



Monitoring report form
(Version 05.1)

MONITORING REPORT

Title of the project activity	Grid Connected Wind Power Project by M/s Giriraj Enterprises in Madhya Pradesh	
UNFCCC reference number of the project activity	5938	
Version number of the monitoring report	2	
Completion date of the monitoring report	06/03/2017	
Monitoring period number and duration of this monitoring period	Monitoring period number: 02 Duration: 25/03/2014 - 30/09/2016 (including both days)	
Project participant(s)	M/s Giriraj Enterprises	
Host Party	India	
Sectoral scope(s)	01 Energy Industries (renewable - /non-renewable sources)	
Selected methodology(ies)	AMS-ID Version 17	
Selected standardized baseline(s)	Not Applicable	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	60,640 tCO ₂ e	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0 tCO ₂ e	63,271 tCO ₂ e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

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Purpose of the project activity and the measures taken for GHG emission reductions or net anthropogenic GHG removals by sinks:

The project activity is grid-connected wind power generation located at Villages: Barada Barkheda, Taluka: Barod, District: Shajapur, State: Madhya Pradesh in India. M/s Giriraj Enterprises is the owner and developer of the project activity. The project activity is supplying the generated electricity to NEWNE Grid of India.

The purpose of the project activity is generation of clean electricity by utilizing kinetic energy of wind. The project activity is estimated to generate 25,529 MWh of electricity annually; with estimated emission reductions of 24,216 tCO_{2e} / annum for the entire crediting period of 7 years.

Brief description of the installed technology and equipment;

The total capacity of the project activity is 15 MW (10 WTGs × 1.50 MW). The project activity employs Wind Turbine Generators (WTGs) of Class S-82 manufactured by M/s. Suzlon Energy Limited.

Technical specifications for Class S-82:

Main Data	
Turbine type	Horizontal axis turbine
Rated Power	1500 kW
Rotor Diameter	82 m
Hub height (including foundation)	Approximately 78.5 m
Rotational Speed	15.6 to 18.4 rpm
Rotor	
Number of rotor blades	3
Rotor Orientation	Upwind
Material	Epoxy bonded fibre glass
Gear Box	
Type of Gear Box housing	One planetary stage / Two helical stages
Ratio	1: 95.09
Power	1650 kW
Type of cooling	Forced oil cooling lubrication system
Generator System	
Generator type	Single speed induction generator with slip rings, variable rotor resistance via Suzlon Flexi slip system
Rated power	1500 kW
Speed at rated power	1511 rpm
Rated voltage	690 V AC (phase to phase)
Frequency	50 Hz
Insulation Class	Class H
Tower	
Tower type	Tubular tower (corrosion proof painting on inner and outer surface) with welded steel plates
Tower Height	76 m
Operational Parameters	
Cut-in wind speed	4 m/s

Rated wind speed	14 m/s
Cut-off wind speed	20 m/s
Survival wind speed	52.5 m/s

The project technology is indigenous & no technology transfer is involved.

Relevant dates for the project activity (e.g. construction, commissioning, continued operation periods, etc.):

The project activity has been commissioned & running successfully. The details are given below:

Sr. No.	Loc. No.	Capacity, MW	Village	Commissioning date
1.	M-12	1.5	Barda Barkheda	31/03/2011
2.	M-34	1.5	Barda Barkheda	28/03/2011
3.	M-35	1.5	Barda Barkheda	28/03/2011
4.	M-36	1.5	Barda Barkheda	28/03/2011
5.	M-45	1.5	Barda Barkheda	30/03/2011
6.	M-55	1.5	Barda Barkheda	19/06/2011
7.	M-90	1.5	Barda Barkheda	07/06/2011
8.	M-91	1.5	Barda Barkheda	19/06/2011
9.	M-92	1.5	Barda Barkheda	19/06/2011
10.	M-93	1.5	Barda Barkheda	19/06/2011

Total GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period:

The project activity has exported 66,700 MWh of electricity to the NEWNE Grid during the monitoring period under consideration i.e. 25/03/2014 to 30/09/2016 (including both days). This has helped in mitigating 63,271 tCO₂e during the same period.

A.2. Location of project activity

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Host Party(ies): India

Region/ State/ Province, etc.: Madhya Pradesh

City/ Town/ Community, etc.: Villages: Barada Barkheda, Taluka: Barod, District: Shajapur

Physical/ Geographical location:

The project activity is located at Villages: Barada Barkheda, Taluka: Barod, District: Shajapur, State: Madhya Pradesh in India. The details of project location are given below:

Sr. No.	Location No.	Village	Latitude	Longitude
1.	M-12	Barda Barkheda	N 23° 51' 55.2"	E 76° 03' 47.5"
2.	M-34	Barda Barkheda	N 23° 51' 05.2"	E 76° 03' 39.7"
3.	M-35	Barda Barkheda	N 23° 50' 53.8"	E 76° 03' 42.0"
4.	M-36	Barda Barkheda	N 23° 50' 45.1"	E 76° 03' 54.6"
5.	M-45	Barda Barkheda	N 23° 50' 25.2"	E 76° 04' 09.6"
6.	M-55	Barda Barkheda	N 23° 48' 39.7"	E 76° 05' 11.9"
7.	M-90	Barda Barkheda	N 23° 50' 05.0"	E 76° 05' 26.5"
8.	M-91	Barda Barkheda	N 23° 49' 56.9"	E 76° 05' 33.9"
9.	M-92	Barda Barkheda	N 23° 49' 44.7"	E 76° 05' 38.5"
10.	M-93	Barda Barkheda	N 23° 49' 34.6"	E 76° 05' 25.5"

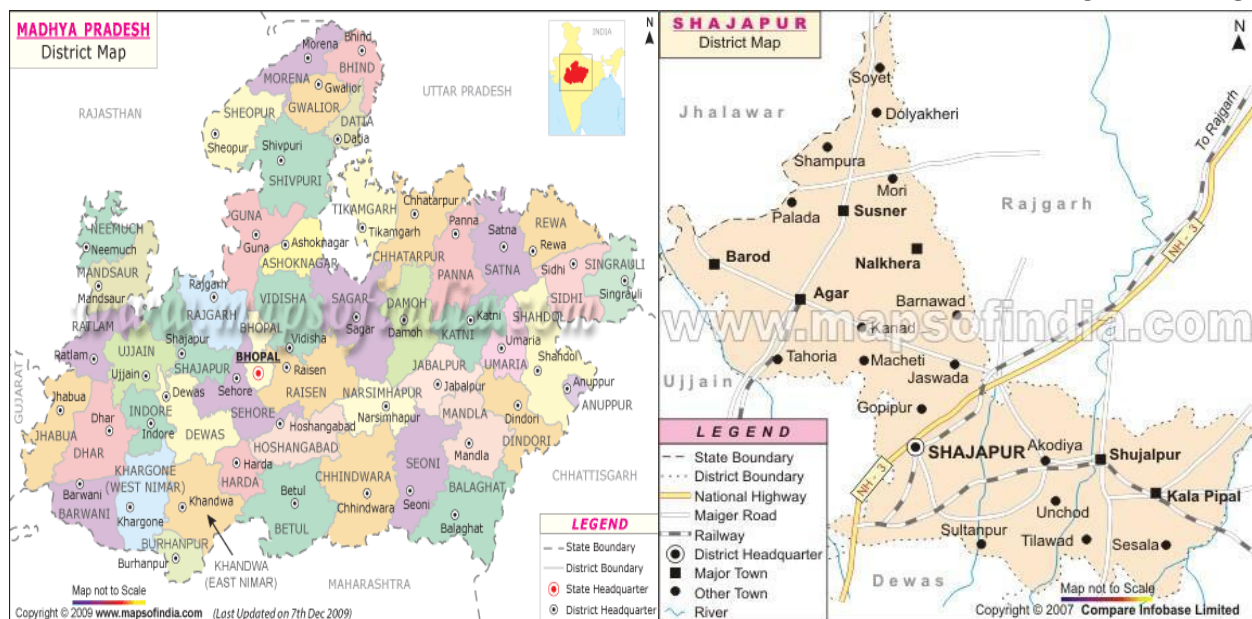


Figure: 01 Project activity on Map

A.3. Parties and project participant(s)

Party involved (host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
India (host)	Private entity: M/s Giriraj Enterprises	No

A.4. Reference of applied methodology and standardized baseline

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Title of methodology: Grid connected renewable electricity generation**Reference:** AMS- I.D.**Version number:** 17

Additionally the project has referred:

Tool to calculate the emission factor for an electricity system (Version- 02.2.1 , EB- 63, Annex- 19)

A.5. Crediting period of project activity

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Type of crediting period: Renewable**Start date of crediting period:** 20/08/2012**Length of crediting period:** 07 years**A.6. Contact information of responsible persons/entities**

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M/s Giriraj Enterprises

The above entity is project participant as mentioned in Appendix 1 of MR

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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Information on the implementation and actual operation of the project activity:

The project activity has been commissioned & running successfully. Please refer table under section A.1 (Relevant dates for the project activity).

No phased implementation involved.

Brief description of the installed technology and equipment;

The total capacity of the project activity is 15 MW (10 WTGs × 1.50 MW). The project activity employs Wind Turbine Generators (WTGs) of Class S-82 manufactured by M/s. Suzlon Energy Limited.

The Technical specifications for Class S-82 can be referred from section A.1 (Brief description of the installed technology and equipment).

The project technology is indigenous & no technology transfer is involved.

Description of the events or situations that occurred during the monitoring period that may impact the applicability of the applied methodology and, where applicable, the applied standardized baseline

There are no events or situations that occurred during the monitoring period that impacted the applicability of the applied methodology.

How the issues resulting from these events or situations have been addressed.

There are no events or situations that occurred during the monitoring period that impacted the applicability of the applied methodology.

PP confirms that there are no changes to the registered CDM project activity.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

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Not Applicable

B.2.2. Corrections

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Not Applicable

B.2.3. Changes to start date of crediting period

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Not Applicable

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

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Not Applicable

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

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Not Applicable

B.2.6. Changes to project design of registered project activity

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Not Applicable

B.2.7. Types of changes specific to afforestation or reforestation project activity

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Not Applicable

SECTION C. Description of monitoring system

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There are two separate set of metering points for the project activity i.e. the meters (Main meters) installed at project site and check meters (back up meters) located at substations (Susner and Agar substation). The monitoring procedure is being followed for the project activity is described as below:

Metering at site metering point:

- The electricity generated by the project activity WTGs along with non-project WTGs is metered at feeder-wise site metering point/s. The metering point consists of a main meter, having accuracy of 0.2s. The respective check meter is installed at substation. These check meter is having accuracy class of 0.2s.
- The main meter at a given site metering point measures parameters like export & import for all the connected WTGs. The export reading for a given metering point for a given billing month is obtained by subtracting initial reading (taken in previous month) from the final reading (taken in billing month). The difference is multiplied by the applicable meter constant. Similar procedure is followed to arrive the import reading.
- The monitoring & measurement of electricity at project metering point/s is being done on continuous basis; while recording is being done on monthly basis as Joint Meter Reading by the representatives of State Utility & PP.

Calculation of Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y:

- The export & import by the project activity WTG/s connected at a given metering point is calculated by apportioning of the electricity at feeder level by the state utility. The apportioning of the electricity is based on the monthly generation ratio (ratio of controller reading of project activity WTG/s to the controller reading for all WTGs connected to the applicable metering point) at the given metering point and the electricity reading (export, import etc) recorded by the main meter at the given metering point on monthly basis. It gives monthly values of export & import for project activity WTG/s. The net export for any given month by the project activity WTG/s to the grid is then obtained by subtracting import from export. Thus,

Net export for any given month by the project activity WTG/s to the grid = Export kWh – Import kWh

- The values of the monthly net electricity supplied to the Grid by the project activity WTGs are aggregated annually to get quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y i.e. $EG_{BL,y}$.
- The value of $EG_{BL,y}$ is converted to MWh before the calculation of emission reductions.

Metering at substation:

- The project metering point/s further evacuates the electricity to the substation. The substation provides respective feeder-wise back- up metering (check meters) facility. These check meters are having accuracy class of 0.2s. The monthly JMR is taken by the representative of PP & State Utility.
- The meters are approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is annual. The monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale. In the absence of the meter calibration— sGuidelines for Assessing Compliance with the Calibration Frequency Requirements will be applied appropriately to confirm the conservativeness of metering.
- Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.

Apportioning Procedure:

The apportioning of the electricity is the responsibility of the State Utility. The sample apportioning procedure adopted for any given WTG for any given month is given below:

Generation Ratio at site metering point:

The generation ratio is the ratio of controller reading of project activity WTG/s to the controller reading for all WTGs connected to the applicable metering point.

$$GR_{\text{metering point}} = \frac{EG_{\text{Controller, WTG}}}{EG_{\text{Controller, metering point}}} \dots\dots\dots(a)$$

Where:

$GR_{\text{metering point}}$: Generation Ratio at metering point

$EG_{\text{Controller, WTG}}$: Electricity generated by installed WTG of PP connected to the applicable metering point

$EG_{\text{Controller, metering point}}$: Total generation by all the connected WTGs to the applicable metering point

Calculation of net electricity export by project activity WTG/s to the grid:

The main meter at the applicable metering point measures number of parameters including export and import for all the connected WTGs.

The import, kWh by the project WTG at the metering point is calculated in the following manner:

$$\text{Import, kWh} = GR_{\text{metering point}} \times EG_{\text{Total Import, metering point}} \dots\dots\dots(b)$$

Where:

$GR_{\text{metering point}}$: Generation Ratio at metering point

$EG_{\text{Total Import, metering point}}$: Total Import, kWh by all the WTGs at the metering point

The export, kWh by the project WTG at the metering point is calculated in the following manner:

$$\text{Export, kWh} = GR_{\text{metering point}} \times EG_{\text{Total Export, metering point}} \dots\dots\dots(c)$$

Where:

$GR_{\text{metering point}}$: Generation Ratio at metering point

$EG_{\text{Total Export, metering point}}$: Total Export, kWh by all the WTGs at the metering point

The net electricity supplied/exported by the by project activity WTG/s to the grid is calculated by subtracting equation (b) from (c).

Thus:

= Export, kWh – Import, kWh(d)

These apportioned values viz import, export and net export kWh can be referred from the Monthly Report on Generation & Compensation.

Operation & Maintenance of the Project:

Suzlon is providing O & M services to the project promoter. Following services are provided by Suzlon:

Routine Maintenance Services:

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

- Tower torquing
- Blade cleaning
- Nacelle torquing and cleaning
- Transformer oil filtration
- Control panel & LT panel maintenance
- Site and transformer yard maintenance

Security Services:

This service includes watch and ward and security of the wind turbines and the equipment.

Management Services:

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

Technical Services:

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

Indicative line diagram displaying the GHG collection and management system:

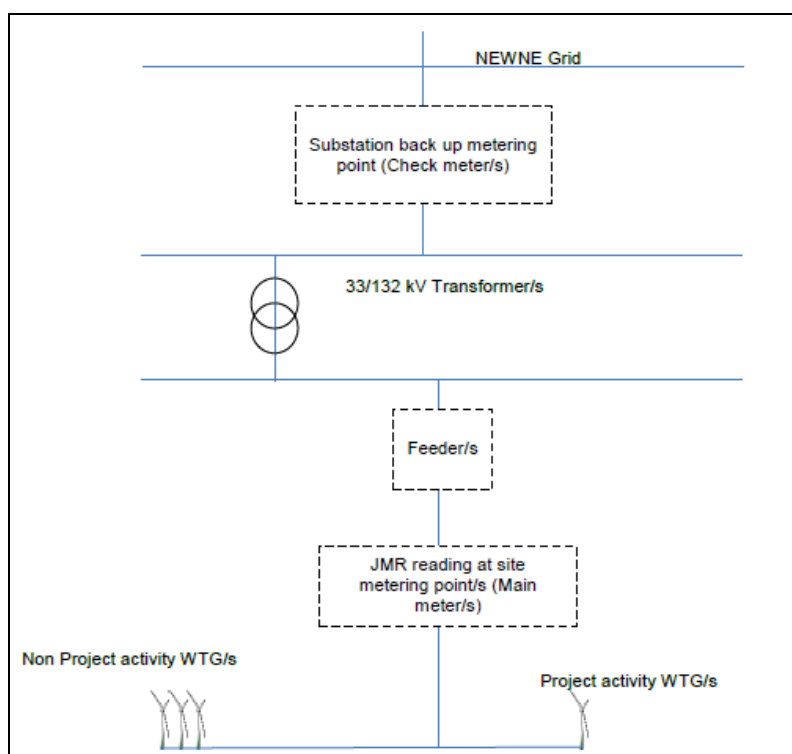


Figure 02: Indicative line diagram with location of metering equipment

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/parameter:	EF _{grid,CO₂,y}
Unit	tCO ₂ / MWh
Description	CO ₂ Emission Factor of the grid in year y
Source of data	CEA CO ₂ Baseline Database (Version- 6.0, Date- March 2011). The value is calculated for year 2007-08, 2008-09 & 2009-10.
Value(s) applied)	0.9486
Choice of data or measurement methods and procedures	The value applied is taken from the plant from CEA reviews. The weights used for calculating combined margin emission factor are 0.75 and 0.25 for operating margin and built margin respectively and EF _{grid,CO₂,y} is calculated for ex – ante.
Purpose of data	Baseline emission calculations
Additional comments	The calculation is done as ex ante.

Data/parameter:	EF _{grid, OM, y}
Unit	tCO ₂ / MWh
Description	Operating margin CO ₂ emission factor for the project electricity system.
Source of data	CEA CO ₂ Baseline Database (Version- 6.0, Date- March 2011). The value is calculated for year 2007-08, 2008-09 & 2009-10.
Value(s) applied)	0.9941
Choice of data or measurement methods and procedures	The value applied is taken from the plant from CEA reviews. The weights used for calculating combined margin emission factor are 0.75 and 0.25 for operating margin and built margin respectively and EF _{grid,CO₂,y} is calculated for ex – ante.

Purpose of data	Baseline emission calculations
Additional comments	The calculation is done as ex ante.

Data/parameter:	EF _{grid, BM, y}
Unit	tCO ₂ / MWh
Description	Build margin CO ₂ emission factor for the project electricity system.
Source of data	CEA CO ₂ Baseline Database (Version- 6.0, Date- March 2011). The value is calculated for year 2007-08, 2008-09 & 2009-10.
Value(s) applied)	0.8123
Choice of data or measurement methods and procedures	The value applied is taken from the plant from CEA reviews. The weights used for calculating combined margin emission factor are 0.75 and 0.25 for operating margin and built margin respectively and EF _{grid, CO₂, y} is calculated for ex – ante.
Purpose of data	Baseline emission calculations
Additional comments	The calculation is done as ex ante.

D.2. Data and parameters monitored

Data/parameter:	EG _{BL, y}
Unit	kWh/y
Description	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y
Measured/calculated/default	Measured and Calculated
Source of data	Monthly Report on Generation & Compensation
Value(s) of monitored parameter	66,700,887 (Monthly values are provided in the ER calculation sheet)

Monitoring equipment	<p>Metering at site metering point:</p> <p>This parameter is calculated using measured parameters. The electricity generated by the project activity WTGs along with non-project WTGs is metered at feeder-wise site metering point/s as mentioned in the below table in this section . Each of the metering point consists of a main meter, having accuracy of 0.2s.</p> <p>The main meter at a given site metering point measures parameters like export & import for all the connected WTGs. The export reading for a given metering point for a given billing month is obtained by subtracting initial reading (taken in previous month) from the final reading (taken in billing month). The difference is multiplied by the applicable meter constant. Similar procedure is followed to arrive the import reading.</p> <p>The monitoring & measurement of electricity at project metering point/s is being done on continuous basis; while recording is being done on monthly basis as Joint Meter Reading by the representatives of State Utility & PP.</p> <p>Calculation of Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y:</p> <p>The export & import by the project activity WTG/s connected at a given metering point is calculated by apportioning of the electricity at feeder level by the state utility. The apportioning of the electricity is based on the monthly generation ratio (ratio of controller reading of project activity WTG/s to the controller reading for all WTGs connected to the applicable metering point) at the given metering point and the electricity reading (export, import etc) recorded by the main meter at the given metering point on monthly basis. It gives monthly values of export & import for project activity WTG/s. The net export for any given month by the project activity WTG/s to the grid is then obtained by subtracting import from export.</p> <p>Thus, Net export for any given month by the project activity WTG/s to the grid = Export kWh – Import kWh</p> <p>The values of the monthly net electricity supplied to the Grid by the project activity WTGs are aggregated annually to get quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y i.e. $EG_{BL,y}$.</p> <p>The value of $EG_{BL,y}$ is converted to MWh before the calculation of emission reductions.</p> <p>Metering at substation:</p> <p>The project metering point/s further evacuates the electricity to the substation. The substation provides respective feeder-wise back- up metering (check meters) facility. These check meters are having accuracy class of 0.2s. The monthly JMR is taken by the representative of PP & State Utility.</p>
Measuring/reading/recording frequency:	Monitoring Frequency: Continuous Recording frequency: Monthly
Calculation method (if applicable):	Refer above section C of MR.
QA/QC procedures:	The meters are approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is annual. The monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale. In the absence of the meter calibration - Guidelines For Assessing Compliance With The Calibration Frequency Requirements will be applied appropriately to confirm the conservativeness of metering.

Purpose of data:	Calculation of baseline emissions or baseline net GHG removals by sinks
Additional comments:	The data will be archived electronically for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

D.3. Implementation of sampling plan

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Not Applicable

SECTION E. Calculation of emission reductions or GHG removals by sinks**E.1. Calculation of baseline emissions or baseline net GHG removals by sinks**

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Calculation of Baseline Emissions (BE_y):

The baseline emissions are the product of electrical energy baseline E_{GBL, y} expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

Thus,

$$BE_y = E_{GBL,y} \times EF_{CO_2,grid,y}$$

Grid emission factor:

The grid emission factor for the project activity has been calculated ex ante as 0.9486 tCO₂/MWh.

$$BE_y = 66,700 \text{ MWh} \times 0.9486 \text{ tCO}_2/\text{MWh} = 63,271 \text{ tCO}_2$$

E.2. Calculation of project emissions or actual net GHG removals by sinks

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Calculation of Project Emissions (PE_y):

As per paragraph 20 of approved methodology AMS- I.D. (Version- 17, EB- 61), for most renewable energy project activities, PE_y = 0.

As project activity is wind power generation. The project emissions are thus considered as zero tCO₂. Thus, PE_y = 0.

E.3. Calculation of leakage

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Calculation of Leakage Emissions (LE_y):

As per paragraph 22 of the approved methodology AMS- I.D. (Version- 17, EB- 61), If the energy generating equipment is transferred from another activity, leakage is to be considered.

The leakage emissions are considered as zero tCO₂ as no such equipment shall be transferred from another project activity. Thus, LE_y = 0.

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

Item	Baseline emissions or baseline net GHG removals by sinks (t CO ₂ e)	Project emissions or actual net GHG removals by sinks (t CO ₂ e)	Leakage (t CO ₂ e)	GHG emission reductions or net GHG removals by sinks (t CO ₂ e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
Total	63,271	0	0	0	63,271	63,271

E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO ₂ e)	61,104	63,271

E.6. Remarks on difference from estimated value in registered PDD

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The actual emission reductions for the monitoring period under consideration are higher by 3.55% than the value estimated in the registered CDM-PDD. The current monitoring period involves huge variation in wind flow and this is nature dependent and not in control of PP.

Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	<input checked="" type="checkbox"/> Project participant <input checked="" type="checkbox"/> Person/entity responsible for completing the CDM-MR-FORM
Organization name	M/s Giriraj Enterprises
Street/P.O. Box	I G Road
Building	Malpani House
City	Sangamner
State/region	Maharashtra
Postcode	422605
Country	India
Telephone	+91 2425 225 011
Fax	+91 2425 225 003
E-mail	prafulla@malpani.com
Website	www.malpani.com
Contact person	
Title	Head -Wind Power Projects
Salutation	Mr.
Last name	Khinvasara
Middle name	Premchand
First name	Prafulla
Department	Renewable Power Projects
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Direct fax	+91 2425 225 003
Direct tel.	+91 2425 225 011 (Extension 215)
Personal e-mail	prafulla@malpani.com

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Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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 <i>F-CDM-MR</i> to <i>CDM-MR-FORM</i>; • 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 (EB70, 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	28 May 2010	EB 54, Annex 34. Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance Keywords: monitoring report		