Monitoring report form for CDM project activity (Version 08.0)

Complete this form in accordance with the instructions attached at the end of this form.

MONITORING REPORT			
Title of the project activity	Wind Electricity Generation Project		
UNFCCC reference number of the project activity	2092[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	16/09/2021		
Monitoring period number	02		
Duration of this monitoring period	24/08/2010 to 31/12/2012		
Monitoring report number for this monitoring period	NA		
Project participants	M/s Reliance Innoventures Limited		
Host Party	India		
Applied methodologies and standardized baselines	ACM0002[2], Version 06		
Sectoral scopes	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
	155,255 tCO_2	-	-
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the PDD	190,923 tCO_2		

[1] https://cdm.unfccc.int/Projects/DB/RWTUV1218537127.82/view

[2] https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG

SECTION A. Description of project activity

A.1. General description of project activity

>>
Reliance Innoventures Limited (RINL) is a Company incorporated under the Indian Companies Act, 1956. The project activity comprises of installation of 30 Wind Electric Generators (WEGs) each of capacity 1500 kW supplied by Suzlon Energy Ltd, at Ambavade Khurd, Chavanwadi, Chalkewadi, Borgewadi, Pawarwadi, Galmewadi, Dhebewadi and Maskarwadi villages of Satara District, Maharashtra.

The objective of the project activity is develop, design, engineering, procure, finance, construct, operate and maintain the 45 MW wind based generation facility in the state of Maharashtra. The Project participant has signed Power Purchase Agreement (PPA) for 13 years period, with Maharashtra State private utility M/s. Reliance Innoventures Limited.

Total emission reductions achieved by the project activity during the monitoring period is 155,255 tCO_2. The credits are not counted in this monitoring period and this monitoring report is only for webhosting in order to continue crediting period.

A.2. Location of project activity

>>
The project activity is located at Ambavade Khurd, Chavanwadi, Chalkewadi, Borgewadi, Pawarwadi, Galmewadi, Dhebewadi and Maskarwadi villages of Satara District of the State Maharashtra; India.
The project activity is located 325 km. from Mumbai. The closest National Highway (NH4) is 30 km. from the location of the project activity and the nearest railway station is located at Satara, 55 km. from the project activity.
The site is having following geographical parameters and its location shown in the map -

S. No.	WEG No.	Village	Loc. No.	Latitude (N)	Longitude (E)
1	WEG - 1	Galmewadi	GPP-28	17° 10' 51.4"	73° 59' 20.7"
2	WEG -2	Galmewadi	GPP-30	17° 11' 17.0"	73° 59' 13.5"
3	WEG -3	Ambewad Khurd	GPP-96	17° 11' 37.0"	73° 59' 07.0"
4	WEG -4	Ambewad Khurd	GPP-40	17° 13' 59.9"	73° 55' 16.3"
5	WEG -5	Ambewad Khurd	GPP-41	17° 14' 12.3"	73° 54' 39.3"
6	WEG -6	Ambewad Khurd	GPP-42	17° 14' 23.2"	73° 54' 38.4"
7	WEG -7	Ambewad Khurd	GPP-43	17° 14' 34.1"	73° 54' 43.5"
8	WEG -8	Chavanwadi	GPP-44	17° 14' 45.7"	73° 54' 45.3"

9	WEG -9	Ambewad Khurd	GPP-45	17° 14' 59.6"	73° 54' 51.4"
10	WEG -10	Ambewad Khurd	GPP-46	17° 15' 09.8"	73° 54' 57.5"
11	WEG -11	Ambewad Khurd	GPP-47	17° 15' 18.3"	73° 55' 02.8"
12	WEG -12	Ambewad Khurd	GPP-48	17° 15' 26.9"	73° 55' 06.3"
13	WEG -13	Ambewad Khurd	GPP-49	17° 15' 37.6"	73° 55' 10.8"
14	WEG -14	Ambewad Khurd	GPP-92	17° 15' 20.4"	73° 52' 16.5"
15	WEG -15	Dhebewadi	GPP-93	17° 15' 33.1"	73° 52' 27.5"
16	WEG -16	Ambewad Khurd	GPP-87	17° 14' 38.6"	73° 52' 18.1"
17	WEG -17	Ambewad Khurd	GPP-56	17° 14' 16.7"	73° 55' 50.4"
18	WEG -18	Ambewad Khurd	GPP-58	17° 14' 49.3"	73° 56' 02.4"
19	WEG -19	Ambewad Khurd	GPP-59	17° 14' 35.5"	73° 55' 56.9"
20	WEG -20	Maskarwadi	GPP-61	17° 15' 05.8"	73° 56' 19.3"
21	WEG -21	Galmewadi	GPP-62	17° 14' 30.6"	73° 52' 37.8"
22	WEG -22	Galmewadi	GPP-63	17° 14' 17.8"	73° 53' 19.4"
23	WEG -23	Galmewadi	GPP-65	17° 14' 06.1"	73° 54' 00.2"
24	WEG -24	Galmewadi	GPP-66	17° 14' 14.8"	73° 54' 17.1"
25	WEG -25	Ambewad Khurd	GPP-89	17° 14' 55.3"	73° 51' 57.0"
26	WEG -26	Ambewad Khurd	GPP-90	17° 15' 05.9"	73° 51' 57.6"
27	WEG -27	Ambewad Khurd	GPP-91	17° 15' 13.2"	73° 52' 06.0"
28	WEG -28	Borgewadi	GPP-94	17° 15' 40.2"	73° 52' 42.4"
29	WEG -29	Chalkewadi	GPP-95	17° 15' 55.1"	73° 40' 25.7"
30	WEG -30	Pawarwadi	GPP -57	17° 14' 22.5"	73° 55' 48.3"

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 (host)	M/s Reliance Innoventures Limited	No

A.4. References to applied methodologies and standardized baselines

>>
Title: "Consolidated baseline methodology for grid-connected electricity generation from renewable Sources (ACM0002)" Version 06
Sectoral Scope no: 1- Energy Industries (Renewable/non-renewable)
Date: 19/05/2006

A.5. Crediting period type and duration

>>
The start date of crediting period is considered as the date of registration, i.e. 31/01/2009.
The end date of crediting period is 30/01/2019
PP has considered fixed crediting period of 10 years.

SECTION B. Implementation of project activity

B.1. Description of implemented project activity

>>
The project activity comprises of installation of 30 Wind Electric Generators (WEGs) each of capacity 1500 kW supplied by Suzlon Energy Ltd. The objective of the project activity is develop, design, engineering, procure, finance, construct, operate and maintain the 45 MW wind based generation facility in the state of Maharashtra. The Project participant has signed Power Purchase Agreement (PPA) for 13 years period, with Maharashtra State private utility M/s. Reliance Innoventures Limited.

The project activity starts generating from the date of commissioning of the WTGs. The WTG's

Commissioning details are provided below:

Sr. No.	Location No	Date of Commissioning	Survey No, as per Commissioning Certificate issued by MSEDCL (formerly known as MSEB
1.	GPP 28	05/12/2007	678
2.	GPP 30	15/12/2007	715
3.	GPP 44	20/12/2007	2125, 2126
4.	GPP 56	03/01/2008	1013
5.	GPP 57		
6.	GPP 40	09/01/2008	17
7.	GPP 41		20
8.	GPP 42		25
9.	GPP 43		25
10.	GPP 58	11/01/2008	90
11.	GPP 61		1603
12.	GPP 62		51
13.	GPP 63		544
14.	GPP 65		475
15.	GPP 66		474
16.	GPP 89		210
17.	GPP 90		213
18.	GPP 94		250
19.	GPP 45	25/01/2008	2116
20.	GPP 48		1943
21.	GPP 46	02/02/2008	2084
22.	GPP 47		2080
23.	GPP 49		1935
24.	GPP 95	04/03/2008	395
25.	GPP 59	29/03/2008	1114
26.	GPP 92	20/06/2008	231
27.	GPP 93		1602
28.	GPP 87	17/11/2008	66
29.	GPP 91	27/03/2009	213
30.	GPP 96	27/03/2009	470

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 have been no temporary deviations from the registered monitoring plan or methodology

B.2.2. Corrections

>>
There are no corrections to the registered project activity.

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

>>
There are no changes in the start date of the crediting period.

B.2.4. Inclusion of monitoring plan

>>
There are no changes in the Monitoring plan

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 have been no permanent changes from the registered monitoring plan or applied methodology.

B.2.6. Changes to project design

>>
There have been no changes to the project design of the registered project activity.

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

>>
This is not applicable since the project activity is not an afforestation or reforestation project activity.

SECTION C. Description of monitoring system

>>
Parameters monitored ex-post are electricity export (EG_{export}) and electricity import (EG_{import}) from the project activity. The same are used to calculate the net electricity export which is taken as the basis for emission reduction calculations.

The joint meter is installed at the sub-station (grid interconnection point) are used to measure the electricity export and electricity import on continuous basis. Every month the joint meter readings were taken by the State Electricity Board (SEB) as per Power Purchase Agreement (PPA) terms. The meters at the sub-station are in the custody of SEB. SEB officials record the readings from the common joint meter and the same are used to calculate net electricity exported to the grid. The site staffs of RINL are responsible for the collation of the electricity export, electricity import and calculate the net electricity export figures in spreadsheets on monthly basis. The same were forwarded to the Project controller who verified on monthly basis and prepared the emission reduction spreadsheets along with the monitoring report. The Project Head undertook the final review and had the overall responsibility for data management.
RINL has entered into Operation and Maintenance Agreement with the M/s Suzlon Wind farm Services Limited (SWSL) for carrying out the necessary operation and maintenance of the project activity during the designed life of the project.

The operation and maintenance contract covers the following services:

1) Routine Maintenance Services
Routine Maintenance involves making available suitable manpower for operation and maintenance of the Equipment and covers periodic preventive maintenance, cleaning and up keep 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

2) Security Services
This service includes watch and ward and Security of the Wind Farm and the Equipment.

3) 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 RINL, of electricity generated at the wind farm and

supplied to SEB grid.

4) Technical Services
a. Visual inspection of the WEG 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.

The SEB carries out the calibration, periodical testing, sealing and maintenance of meters in the presence of RINL representative. The frequency of meter testing is on annual basis. The Article 11 of the Power Purchase Agreement of the project activity, which clearly identifies the following:

- **Metering and recording of power generation and consumption data**
- **Testing and Calibration of metering instruments**
- **Recording and approving authority**

RINL has formed a dedicated CDM and project team which is responsible for the recording and storing the data related to the project activity. The project team is also responsible for collation and preparation of monitoring reports and corresponding emission reduction sheets. All the monitoring data is maintained in the electronic form which is further cross verified by the project head and archived for the project life time.
The Organization and responsibility chart for the CDM project activity is described below

Sl. No	Designation	Responsibilities
1.	Project Head	1. Overall responsibility of the Project including CDM. 2. Review of monitoring reports and emission reduction calculation sheet. 3. Coordinate with DOE during verification process
2.	Project Controller	1. Operation & Maintenance of the wind farm. 2. Review of Project including performance evaluation. 3. Invoicing of the generated electricity. 4. Project Documentation: Preparation of monitoring reports and Emission reduction calculation sheet.
3.	Site staff	1. Collation of generation and consumption data 2. Preparation of spreadsheets mentioning electricity export, electricity import and net electricity export

Archiving of data:
Data shall be archived for 20 years (operational lifetime) + 2 years.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{BM,y}$
Unit	tCO_2e/MWh
Description	Build Margin Emission Factor of Western Regional Electricity Grid
Source of data	"CO2 Baseline Database for Indian Power Sector" Version 3.0 published by the Central Electricity Authority, Ministry of Power, Government of India
Value(s) applied	0.59
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 in accordance with "Tool to calculate the emission factor for an electricity system."
Purpose of data/parameter	Baseline emission calculations
Additional comments	Value is calculated based on ex-ante approach

Data/Parameter	$EF_{OM, y}$
Unit	tCO_2e / MWh
Description	Operating Margin emission factor for Western regional grid
Source of data	"CO_2 Baseline Database for Indian Power Sector" Version 3.0 published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	1.00
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 in accordance with "Tool to calculate the emission factor for an electricity system."
Purpose of data/parameter	Baseline emission calculations
Additional comments	Value is calculated based on ex-ante approach

Data/Parameter	EF_y
Unit	tCO_2e / MWh
Description	Combined Margin CO_2 emission factor for Western regional grid
Source of data	"CO_2 Baseline Database for Indian Power Sector" Version 3.0 published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	0.8975 tCO_2/MWh
Choice of data or measurement methods and procedures	The calculation is as per the Tool to calculate the emission factor for an electricity system.
Purpose of data/parameter	Baseline emission calculations
Additional comments	Fixed ex ante throughout the crediting period as per PDD

D.2. Data and parameters monitored

Data/Parameter	EG_y
Unit	MWh (Mega-watt hour)
Description	Net Electricity supplied to the grid by the Project activity in year y
Measured/calculated/ default	Calculated from EG_{export} and EG_{import} ($EG_{export} – EG_{import}$)
Source of data	Monthly Joint Energy Meter Reading Reports
Value(s) of monitored parameter	172,986 MWh
Monitoring equipment	Net electricity supplied to grid is calculated as product of difference between EG_{export} and EG_{import} ($EG_{export} – EG_{import}$).
Measuring/reading/recording frequency	Continuous measurement and monthly recording
Calculation method (if applicable)	The net electricity supplied to the grid is calculated by the summation of the net electricity export figures mentioned in the joint meter reading reports
QA/QC procedures	The quantity of net electricity supplied is cross-verified from the invoice raised by Reliance Innoventures Limited
Purpose of data/parameter	Baseline Emission calculation
Additional comments	-

Data/Parameter	EG_{export}
Unit	MWh (Mega-watt hour)
Description	Electricity exported to the grid by the Project activity in year y

Measured/calculated/ default	Measured
Source of data	Monthly Joint Energy Meter Reading Reports
Value(s) of monitored parameter	171,417 MWh
Monitoring equipment	The export of electricity was measured by the energy meter installed at common metering point. Joint meter readings were taken jointly by representatives of SEB and representative of RINL as per the applicable provisions mentioned in the Power Purchase Agreement. The joint meter readings were recorded once in a month. Net electricity supplied to grid is calculated as product of difference between EG_{export} and EG_{import} (EG_{export}t – EG_{import}). The calibration details of energy meters is provided in Annex 1.
Measuring/reading/recording frequency	Continuous measurement and monthly recording.
Calculation method (if applicable)	As per Joint Meter reading report
QA/QC procedures	The energy meters were checked for accuracy as per SEB guidelines on a regular basis and are subject to periodic calibration as per PPA. To calculate the net electricity exported to the grid for the monitoring start period where the date of registration of the project does not match with the JMR where RINL has calculated the net electricity supplied to the grid by two approaches i.e., a) Pro-rata basis (from the JMR Reading) and b) b) apportioning (from turbine controller data provided by O&M service provider) the electricity supplied. The lowest value between these two approaches has been considered for emission reduction calculation.
Purpose of data/parameter	Baseline Emission Calculation
Additional comments	-

Data/Parameter	**EG_{import}**
Unit	MWh (Mega-watt hour)
Description	Electricity exported to the grid by the Project activity in year y
Measured/calculated/ default	Measured
Source of data	Monthly Joint Energy Meter Reading Reports
Value(s) of monitored parameter	1,569 MWh
Monitoring equipment	The import of electricity was measured by the energy meter installed at common metering point. Joint meter readings were taken jointly by representatives of SEB and representative of RINL as per the applicable provisions mentioned in the Power Purchase Agreement. The joint meter readings were recorded once in a month. Net electricity supplied to grid is calculated as product of difference between EG_{export} and EG_{import} (EG_{export} – EG_{import}).
Measuring/reading/recording frequency	Continuous measurement and monthly recording
Calculation method (if applicable)	As per Joint Meter reading report

QA/QC procedures	The energy meters were checked for accuracy as per SEB guidelines on a regular basis and are subject to periodic calibration as per PPA. To calculate the net electricity exported to the grid for the monitoring start period where the date of registration of the project does not match with the JMR where RINL has calculated the net electricity supplied to the grid by two approaches i.e., a) Pro-rata basis (from the JMR Reading) and b) apportioning (from turbine controller data provided by O&M service provider) the electricity supplied. The lowest value between these two approaches has been considered for emission reduction calculation.
Purpose of data/parameter	Baseline Emission Calculation
Additional comments	-

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

>>
Since the project is a grid connected renewable energy project, emission reduction quantity depends on the units of electricity exported to the grid (in MWh) and the baseline emission factor of the Indian Grid The applicable version of the methodology ACM0002, mentioned below is used for estimation of emission reductions.

$$\mathbf{ER_y = BE_y – PE_y - LE_y}$$

Where,
ER_y **-** Net Emission Reduction in tCO_2 in year y.
BE_y - Baseline emissions in tCO_2 in year y.
PE_y **-** Project emissions in tCO_2 in year y.
LE_y **-** Leakage emissions in tCO_2 in year y.

Baseline emissions (BE_y)
As per the applicable version of ACM0002, BE_y is calculated by multiplying the net quantity of electricity supplied by this project activity (EG_y) with the combined margin co2 emission factor for grid connected power generation ($EF_{grid,CM,y}$)

$$\mathbf{BE_y = EG_y * EF_y}$$

Where:

EF_y - Baseline emission factor in tCO_2/MWh
EG_y - Net electricity supplied to the western regional grid in year y
BE_y - Baseline electricity supplied to the Grid in case of Modified or retrofit projects

Thus, as per the CDM PDD, the calculated Baseline emission factor is $EF_{grid,CM,y}$ = 0.8975 tCO_2/MWh The Baseline Emission Factor is fixed.
Hence the baseline emissions are calculated as below: Baseline Emissions (BE_y)
= 0.8975 * 172,986 = 155,255 tCO_2

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

>>
Since the project activity does not involve combustion of fossil fuel, operation of geothermal power plants to release non-condensable gases and water reservoirs, emissions from the project activity are taken as nil.
$PE_y = 0$

E.3. Calculation of leakage emissions

>>
No LE_Y is considered for the project activity.
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	155,255	0	0	155,255	0	0	155,255

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)
155,255	190,923

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 CERs generally annually is 80,937 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 861 days. Hence, the amount of estimated ex ante for this monitoring period

$$= 80,937 \times 861/365$$
$$= 190,923\ tCO_2/year$$

E.6. Remarks on increase in achieved emission reductions

>>
The estimated annual emission reductions as per the registered CDM PDD corresponding to the current monitoring period are 190,923 tCO_2.The actual emission reductions achieved during the current monitoring period is 155,255 tCO_2 which is 18.68 % lower than the estimated emission reduction.

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

>>
Not Applicable.

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Document information

Version	*Date*	*Description*
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.
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.

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