Purpose of data/parameter	For the calculation of Baseline emission
Additional comments	This value is determined ex-ante and is fixed for the crediting period.

D.2. Data and parameters monitored

Data/Parameter	$EG_{PJ,y}$
Unit	MWh
Description	Net electricity supplied by the WEGs in the project activity to the grid
Measured/calculated/ default	Calculated
Source of data	JMR Statements / Statements on Break-up of Net Export Units prepared by the O&M Service provider
Value(s) of monitored parameter	116255

Monitoring equipment	Energy Meter
Measuring/reading/recording frequency	Continuous measurement and monthly recording
Calculation method (if applicable)	Net Electricity **=** Total electricity exported by project proponent - Total electricity imported by project proponent
QA/QC procedures	The quantity of net electricity supplied has been cross-verified from the invoices/sales receipts raised to the state utility. The conservative values of net electricity exported has been considered for emission reductions
Purpose of data/parameter	For the calculation of Baseline emission
Additional comments	The data will be kept for two years after the crediting period or from last issuance. The values are monitored ex-post and CERs are being calculated at actual.

Data/Parameter	$EG_{p\ export,y}$
Unit	MWh
Description	Electricity exported to the state electricity board by the project activity
Measured/calculated/ default	Measured
Source of data	JMR Statements / Statements on Break-up of Net Export Units prepared by the O&M Service provider
Value(s) of monitored parameter	117572
Monitoring equipment	Energy Meters
Measuring/reading/recording frequency	Continuous monitoring, hourly measurement and monthly recording
Calculation method (if applicable)	Not Applicable
QA/QC procedures	The quantity of net electricity imported is cross-verified from the invoices/sales receipts raised to the state utility. The conservative values of net electricity exported would be considered for emission reductions. As per the registered monitoring plan, the energy meters has to be calibrated annually. It is to be noted here that due to delay in calibration, error factor has been applied on export values to retain conservativeness for the month of Dec 2013, Jan 2014 and from Dec 2015 to July 2016.
Purpose of data/parameter	Calculation of Baseline emissions
Additional comments	The data will be kept for two years after the end of the crediting period

Data/Parameter	$EG_{p\ import,y}$
Unit	MWh
Description	Electricity imported to the state electricity board by the project activity
Measured/calculated/ default	Measured
Source of data	JMR Statements / Statements on Break-up of Net Export Units prepared by the O&M Service provider
Value(s) of monitored parameter	1250
Monitoring equipment	Energy Meters of Accuracy class 0.2s.
Measuring/reading/recording frequency	Continuous monitoring, hourly measurement and monthly recording
Calculation method (if applicable)	Not Applicable
QA/QC procedures	The quantity of net electricity imported is cross-verified from the invoices/sales receipts raised to the state utility. The conservative values of

	net electricity exported is considered for emission reductions As per the registered monitoring plan, the energy meters has to be calibrated annually. It is to be noted here that due to delay in calibration, error factor has been applied on import values to retain conservativeness for the month of Dec 2013, Jan 2014 and from Dec 2015 to July 2016.
Purpose of data/parameter	Calculation of Baseline emissions
Additional comments	The data will be kept for two years after the end of the crediting period

Data/Parameter	**X**
Unit	MWh
Description	Sum of Gross electricity generated by all WEGs connected to substation of the state utility
Measured/calculated/ default	Measured
Source of data	Individual WEG Controller Readings
Value(s) of monitored parameter	1619962
Monitoring equipment	The WEG controllers measure the gross electricity generated by all the WEGs connected to the respective feeder.
Measuring/reading/recording frequency	Continuous measurement and monthly recording
Calculation method (if applicable)	Not Applicable
QA/QC procedures	These WEG controller meters are tested for accuracy once in three years.
Purpose of data/parameter	For the Calculation of Baseline Emissions.
Additional comments	The data will be kept for two years after the end of the crediting period

Data/Parameter	Y
Unit	MWh
Description	Sum of Gross electricity generated by all WEGs owned by PP in project activity
Measured/calculated/ default	Measured
Source of data	Individual WEG Controller Readings
Value(s) of monitored parameter	124715
Monitoring equipment	The WTG controllers measure the gross electricity generated by all the WTGs connected to the respective feeder.
Measuring/reading/recording frequency	Daily measurement and monthly recording
Calculation method (if applicable)	Not Applicable
QA/QC procedures	These WEG controller meters are tested for accuracy once in three years.
Purpose of data/parameter	For the calculation of Baseline emission
Additional comments	The data will be kept for two years after the end of the crediting period

Data/Parameter	A
Unit	MWh
Description	Total electricity exported to the grid measured at the substation of the state utility
Measured/calculated/	Measured

default	
Source of data	Joint Meter Reading
Value(s) of monitored parameter	1528053
Monitoring equipment	The main meter installed at the substation of the state utility measures the total electricity exported to the grid continuously. A monthly meter reading taken jointly by state electricity board and PP representative is recorded in the JMR. There is also a check meter installed at the substation to measure the total electricity exported to the grid continuously, in case of the failure of the main meter, the readings are monitored from the check meter in a similar way as that for the main meter.
Measuring/reading/recording frequency	Daily measurement and monthly recording
Calculation method (if applicable)	Not Applicable
QA/QC procedures	These meters (main meter and the check meter) are the property of respective state electricity boards and calibration of the meters is carried out once in a year. The accuracy class of the main meter and the check meter is 0.2s.
Purpose of data/parameter	For the calculation of Baseline emission
Additional comments	The data will be kept for two years after the end of the crediting period

Data/Parameter	B
Unit	MWh
Description	Total electricity imported from the grid measured at the substation
Measured/calculated/ default	Measured
Source of data	Joint Meter Reading
Value(s) of monitored parameter	15810
Monitoring equipment	The main meter installed at the substation of the state utility measures the total electricity imported from the grid continuously. A monthly meter reading taken jointly by state electricity board and PP representative is recorded in the JMR. There is also a check meter installed at the substation to measure the total electricity imported from the grid continuously, in case of the failure of the main meter, the readings are monitored from the check meter in a similar way as that for the main meter.
Measuring/reading/recording frequency	Continuous measurement and monthly recording
Calculation method (if applicable)	Not Applicable
QA/QC procedures	These meters (main meter and the check meter) are the property of respective state electricity boards and calibration of the meters is carried out once in a year. The accuracy class of the main meter and the check meter is 0.2s.
Purpose of data/parameter	For the calculation of Baseline emission
Additional comments	The data will be kept for two years after the end of the crediting period

D.3. Implementation of sampling plan

No sampling is required

SECTION E. Calculation of emission reductions or net anthropogenic removals

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

Baseline emissions (BE_y in tCO_2e) are the product of the baseline emissions factor (EF_y in tCO_2/MWh) times the electricity supplied by the project activity to the grid ($EG_{PJ,y}$ in MWh) as described in registered PDD.

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

Where,
BE_y baseline emissions, tCO_2e

$EG_{PJ,y}$ Net Quantity of Electricity exported to RRECL facility

$EF_{CO2,grid,y}$ grid emission factor, i.e. 0.9487 t CO_2/MWh (it has been fixed ex-ante)

$EG_{BL,y} = EG_{y,Export} – EG_{y,Import}$

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

= 116,255 * 0.9487

= 110,273 tCO_2e (Rounded down)

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

As the project activity is wind powered renewable energy project, project emissions are zero.

E.3. Calculation of leakage emissions

No leakage has been considered for the project activity

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	110,273	0	0	0	110,273	110,273

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 (t CO_2e)
137,794	110,273

E.6. Remarks on increase in achieved emission reductions

During the present monitoring period, actual emission reductions achieved are 110,273 tCO_2e whereas estimated emission reductions was 137,794 tCO_2e. The project witnessed 20% decrease

in emission reductions as compared to ex-ante emissions, which is due to natural phenomena and nature dependent.

Annexure 1: Meter Calibration Details

Meter Details	Meter Sr. No.	Calibration in Previous MP	Calibration Done	Validity	Calibration done	Validity	Calibration Done	Validity	Calibration Done	Validity
220 KV Line 1 Main	9166170	13-03-2012	12-12-2012	11-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	20-07-2016	19-07-2017
220 KV Line 1 Back Up	9166172	13-03-2012	12-12-2012	11-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	20-07-2016	19-07-2017
220 KV Line 2 Main	MSB 60428	13-03-2012	17-12-2012	16-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	20-07-2016	19-07-2017
220 KV Line 2 Back Up	MSB 60429	13-03-2012	17-12-2012	16-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	20-07-2016	19-07-2017
SEL 74 (main)	RJB69748	16-03-2012	16-12-2012	15-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	20-07-2016	19-07-2017
SEL 74 (back)	RJB69747	16-03-2012	16-12-2012	15-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	20-07-2016	19-07-2017
SEL 75 Main	MSB10288	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	19-07-2016	18-07-2017
SEL 75 Back	MSB10287	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	19-07-2016	18-07-2017
SEL 86 Main	MSB10290	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	19-07-2016	18-07-2017
SEL 86 Back	MSB10291	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	28-12-2014	27-12-2015	19-07-2016	18-07-2017
SEL 90 Main	RJB69756	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	27-12-2014	26-12-2015	20-07-2016	19-07-2017
SEL90 backup	RJB69757	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	27-12-2014	26-12-2015	20-07-2016	19-07-2017
SEL91 Main	RJB69759	16-03-2012	15-12-2012	14-12-2013	23-01-2014	22-01-2015	27-12-2014	26-12-2015	20-07-2016	19-07-2017
SEL91 Backup	RJB69760	16-03-2012	15-12-2012	14-12-2013	23-01-2014	22-01-2015	27-12-2014	26-12-2015	20-07-2016	19-07-2017
SEL 92 Main	RJB69751	16-03-2012	15-12-2012	14-12-2013	23-01-2014	22-01-2015	29-12-2014	28-12-2015	19-07-2016	19-07-2017
SEL 92 Back up	RJB 69753	16-03-2012	15-12-2012	14-12-2013	23-01-2014	22-01-2015	29-12-2014	28-12-2015	19-07-2016	19-07-2017
SEL 99 Main	RJB69754	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	29-12-2014	28-12-2015	20-07-2016	19-07-2017

Meter Details	Meter Sr. No.	Calibration in Previous MP	Calibration Done	Validity	Calibration done	Validity	Calibration Done	Validity	Calibration Done	Validity
SEL 99 backup	RJB 69755	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	29-12-2014	28-12-2015	20-07-2016	19-07-2017
SEL 103 Main	RJB 72832	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	29-12-2014	28-12-2015	20-07-2016	19-07-2017
SEL 103 backup	RJB 72831	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	29-12-2014	28-12-2015	20-07-2016	19-07-2017
SEL 104 Main	RJB 72833	16-03-2012	15-12-2012	14-12-2013	23-01-2014	22-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017
SEL 104 backup	RJB 72834	16-03-2012	15-12-2012	14-12-2013	23-01-2014	22-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017
SEL 105 Main	RJB 72524	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017
SEL 105 Backup	RJB 72525	16-03-2012	15-12-2012	14-12-2013	21-01-2014	20-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017
SEL 113 Main	RJB 73569	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017
SEL 113 back up	RJB73570	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017
SEL 114 Main	RJB 73571	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017
SEL 114 Backup	RJB 73572	16-03-2012	15-12-2012	14-12-2013	22-01-2014	21-01-2015	29-12-2014	28-12-2015	19-07-2016	18-07-2017

It is to be noted here that due to delay in calibration, error factor has been applied on export and import values to retain conservativeness for the month of Dec 2013, Jan 2014 and from Dec 2015 to July 2016.

Annexure 2: Major Breakdown Details for the Current Monitoring Period

Gen. Date	MW	Loc. No.	Breakdown Remark	Breakdown Hrs.
01-Apr-2014	2.10	SKD 186	Preventive Check	0.20
01-Apr-2014	2.10	MK 29	Elec SafetyChainStop	0.20
01-Apr-2014	2.10	MK 44	Pitch BatterySurveillance2	12.30
01-Apr-2014	2.10	MK 178	Preventive Check	0.40
01-Apr-2014	2.10	MK 221	Line Breakdown due to Earthfault	0.10
01-Apr-2014	2.10	MK 178	Line Breakdown due to Earthfault	0.10
02-Apr-2014	2.10	MK 179	Elec FB YawCW Error	6.40
02-Apr-2014	2.10	MK 180	Pitch Akku1Voltage LowStop	6.00
02-Apr-2014	2.10	MK 181	Elec FB GeneratorFan	0.10
03-Apr-2014	2.10	MK 215	Preventive Check	0.10
07-Apr-2014	2.10	MK 216	Rep Pitch FreqConvPitch2 ErrStop	0.70
07-Apr-2014	2.10	MK 217	Rep Pitch CANComFail	0.60
07-Apr-2014	2.10	MK023	Elec UPSBattChange	3.40
11-Apr-2014	2.10	MK029	Rep Pitch CANComFail	6.90
11-Apr-2014	2.10	MK031	IDRV Audit	1.10
12-Apr-2014	2.10	MK044	Theft	3.70
02-May-2014	2.10	MK178	Shut Down Taken By EB	24.00
02-May-2014	2.10	MK221	Shut Down Taken By EB	24.00
02-May-2014	2.10	MK179	Shut Down Taken By EB	24.00
02-May-2014	2.10	MK221	Shut Down Taken By EB	24.00
02-May-2014	2.10	MK31	Shut Down Taken By EB	10.30
02-May-2014	2.10	MK29	Shut Down Taken By EB	24.00
02-May-2014	2.10	MK023	Shut Down Taken By EB	24.00
02-May-2014	2.10	MK 186	Shut Down Taken By EB	24.00

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Document information

Version	*Date*	*Description*
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.

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

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