



Monitoring report form (Version 03.2)

Monitoring report

Title of the project activity	Wind Power Project at Rajkot, Gujarat
Reference number of the project activity	8095
Version number of the monitoring report	1
Completion date of the monitoring report	05/12/2013
Registration date of the project activity	09/11/2012
Monitoring period number and duration of this monitoring period	Monitoring period: 1 st , Duration of this monitoring period: 15/11/2012 to 30/11/2013
Project participant(s)	ReNew Wind Energy (Rajkot) Private Limited
Host Party(ies)	India
Sectoral scope(s) and applied methodology(ies)	<p>Sectoral Scope 1: Energy Industries (renewable - / non-renewable sources)</p> <p>Methodology : ACM0002 version 12.3.0- Consolidated baseline methodology for grid connected electricity generation from renewable sources</p>
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	50,352 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	54,942 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	5,260 tCO ₂ e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	49,682 tCO ₂ e

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

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ReNew Wind Energy (Rajkot) Private Limited (RNWERPL), the Project Proponent (PP), has set up wind power project of 25.2 MW capacity at Villages: Godladha, Madhavipur, Kalasar, Devpara and Madava of Rajkot district in Gujarat.

The purpose of the project activity is to generate electricity using wind as renewable energy source and helping in reducing usage of fossil fuels which are used for electricity generation. This would reduce the dependency on fossil fuels and reduce the Green House Gas (GHG) emissions.

The baseline scenario for the project activity as per the applied methodology ACM0002 version 12.3.0) is : "Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system."

As the project activity is a greenfield project, there was no power plant existing at the project site prior to the installation of the project activity (i.e. in the pre-project scenario).

The project consists of installation of 12 Suzlon make wind turbines of 2.1 MW capacity each. As per the Energy Estimate report issued by a third party agency, the project activity is expected to supply 50.733 GWh of energy to the NEWNE Grid of India each year. This translates into a Plant Load Factor (PLF) of 22.98%. Also, this is expected to result in emission reductions of 48,338 tCO₂e per year of operation. During the monitoring period 15th November 2012 to 30th November 2013, the project has supplied 57.664 GWh of energy result in emission reductions of 54,942 tCO₂e.

The projects was commissioned successfully on 29/03/2012 as evident from commissioning certificate dated 26/04/2012 and 11/06/2012 issued by Gujarat Energy Development Agency (GEDA).

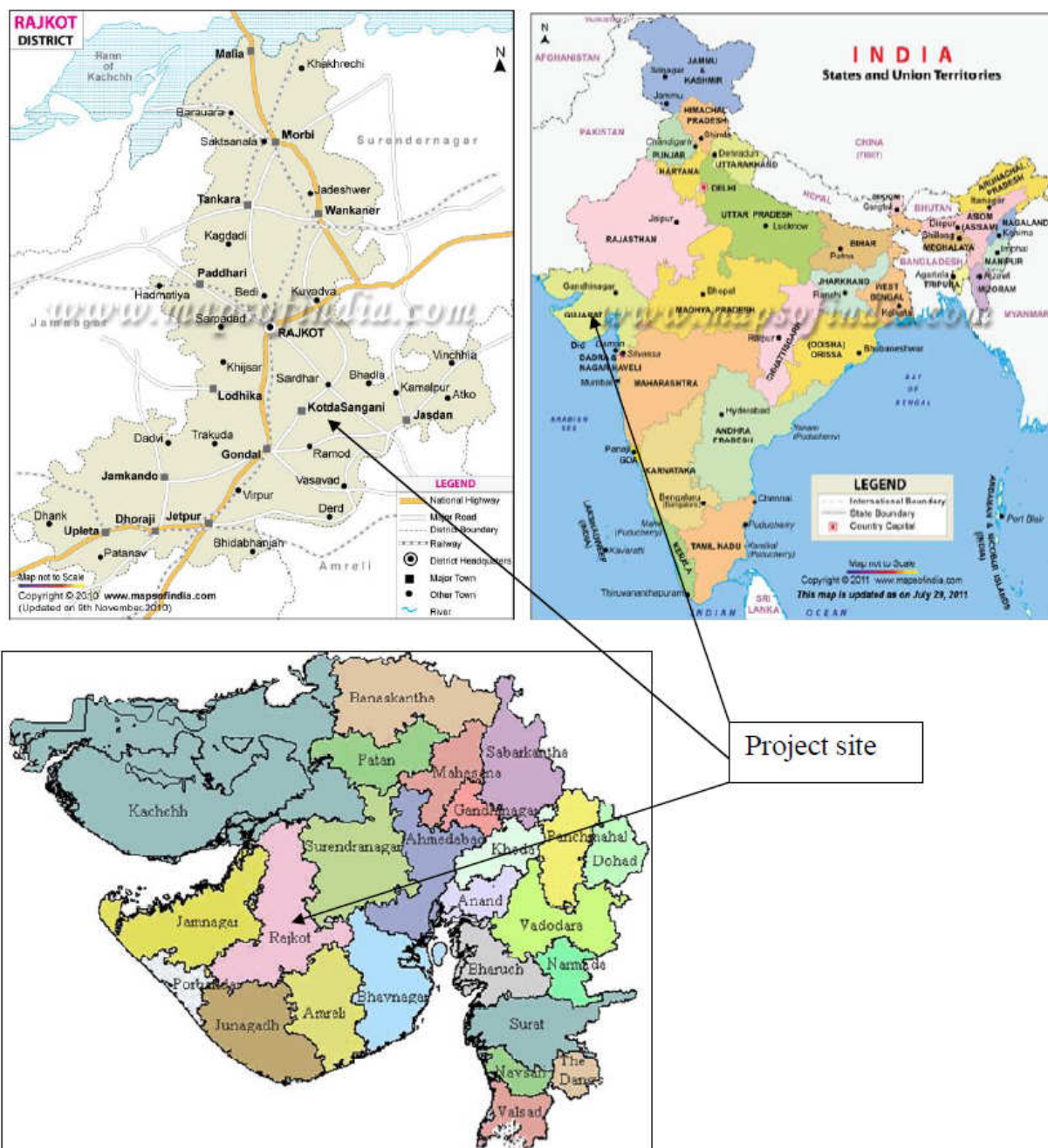
A.2. Location of project activity

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The project is located in the Godladhar, Madhavipur, Kalasar, Devpara and Madav villages of Jasdan Taluka, Rajkot District, Gujarat State of India.

Wind turbine-wise detailed co-ordinates are tabulated below.

Location No.	Village/Taluka/District/State	Coordinates
G 034	Godladhar/Jasdan/Rajkot/Gujarat.	N22 02 39.2 E71 18 58.5
G 036	Godladhar/Jasdan/Rajkot/Gujarat.	N22 03 01.8, E71 18 08.2
G 037	Madhavipur/Jasdan/Rajkot/Gujarat	N22 03 33.6 , E71 18 01.5
G 038	Godladhar/Jasdan/Rajkot/Gujarat.	N22 02 52.1 E71 18 58.9
G 039	Godladhar/Jasdan/Rajkot/Gujarat.	N22 03 14.8 E71 18 45.6
G 041	Madhavipur/Jasdan/Rajkot/Gujarat	N22 03 47.3, E71 17 49.0
G 042	Madhavipur/Jasdan/Rajkot/Gujarat	N22 03 45.5, E71 18 10.6
G 046	Kalasar /Jasdan/Rajkot/Gujarat.	N22 05 06.0, E71 16 42.6
G 055	Devpara /Jasdan/Rajkot/Gujarat.	N22 06 04.6, E71 14 19.7
G 056	Devpara /Jasdan/Rajkot/Gujarat.	N22 06 18.1, E71 14 15.1
G 068	Madava /Jasdan/Rajkot/Gujarat.	N22 08 36.6, E71 14 06.0
G 112	Kalasar/Jasdan/Rajkot/Gujarat.	N22 04 54.0, E71 16 18.0



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 if the Party involved wishes to be considered as project participant (Yes/No)
India (host)	ReNew Wind Energy (Rajkot) Private Limited	No

A.4. Reference of applied methodology

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Title: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

ACM0002 (Version 12.3.0)

Reference: ACM0002 (Version 12.3.0) draws upon the following tools which have been used in the PDD:

1. Tool to calculate the emission factor for an electricity system (Version 02.2.1)
2. Tool for demonstration and assessment of additionality (Version 6.1.0)

A.5. Crediting period of project activity

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15th November 2012 to 14th November 2019 (Renewable)

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

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The project consists of installation of 12 Suzlon make wind turbines of 2.1 MW capacity each. The technical specifications of the S-88 model wind turbine are mentioned below:

Description	Specifications
Wind speed at rated output	14 m/s
Cut in speed	4 m/s
Cut out speed	25 m/s
Hub height	79 m
Power regulation	Pitch
Rotor diameter	88 m
Swept area	6082 m ²
Generator type	Asynchronous slip ring type induction generator
Generator rated power output	2100 kW
Voltage	690 V
Life	25 years

These turbines are supplied by Suzlon Energy Ltd and are designed for particular wind conditions. The technology for the same is environmentally safe and sound and there is no technology transfer to the host party involved in the same. Lifetime of the WTGs is expected to be 25 years as per data shared by the technology supplier.

The projects was commissioned successfully on 29/03/2012 as evident from commissioning certificate dated 26/04/2012 and 11/06/2012 issued by Gujarat Energy Development Agency (GEDA).

B.2. Post registration changes

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

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No such temporary deviations have taken place.

B.2.2. Corrections

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No corrections are applicable.

B.2.3. Permanent changes from registered monitoring plan or applied methodology

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No such changes from registered monitoring plan or applied methodology taken place.

B.2.4. Changes to project design of registered project activity

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There are no changes of the project design of registered project activity.

B.2.5. Changes to start date of crediting period

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No such changes to start date of crediting period taken place.

B.2.6. 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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In Monitoring & Verification protocol, the objective is to have clear, credible and accurate monitoring, evaluation and verification procedures. This involves recording, data collection of all wind turbines, metering of electricity generated at substation, on daily basis as well as on monthly basis. The general conditions for metering, recording, meter readings, meter inspections, Test & Checking and communication shall be as per the Power Purchase Agreement with the state utility.

Procedure for apportioning of electricity:

1. In case the start/end dates of monitoring period do not match with the start/end dates of Joint Meter Reading Sheets / Generation reports issued by GETCO/SLDC, following apportioning procedure will be applied for the first and the last monitoring period within a particular crediting period:

Apportioning will be carried out based on ratio of generation data recorded using WTG yard meter installed near each WTG. The emission reductions of that particular period (between the start/end date of monitoring period and the end/start of the billing period) will be calculated based on percentage generation of that particular period at WTG using yard meter data multiplied with the total units generated in the month as per the Certificate for share of electricity generated by Wind farm provided by GETCO/SLDC. The calculation formula has been furnished below:

Generation from all project WTGs for the period y1 = $EG_{WTGyard,i,y1}$

Generation from all project WTGs for the period y2 = $EG_{WTGyard,i,y2}$

Net energy supplied used for calculation of emission reduction for the monitoring period y1

$$N \sum_{i=1} ((EG_{facility,i,y2}) * (EG_{WTGyard,i,y1} / EG_{WTGyard,i,y2}))$$

Where:

y1 = No. of days within a billing period up to which generation is considered for emission reduction calculation

y2 = No. of days in the billing period

N = No. of feeders to which project WTGs are connected to.

2. In case if there are project and non-project WTGs connected to a particular feeder i, the quantity of net electricity supplied by project WTGs to the grid connected to that particular feeder will be calculated based on the formula specified below:

Total generation from all project WTG(s) connected to the feeder i in period y = $EG_{WTGyard,i,y}$

Total generation from all project and non-project WTGs connected to the feeder i in period y = $EG_{Allyard,i,y}$

Quantity of net electricity supplied by all (project and non-project) WTGs connected to feeder i to the grid in period y = $EG_{facility,i,y}$

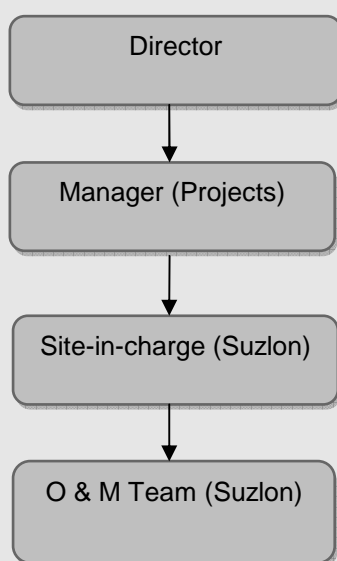
Net electricity supplied by the project WTGs connected to feeder i to the grid in period y =

$$\sum_{i=1}^N ((EG \text{ facility}, i, y) * (EG \text{ WTG yard}, i, y / EG \text{ Allyard}, i, y))$$

Where: N = No. of feeders to which project WTGs are connected to.

3. In cases where both scenarios mentioned above exist at the same time (i.e. both project and non- project WTGs connected to the same feeder(s) and the start/end date of the monitoring periods do not match with those of the JMR readings), firstly the apportioning as per point # 2 above will be applied for the billing period y2 to estimate the Net electricity supplied by the project WTGs connected to feeder Z to the grid in period y2. Then this value would replace (EG facility,y2) in the formula specified under point # 1 above to arrive at the Net energy export used for calculation of emission reduction for the monitoring period y1.

The project proponent proposes following arrangements in order to carry out metering and O & M activities for all wind turbines:



At 33 kV/66 kV Parveda substation (Currently managed by Suzlon), there are two feeders; Feeder 1 and Feeder 2. Main meter, check meter and ABT meters are located at this substation.

Electricity measurement in the state of Gujarat initiates with recording of electricity generation at the dedicated meter installed at the respective WTG's yard which measures the export / import of electricity from particular WTG. At the time of Joint Meter Reading (JMR), at the net generation (Export-Import) reading from the yard meter of all respective WTGs connected to a particular common substation is measured in the presence of representative of both GEDA and the power producer. The measured values are recorded and summarized in the monthly generation report. Parallel to the above process Main meter readings are measured and recorded at the substation. Apportioning procedure is carried out by the GEDA to calculate the net electricity supplied to the grid from a particular WTG. According to the procedure the ratio of electricity generation at the yard meter of a particular WTG (A) to the sum of all WTGs at the yard meter (B) is calculated. Net electricity supplied to the grid from a particular WTG (D) is calculated as the product of this ratio and the value of net electricity supplied to the grid measured at the Main meter.

$$D = (A/B) * C$$

The meter readings will be reported to the site-in-charge and the compiled reports will be sent to the Manager (Projects) and Director. The Manager will monitor overall activity of the project and report to the Director. As per O & M schedule, the operation and maintenance activities will be carried out by trained and qualified technical staff of Suzlon.

Each party shall maintain complete and accurate records and all other data required by each of them for the purposes of proper administration and the operation of the project.

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

(Copy this table for each piece of data and parameter.)

Data / Parameter:	EF_{grid,OM,y}
Unit:	tCO₂/MWh
Description:	Simple operating margin for NEWNE grid
Source of data:	CO ₂ baseline database (Version 7.0) published by CEA in January 2012
Value(s) applied:	0.9842
Purpose of data:	Calculation of baseline emissions
Additional comment:	Fixed ex-ante for entire crediting period

Data / Parameter:	EF_{grid,BM,y}
Unit:	tCO₂/MWh
Description:	Build margin for NEWNE grid
Source of data:	CO ₂ baseline database (Version 7.0) published by CEA in January 2012
Value(s) applied:	0.8587
Purpose of data:	Calculation of baseline emissions
Additional comment:	Fixed ex-ante for entire crediting period

Data / Parameter:	EF_{grid,CM,y}
Unit:	tCO₂/MWh
Description:	Combined margin emission factor for NEWNE grid
Source of data:	Calculated as per the procedure described in PDD section B.6.1
Value(s) applied:	0.9528
Purpose of data:	Calculation of baseline emissions
Additional comment:	Fixed ex-ante for entire crediting period

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter.)

Data / Parameter:	EG_{facility,i,y}
Unit:	MWh
Description:	Quantity of net electricity generation supplied by the project WTGs connected to feeder i to the grid in period y
Measured/ Calculated / Default:	Calculated

Source of data:	<p>Sum of net electricity generation values as per all the certificates for share of electricity generated by Wind farm provided by GETCO/SLDC 10 for the period y and for all the feeders to which WTGs of the project activity are connected.</p> <p>In cases where there are other (non-project) WTGs connected to the same feeder, appropriate apportioning mechanism specified in PDD section B.7.3 shall be applied.</p> <p>Also for cases when the start/end dates of monitoring period do not match with the start/end dates of certificates for share of electricity generated by Wind farm provided by GETCO/SLDC, appropriate apportioning mechanism specified in PDD section B.7.3 shall be applied.</p>
Value(s) of monitored parameter:	57,664.052 MWh
Monitoring equipment:	<p>WTG yard meters (tri-vector meters) as well as the ABT meters installed at the 33/66 kV Parveda substation.</p> <p>For ABT meter: Accuracy Class: 0.2S (Active) and 0.5S (Reactive)</p> <p>For Tri-vector meter (installed at the yard near each WTG): Accuracy Class: 0.2S</p>
Measuring/ Reading/ Recording frequency:	Continuous measurement and at least monthly recording.
Calculation method (if applicable):	The above values are calculated by specific apportioning mechanism. The same has been provided in appendix 5 of this PDD for reference.
QA/QC procedures:	<p>The Quantity of net electricity generation from the certificate for share of electricity can be cross-checked with the invoices for the sale of power by the project proponent.</p> <p>The meter(s) shall be calibrated and maintained by the state utility as per their own schedule and this frequency of meter calibration is not within the control of the Project Proponent. However, PP would ensure that calibration is carried out at least once in 3 years.</p>
Purpose of data:	Calculation of baseline emissions
Additional comment:	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Data / Parameter:	EG_{WTG_yard,i,y}
Unit:	MWh
Description:	Sum of electricity generation measured at individual yard meters of all project WTGs that are connected to feeder i during period 15 th November – 30 th November 2012
Measured/ Calculated / Default:	Measured
Source of data:	Yard meter readings of project activity WTGs
Value(s) of monitored parameter:	1107.896
Monitoring equipment:	WTG yard meters (tri-vector meters); Accuracy Class: 0.2S
Measuring/ Reading/ Recording frequency:	Continuous measurement and daily recording
Calculation method (if applicable):	Not applicable
QA/QC procedures:	The yard meters installed near individual WTGs will be tested at least once in a year and calibrated (if required).
Purpose of data:	Calculation of baseline emissions
Additional comment:	The data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Data / Parameter:	EG_{Allyard,i}
Unit:	MWh
Description:	Sum of electricity generation measured at individual yard meters of all project and non-project WTGs that are connected to feeder i during period 15 th November – 30 th November 2012
Measured/ Calculated / Default:	Measured
Source of data:	Yard meter readings of project & non-project activity WTGs
Value(s) of monitored parameter:	1107.896
Monitoring equipment:	WTG yard meters (tri-vector meters); Accuracy Class: 0.2S
Measuring/ Reading/ Recording frequency:	Continuous measurement and daily recording
Calculation method (if applicable):	Not applicable

QA/QC procedures:	The yard meters installed near individual WTGs will be tested at least once in a year and calibrated (if required). Note: The project proponent does not have any control over the yard meter readings of other project developers and therefore the values certified by the O&M contractor/GETCO/SLDC will be directly used for the purpose of calculation.
Purpose of data:	Calculation of baseline emissions
Additional comment:	The data will be kept 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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According to equation (1) of PDD section B.6.1, the baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

According to equation (5) of PDD section B.6.1, Combined margin CO₂ emission factor for grid connected power generation ($EF_{grid,CM,y}$) is calculated as follows:

$$\begin{aligned} EF_{grid,CM,y} &= W_{OM} * EF_{grid,OM,y} + W_{BM} * EF_{grid,BM,y} \\ &= 0.75 * 0.9842 + 0.25 * 0.8588 \\ &= 0.9528 \text{ tCO}_2\text{e/MWh} \end{aligned}$$

Thus for ex-ante emission reduction calculations, the baseline emission factor for the grid
= 0.9528 tCO₂e/MWh

Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity ($EG_{PJ,y}$)

$$EG_{PJ,y} = EG_{facility,y} = 57,664.052 \text{ MWh}$$

Hence, substituting values in equation 1, we get:

$$\begin{aligned} BE_y &= 57,664.052 * 0.9528 \\ &= 54,942.309 \text{ tCO}_2\text{e} \\ &= 54,942 \text{ tCO}_2\text{e} \end{aligned}$$

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

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The Project activity does not envisage any fossil fuel consumption. Therefore, the parameter $PE_{FF,y} = 0$ tCO₂e/ annum. Also, as the proposed CDM Project activity is not a geothermal project activity or a hydro project activity, hence, the Project emissions as per parameters $PE_{GP,y}$ and $PE_{HP,y}$ are also zero.

Therefore, $PE_y = 0$ tCO₂e/annum

E.3. Calculation of leakage

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Leakage (LE_v) = 0**E.4. Summary of calculation of emission reductions or net anthropogenic 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)	Emission reductions or net anthropogenic GHG removals by sinks (t CO ₂ e)
Total	54,942	0	0	54,942

E.5. Comparison of actual emission reductions or net anthropogenic 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)	50,352	54,942

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

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The difference of emission reduction as achieved during the crediting period from estimated value, occurs due to variation of wind flow availability in the project area, which is beyond the control on the PP and purely a natural phenomena. This is also within the limit of sensitivity test.

E.7. Actual emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Item	Actual values achieved up to 31 December 2012	Actual values achieved from 1 January 2013 onwards
Emission reductions or GHG removals by sinks (t CO ₂ e)	5,260	49,682

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
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 anthropogenic 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.
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