



Monitoring report form (Version 03.2)

Monitoring report

Title of the project activity	Bundled wind energy power projects (2004 policy) in Rajasthan
Reference number of the project activity	1166
Version number of the monitoring report	1
Completion date of the monitoring report	17 Jun 2014
Registration date of the project activity	30 Oct 2008
Monitoring period number and duration of this monitoring period	Monitoring period number: Fifth Monitoring period duration: 1 Oct 2012 to 30 Apr 2014 (Inclusive of both days)
Project participant(s)	Wind World (India) Limited (previously Enercon (India) Limited)
Host Party(ies)	India
Sectoral scope(s) and applied methodology(ies)	Sectoral Scope: 1, Energy industries (renewable / non-renewable sources) Methodology: ACM0002 / Version 06 Title: Approved baseline and monitoring methodology title "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources"
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	66,130 tCO₂e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	33,778 tCO₂e
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period up to 31 December 2012(if applicable)	CERs from 01 Oct 2012 to 31 Dec 2012 = 2440
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved during the period from 1 January 2013 onwards (if applicable).	CERs from 01 Jan 2013 to 30 Apr 2014 = 31338

SECTION A. Description of project activity**A.1. Purpose and general description of project activity****>> Purpose of the project activity and the measures taken to reduce greenhouse gas emissions:**

Bundled wind power project of 24.8 MW ("Project") is installed in the state of Rajasthan and provides reliable, renewable power to the Rajasthan state electricity grid. The Project leads to reduction of greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants. The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. Wind World (India) Ltd ("WWIL") is the equipment supplier and the operations and maintenance contractor for the Project. The generated electricity is supplied to the utility (Discom) under a long-term power purchase agreement (PPA). The details of the sub-projects comprising the Project are as under:

SN	Name of the Customer	Capacity of M/C	No. of M/C	Capacity (MW)
1	CEPCO	0.8	15	12.00
2	Ushdev International	0.8	3	2.40
3	Brindavan Agro Industries	0.8	2	1.60
4	Amrit Bottlers Ltd.	0.8	1	0.80
5	Deedee Enterprises	0.8	1	0.80
6	JN Investment	0.8	1	0.80
7	Metalfab Hightech Private Limited	0.8	1	0.80
8	SE Investment	0.8	1	0.80
9	Brindavan Bottlers Ltd.	0.8	1	0.80
10	Delta Enterprises	0.8	3	2.40
11	Sankalp International	0.8	1	0.80
12	Malani Impex Inc.	0.8	1	0.80
		Total Capacity (MW)	31	24.80

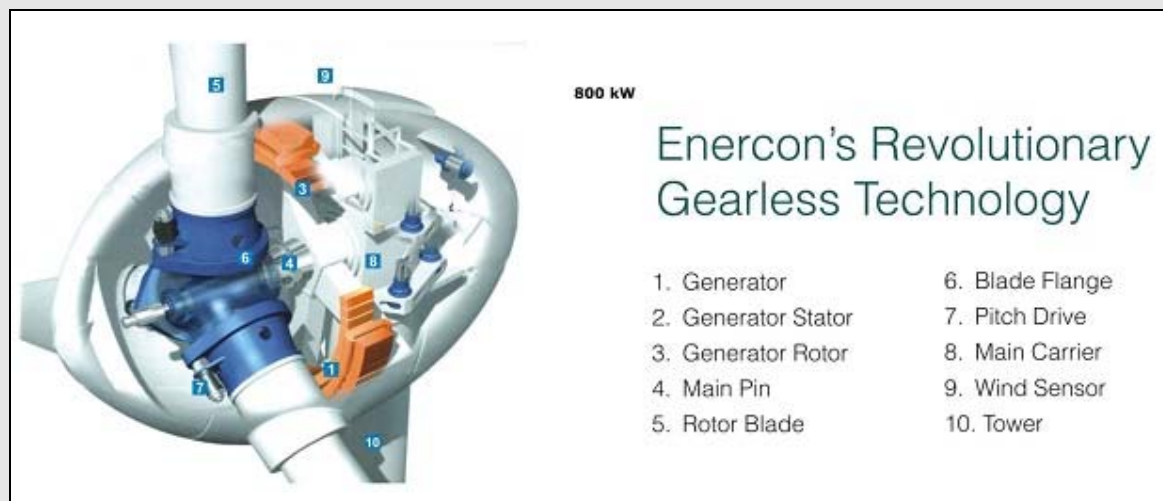
Brief description of the installed technology and equipments:

The Project involves 31-wind energy converters (WEGs) of WWIL make (800 kW E-48) with internal electrical lines connecting the Project with local evacuation facility. The WEGs generates 3-phase power at 400V, which is stepped up to 33 KV. The Project can operate in the frequency range of 47.5–51.5 Hz and in the voltage range of 400 V \pm 12.5%. The other salient features of the state-of-art-technology are:

- Gearless Construction - Rotor & Generator Mounted on same shaft eliminating the Gearbox.
- Variable speed function – has the speed range of 18 to 33 RPM thereby ensuring optimum efficiency at all times.
- Variable Pitch functions ensuring maximum energy capture.
- Near Unity Power Factor at all times.
- Minimum drawl (less than 1% of kWh generated) of Reactive Power from the grid.
- No voltage peaks at any time.
- Operating range of the WEG with voltage fluctuation of -20 to +20%.
- Less Wear & Tear since the system eliminates mechanical brake, which are not needed due to low speed generator, which runs at maximum speed of 33 rpm and uses Air Brakes.
- Three Independent Braking Systems.
- Generator achieving rated output at only 33 rpm.
- Incorporates lightning protection system, which includes blades.
- Starts Generation of power at wind speed of 3 m/s.

Wind World (India) Ltd has secured and facilitated the technology transfer for wind based renewable energy

generation from Enercon GmbH, has established a manufacturing plant at Daman in India, where along with other components the "Synchronous Generators" using "Vacuum Impregnation" technology are manufactured.



Technology Diagram

Relevant dates for the project activity:

The first machine under the project activity was commissioned on 25th Mar 2006 and the last machine under the project activity was commissioned on 13th May 2006. The expected operational lifetime of the project is for 20 years. The crediting period of the project activity commenced on 30/10/2008. This is the fourth monitoring report. The details of issuance of CERs for the previous monitoring periods are as follows:

Monitoring Period No.	Monitoring Period (Inclusive of both days)	CERs issued	Date of Issuance
First	30 Oct 2008 – 30 Nov 2009	33,322	08/04/2011
Second	01 Dec 2009 – 31 Aug 2010	22,731	05/05/2011
Third	01 Sep 2010 – 31 Aug 2011	24,255	22/03/2012
Fourth	01 Sep 2011 to 30 Sep 2012	31,454	

Total emission reductions achieved in this monitoring period

This is the fifth monitoring report for the project activity. The total emission reductions achieved under this monitoring period 01 Oct 2012 to 30 Apr 2014 (including first and last day) is **33,778 tCO₂e**.

A.2. Location of project activity

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The Project is located at Kita and Bhu village, in Jaisalmer District of Rajasthan that forms part of the Northern regional electricity grid of India. The project area extends between latitude 26° 41' & 26° 46.5' North and longitude 70° 57.5' & 71° 4' East. The Project is connected to the RRVNPL 33/132/220 kV substation at Amarsagar. The sites are located at a distance of 25 km from Jaisalmer by road. The nearest railway station is at Jaisalmer. Individual WEG location numbers and coordinates are detailed out in below table: -

Sr.N o.	Unique Identification No.	Location No	Latitude			Longitude		
			Degree	Minute	Second	Degree	Minute	Second
1	Cepco-01	207	26	44	23.9	71	0	4.9
2	Cepco-02	208	26	44	18.7	71	0	13.4
3	Cepco-03	209	26	44	10.1	71	0	15.1

4	Cepco-04	210	26	44	1.6	71	0	15.4
5	Cepco-05	171	26	43	16.6	70	58	53.6
6	Cepco-06	172	26	43	28.0	70	58	47.8
7	Cepco-07	173	26	43	36.5	70	58	48.8
8	Cepco-08	175	26	43	35.9	70	59	8.1
9	Cepco-09	187	26	43	35.1	70	59	34.0
10	Cepco-10	166	26	42	33.7	70	59	4.1
11	Cepco-11	165	26	42	29.2	70	59	7.9
12	Cepco-12	164	26	42	24.6	70	59	11.8
13	Cepco-13	163	26	42	20.0	70	59	15.6
14	Cepco-14	162	26	42	15.4	70	59	19.5
15	Cepco-15	189	26	43	31.6	70	59	46.1
16	DE-01	202	26	44	8.3	70	59	55.9
17	DE-02	201	26	44	2.0	70	59	59.0
18	DE-03	200	26	43	56.5	71	0	2.5
19	UIL-01	206	26	44	28.4	70	59	41.2
20	UIL-02	205	26	44	22.1	70	59	44.3
21	UIL-03	204	26	44	16.2	70	59	47.4
22	BAIL-01	199	26	43	51.0	71	0	6.0
23	BAIL-02	198	26	43	46.4	71	0	9.8
24	ABL-01	216	26	45	41.9	70	59	34.6
25	BBL-01	217	26	45	46.2	70	59	31.7
26	DDE-01	203	26	44	12.9	70	59	52.0
27	JNI-01	214	26	45	13.7	70	59	19.8
28	MII-01	212	26	45	6.9	70	59	35.1
29	MHPL-01	188	26	43	40.4	70	59	29.5
30	SI-01	211	26	45	4.2	70	59	19.8
31	SE-01	291	26	45	38.0	70	59	38.7

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)
Party A (host) Government of India	Private entity A Wind World (India) Limited	No

A.4. Reference of applied methodology

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Baseline and Monitoring Methodology: ACM0002 / Version 06, Sectoral Scope: 01, 19/05/2006**Title:** "Consolidate monitoring methodology for grid-connected electricity generation from renewable sources"

The tool used for the project is as follows: "Tool for the demonstration and assessment of additionality"

version 2.0

References:

<http://cdm.unfccc.int/methodologies/DB/UB3431UT9I5KN2MUL2FGZXZ6CV71LT/view.html>
<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v2.pdf>
A.5. Crediting period of project activity

>> The length of the Crediting period of the project activity as per registered PDD is 10 years (Fixed) starting from 30 Oct 2008 to 29 Oct 2018 (first and last days included).

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

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The first machine under the project activity was commissioned on 25th March 2006 and last machine under the project activity was commissioned on 13th May 2006. The project activity consists of 31 machines (800 kW) of WWIL make E-48. The commissioning date for all the machines included in the project activity is given in the table below.

Serial No	Capacity	Unique Identification No.	Location No	Date of Commissioning
1	0.8	Cepco-01	207	29-Mar-06
2	0.8	Cepco-02	208	29-Mar-06
3	0.8	Cepco-03	209	29-Mar-06
4	0.8	Cepco-04	210	29-Mar-06
5	0.8	Cepco-05	171	29-Mar-06
6	0.8	Cepco-06	172	29-Mar-06
7	0.8	Cepco-07	173	31-Mar-06
8	0.8	Cepco-08	175	31-Mar-06
9	0.8	Cepco-09	187	30-Mar-06
10	0.8	Cepco-10	166	30-Mar-06
11	0.8	Cepco-11	165	30-Mar-06
12	0.8	Cepco-12	164	30-Mar-06
13	0.8	Cepco-13	163	13-May-06
14	0.8	Cepco-14	162	13-May-06
15	0.8	Cepco-15	189	13-May-06
16	0.8	DE-01	202	29-Mar-06
17	0.8	DE-02	201	29-Mar-06
18	0.8	DE-03	200	29-Mar-06
19	0.8	UIL-01	206	29-Mar-06
20	0.8	UIL-02	205	29-Mar-06
21	0.8	UIL-03	204	29-Mar-06
22	0.8	BAIL-01	199	29-Mar-06
23	0.8	BAIL-02	198	29-Mar-06

24	0.8	ABL-01	216	25-Mar-06
25	0.8	BBL-01	217	25-Mar-06
26	0.8	DDE-01	203	25-Mar-06
27	0.8	JNI-01	214	29-Mar-06
28	0.8	MII-01	212	29-Mar-06
29	0.8	MHPL-01	188	31-Mar-06
30	0.8	SI-01	211	29-Mar-06
31	0.8	SE-01	291	25-Mar-06

WWIL operation and maintenance activities are ISO 9001:2000 certified and all the events are recorded in the log book available at the project site. Referring to the data available it can be inferred that there have not been any major special events of breakdown for any of the machines of the project activity occurred during the monitoring period, which may impact the applicability of the methodology. As a part of regular maintenance the machines are stopped for mechanical and electrical maintenance for 16 to 18 hours annually and for visual inspection for 6 to 7 hours quarterly.

B.2. Post registration changes

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

>> There is no deviation from registered monitoring plan or applied methodology during this monitoring period

B.2.2. Corrections

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There are no corrections from the registered PDD during this monitoring period

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

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The monitoring plan of the project activity has been revised. The revision for monitoring plan was approved by UNFCCC on 02/08/2010 (Link: <http://cdm.unfccc.int/Projects/DB/SGS-UKL1181723770.26/view>). The revision in monitoring plan was done to describe the allocation plan transparently

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

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

B.2.5. Changes to start date of crediting period

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There are no changes to the start date of the crediting period

B.2.6. Types of changes specific to afforestation or reforestation project activity

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Not applicable to the project activity.

SECTION C. Description of monitoring system

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Approved monitoring methodology ACM0002 / Version 06 Sectoral Scope: 1, "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", by CDM - Meth Panel is proposed to be used to monitor the emission reductions.

The electricity supplied to the grid will be metered at the 33/132/220 kV level at the RRVPNL substation at Amarsagar. Representatives of RRVPNL/Jodhpur Discom and WWIL will jointly take the main reading and sign the meter reading on the first day of every month. Simultaneously, the joint meter reading at 33/132/220 kV level of the backup metering system at Temdarai substation will also be taken by representatives of RRVPN/Jodhpur Discom and WWIL. The meter reading is recorded during the daytime and hence leads to the overlapping of end/start dates of monthly measured data as is seen in the joint meter reading records (JMR). Hence there will be overlapping of end/start dates of joint reading record but there is no double counting of electricity import & export figures.

The meters used are Tri-vector and the manufacturer is the Secure Meter. The meters are two-way meter and measure the electricity import and export and give the net electricity. In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Error correction will be applied to the meter reading. Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred. The details of the malfunctioning along with date and time and snaps shot parameters along with load survey will be retrieved from the main meter. The exact nature of the malfunctioning will be determined after analyzing the data so retrieved and the consumption recorded by the main meter will be assessed accordingly.

If main as well as back up metering system becomes defective, the assessment of energy consumption for the outage period will be done from the backup meters by the concerned parties as mutually agreed or at the level of Metering Committee set up under the Metering Code. The main and the backup metering systems will be sealed in presence of representatives of WWIL and RRVPN/Jodhpur Discom.

The main meter readings are apportioned based upon the LCS meter readings from the individual WEGs to compute net electricity supplied from individual WEGs. The LCS meter readings are archived electronically on continuous basis. Joint meter reading at the EB substation and at the pooling substation of WWIL is noted each month. Therefore cumulative LCS meter reading for each month is used for purpose of allocation of net electricity supplied to the grid from the project activity.

The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. The operations and maintenance staff will calibrate the meter immediately and correction factor will be determined.

EG_y for the project activity is derived as follows:-

The project activity is located in Bhu and is connected to Amarsagar substation. In addition to the project activity, the wind farms located at Temdarai, Sodabandhan, Korwan, Asloi and other wind turbines at Bhu are also connected to the Amarsagar substation. Electricity delivered by all these wind farms is metered at a common metering point. The common metering point comprises two main meters i.e. Main meter 1 and Main meter 2 that are installed at 132 kV metering point at the Amarsagar substation. Consequently, the main meter readings reflect the aggregate electricity supplied by all these wind farms, including the project activity. The net electricity supplied by individual wind turbines is determined by following a process of allocating the total electricity (recorded at the main meters M1 and M2) to the individual turbines in proportion of the electricity generation recorded by the LCS meters at the individual wind turbines. The procedure for allocation is detailed below:

$E_{\text{JMR, Export}}$ = Electricity exported, as recorded by the main meter at the substation

$E_{\text{JMR, Import}}$ = Electricity imported, as recorded by the main meter at the substation

$E_{\text{Controller, Export}}$ = Electricity exported by a WEG, as measured at the controller

$\sum E_{\text{Controller, Export}}$ = Electricity exported by all the WEGs connected to the main meter at the substation,

measured at the controller of each WEG

$E_{WEG, Export}$ = Electricity exported by a WEG to the grid, calculated

$E_{WEG, Import}$ = Electricity imported by a WEG from the grid, calculated

Electricity exported by each WEG is apportioned on the basis of electricity exported recorded at the controller of each WEG and the electricity exported at the main meter and mentioned in the JMR. The export multiplication factor is calculated as follows-

$$\text{Export Multiplication factor} = E_{JMR, Export} / \sum E_{Controller, Export} \dots\dots\dots (1)$$

Thus the energy exported by a WEG to the grid is given by the equation-

$$E_{WEG, Export} = \text{Export Multiplication factor} \times E_{Controller, Export} \dots\dots\dots (2)$$

As the controller meter doesn't record import, the apportioning of energy imported by each WEG is also done on the basis of electricity exported recorded at the controller of each WEG and the electricity imported at the main meter and mentioned in the JMR. The import multiplication factor is calculated as follows-

$$\text{Import Multiplication factor} = E_{JMR, Import} / \sum E_{Controller, Export} \dots\dots\dots (3)$$

Thus the energy imported by a WEG to the grid is given by the equation-

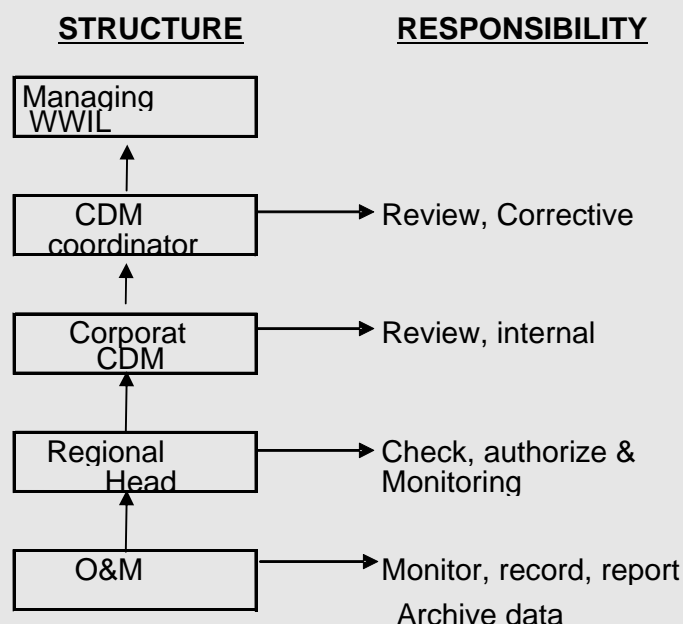
$$E_{WEG, Import} = \text{Import Multiplication factor} \times E_{Controller, Export} \dots\dots\dots (4)$$

The net electricity exported by the WEGs of the project is given by the equation-

$$EG_y = \sum_{Project} E_{WEG, Export} - \sum_{Project} E_{WEG, Import} \dots\dots\dots (5)$$

The summation is done on the WEGs belonging to the project activity.

The operational and management structure implemented by Wind World is as follows:



Training and maintenance:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WEGs), it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that WWIL's service staffs is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The WWIL Training Academy provides need-based training to meet the training requirements of WWIL.

projects. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving.

Calibration Details

The metering equipments were inspected & calibrated by state utility. Meter details for the all the main and backup meters are as follows:-

Meter description	Serial No.	Make	Accuracy class	Metering point	Calibration before monitoring period	Calibration during monitoring period	Validity
Main meter (Line I)	TNU0094 6	Secure	0.2	Amarsagar Substation	19-03-2012	26-12-2012	25-12-2013
Backup meter (Line I)	RJB00052	Secure	0.2	Temdarai Substation	23-03-2012	28-12-2012	27-12-2013
Main meter (Line II)	TNU0094 5	Secure	0.2	Amarsagar Substation	19-03-2012	26-12-2012	25-12-2013
Backup meter (Line II)	ABB00691	Secure	0.2	Temdarai Substation	23-03-2012	28-12-2012	27-12-2013

The main and the backup meters are calibrated once each year. The LCS meters are do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. Therefore there is no data uncertainty. The line diagrams showing all relevant monitoring points are appendix 1

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

Data/Parameter	$EF_{OM,y}$		
Unit	tCO ₂ e/MWh		
Description	Operating Margin Emission Factor of Northern Regional Electricity Grid		
Source of data	<p>“CO₂ Baseline Database for Indian Power Sector” version 1.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector” version 1.1 is available at www.cea.nic.in</p>		
Value(s) applied	2002 – 03	0.999 3	
	2003 – 04	0.986 9	
	2004 – 05	0.975 6	
Purpose of data	Baseline Emissions		
Additional comment	None		

Data/Parameter	$EF_{BM,y}$		
Unit	tCO ₂ e/MWh		
Description	Build Margin Emission Factor of Northern Regional Electricity Grid		
Source of data	<p>“CO₂ Baseline Database for Indian Power Sector” version 1.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector” version 1.1 is available at www.cea.nic.in</p>		
Value(s) applied	0.5335		
Purpose of data	Baseline Emissions		
Additional comment	None		

Data/Parameter	$EF_{CM,y}$		
Unit	tCO ₂ e/GWh		
Description	Combined Margin Emission Factor of North East West North-east (NEWNE)		
Source of data	<p>“CO₂ Baseline Database for Indian Power Sector” version 1.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector” version 1.1 is available at www.cea.nic.in</p>		
Value(s) applied	873.87		
Purpose of data	Baseline Emissions		
Additional comment	None		

D.2. Data and parameters monitored

Data/Parameter	EGy
Unit	MWh (Mega-Watt hour)
Description	Net electricity supplied to the grid by the Project

Measured/Calculated /Default	Calculated by applying apportioning procedure better described in C.
Source of data	Electricity supplied to the grid as per the tariff invoices raised on RRVPNL/Jodhpur Discom.
Value(s) of monitored parameter	MWh
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/Reading/ Recording frequency	Monthly: The apportioning is done as per the procedure described in section C.
Calculation method (if applicable)	$EGy = \sum_{Project} E_{WEG, Export} - \sum_{Project} E_{WEG, Import}$ <p>Refer section C for details and description of the above variables</p>
QA/QC procedures	<p>QA/QC procedures will be as implemented by state utility (Discom) pursuant to the provisions of the power purchase agreement and the Metering Code of Rajasthan and there will be no additional QA/QC procedures. Refer Section C for an illustration of the provisions for QA/QC procedures.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
Purpose of data	Calculation of Baseline Emissions
Additional comment	None

Data/Parameter	$E_{JMR, Export}$
Unit	MWh (Mega-Watt hour)
Description	Electricity exported, as recorded by the main meter at the EB substation
Measured/Calculated /Default	Measured: The Export reading is jointly noted from the main meter installed at the EB substation.
Source of data	Export value from Joint meter reading taken at Substation in the presence of representatives of WWIL and state utility.
Value(s) of monitored parameter	242597 MWh
Monitoring equipment	<p>Line I Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00946 Serial Number of Backup Meter: RJB00052</p> <p>Line II Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00945 Serial Number of Backup Meter: ABB00691</p> <p>Frequency of Calibration- Annual</p>
Measuring/Reading/ Recording frequency	Measured in continuous basis and recorded on Monthly basis. The reading is jointly noted by the representatives of state utility and WWIL.
Calculation method (if applicable)	Not Applicable
QA/QC procedures	<p>The meters will be calibrated once each year by the state utility. Refer Section C for an illustration of the provisions for QA/QC procedures.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
Purpose of data	Calculation of Baseline emissions
Additional comment	None

Data/Parameter	E_{JMR, Import}
Unit	MWh (Mega-Watt hour)
Description	Electricity imported, as recorded by the main meter at the EB substation
Measured/Calculated/Default	Measured: The import reading is jointly noted from the main meter installed at the EB substation.
Source of data	Import value from Joint meter reading taken at Substation in the presence of representatives of WWIL and state utility.
Value(s) of monitored parameter	569 MWh
Monitoring equipment	<p>Line I Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00946 Serial Number of Backup Meter: RJB00052</p> <p>Line II Type- Tri-vector Meter Accuracy Class-0.2 Serial Number of Main Meter: TNU00945 Serial Number of Backup Meter: ABB00691</p> <p>Frequency of Calibration- Annual</p>
Measuring/Reading/Recording frequency	Measured in continuous basis and recorded on Monthly basis. The reading is jointly noted by the representatives of state utility and WWIL.
Calculation method (if applicable)	Not Applicable
QA/QC procedures	<p>The meters will be calibrated once each year by the state utility. Refer Section C for an illustration of the provisions for QA/QC procedures.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
Purpose of data	Calculation of Baseline emissions
Additional comment	None

Data/Parameter	E_{Controller, Export}
Unit	MWh (Mega-Watt hour)
Description	Electricity exported by a WEG, as measured at the controller (LCS).
Measured/Calculated/Default	Measured: The value is recorded continuously by the online monitoring station. This value can also be checked from the electronic panel installed inside the WTG tower.
Source of data	This reading is monitored continuously by the online monitoring station at the project site. This reading can also be seen in the electronic panel installed inside the WTG tower.
Value(s) of monitored parameter	40502.430 MWh

Monitoring equipment	<p>Meter Type: Refer Appendix 2 Accuracy Class: Refer Appendix 2 Serial Number: Refer Appendix 2</p> <p>The LCS meters are do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. Therefore there is no data uncertainty.</p>
Measuring/Reading/Recording frequency	Monthly: The value is recorded continuously by the online monitoring station. This value can also be checked from the electronic panel installed inside the WTG tower.
Calculation method (if applicable)	Not applicable
QA/QC procedures	<p>The LCS meters are do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. Therefore there is no data uncertainty.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
Purpose of data	Calculation of Baseline emissions
Additional comment	None

Data/Parameter	E_{WEG, Export}
Unit	MWh (Mega-Watt hour)
Description	Electricity exported by a WEG to the grid
Measured/Calculated/Default	Calculated: E_{WEG, Export} denotes the electricity exported by a WEG to the grid. The value is calculated based on the formula mentioned in Section C
Source of data	Calculated using formula mentioned in Section C.
Value(s) of monitored parameter	38752.545 MWh
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/Reading/Recording frequency	Monthly basis: Calculated using the formulas better described under section C.
Calculation method (if applicable)	$E_{WEG, Export} = \text{Export Multiplication factor} \times E_{\text{Controller, Export}}$ <p>Refer to Section C for details and description of the above variables.</p>
QA/QC procedures	<p>The value is calculated. Please refer Section C for QA/QC procedures.</p> <p>The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.</p>
Purpose of data	Calculation of Baseline emissions
Additional comment	None

Data/Parameter	E_{WEG, Import}
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Unit	MWh (Mega-Watt hour)
Description	Electricity imported by a WEG from the grid.
Measured/Calculated /Default	Calculated: $E_{WEG, Import}$ denotes the electricity imported by a WEG to the grid. The value is calculated based on the formula mentioned in Section C
Source of data	Calculated as per the procedures shown in section C.
Value(s) of monitored parameter	98.884 MWh
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/Reading/ Recording frequency	Monthly basis: Calculated using the formulas better described under section C.
Calculation method (if applicable)	$E_{WEG, Import} = \text{Import Multiplication factor} \times E_{\text{Controller, Export}}$ Refer to Section C for details and description of the above variables.
QA/QC procedures	The value is calculated. Please refer Section C for QA/QC procedures. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Purpose of data	Calculation of Baseline emissions
Additional comment	None

Data/Parameter	$\Sigma_{\text{Project}} E_{WEG, Export}$
Unit	MWh (Mega-Watt hour)
Description	Summation of electricity exported to the grid by all the WEGs included in the project activity.
Measured/Calculated /Default	$\Sigma_{\text{Project}} E_{WEG, Export}$ denotes summation of the electricity exported to the grid by a WEGs included in the project activity. The value is calculated based on the formula mentioned in section C.
Source of data	Summation of data values of $E_{WEG, Export}$ for all the WEGs included in the project activity.
Value(s) of monitored parameter	230492.500MWh
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/Reading/ Recording frequency	Monthly basis: Calculated using the formulas better described under section C.
Calculation method (if applicable)	$\Sigma_{\text{Project}} E_{WEG, Export}$ denotes summation of the electricity exported to the grid by a WEGs included in the project activity. Refer to Section C for details and description.
QA/QC procedures	The value is calculated and can be cross checked from the invoices raised on the state utility. Please refer Section C for QA/QC procedures. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Purpose of data	Calculation of Baseline emissions
Additional comment	None

Data/Parameter	$\Sigma_{\text{Project}} E_{WEG, Import}$
Unit	MWh (Mega-Watt hour)
Description	Summation of electricity imported from the grid by all the WEGs included in the project activity.

Measured/Calculated/Default	$\Sigma_{\text{Project}} E_{\text{WEG, Import}}$ denotes the summation of electricity imported from the grid by a WEGs included in the project activity. The value is calculated based on the formula mentioned in section C.
Source of data	Summation of data values of $E_{\text{WEG, Import}}$ for all the WEGs included in the project activity.
Value(s) of monitored parameter	601.750MWh
Monitoring equipment	Calculated as per the procedures shown in section C.
Measuring/Reading/Recording frequency	Monthly basis: Calculated using the formulas better described under section C.
Calculation method (if applicable)	$\Sigma_{\text{Project}} E_{\text{WEG, Import}}$ denotes the summation of electricity imported from the grid by a WEGs included in the project activity. Refer to Section C for details and description.
QA/QC procedures	The value is calculated and can be cross checked from the invoices raised on the state utility. Please refer Section C for QA/QC procedures. The data will be archived electronically as well as on paper. The data will be kept for the period up to two years after the completion of the crediting period.
Purpose of data	Calculation of Baseline emissions
Additional comment	None

D.3. Implementation of sampling plan

>> Not applicable to the project activity

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

>>

"The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner as the weighted average emissions (in kg CO₂e/kWh) as described in registered PDD.

$$BE_y = EG_y * EF_y$$

Where,

BE is baseline emissions in year y, t CO₂e

EG_y is the net electricity supplied to the grid in year y and is applied directly from JMR certified by state utility. This value can also be cross checked from the invoice. Refer Appendix 3 for detail.

EF_y is the CO₂ emission factor of the grid (873.87 tCO₂e/GWh fixed ex-ante).

Baseline Emission reduction calculation for the period 01 Oct 2012 to 30 Apr 2014:

$$\begin{aligned} \text{Baseline Emission Reductions (BE}_y) &= 38.653678 \text{ (GWh)} * 873.87 \text{ (tCO}_2\text{e/GWh)} \\ &= 33,778 \text{ tCO}_2\text{e} \end{aligned}$$

Therefore, total baseline emissions are 33,778 tCO₂.

Total project emissions: Zero

Total leakages: Zero

Total Emission reductions, ER = Baseline Emissions - Project Emissions - Leakages

= 33,778 - 0 - 0

= 33,778 tCO₂

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

>>

Since the project activity is a renewable energy project which generates electricity using wind power and hence does not result in project emissions.

E.3. Calculation of leakage

>>

No leakage is considered from the project activity as per approved methodology ACM0002.

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

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO ₂ e)
01 Oct 2012 to 30 Apr 2014	33,778	0	0	33,778
Total	33,778	0	0	33,778

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 (tCO ₂ e)	66,130	33,778

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

>>

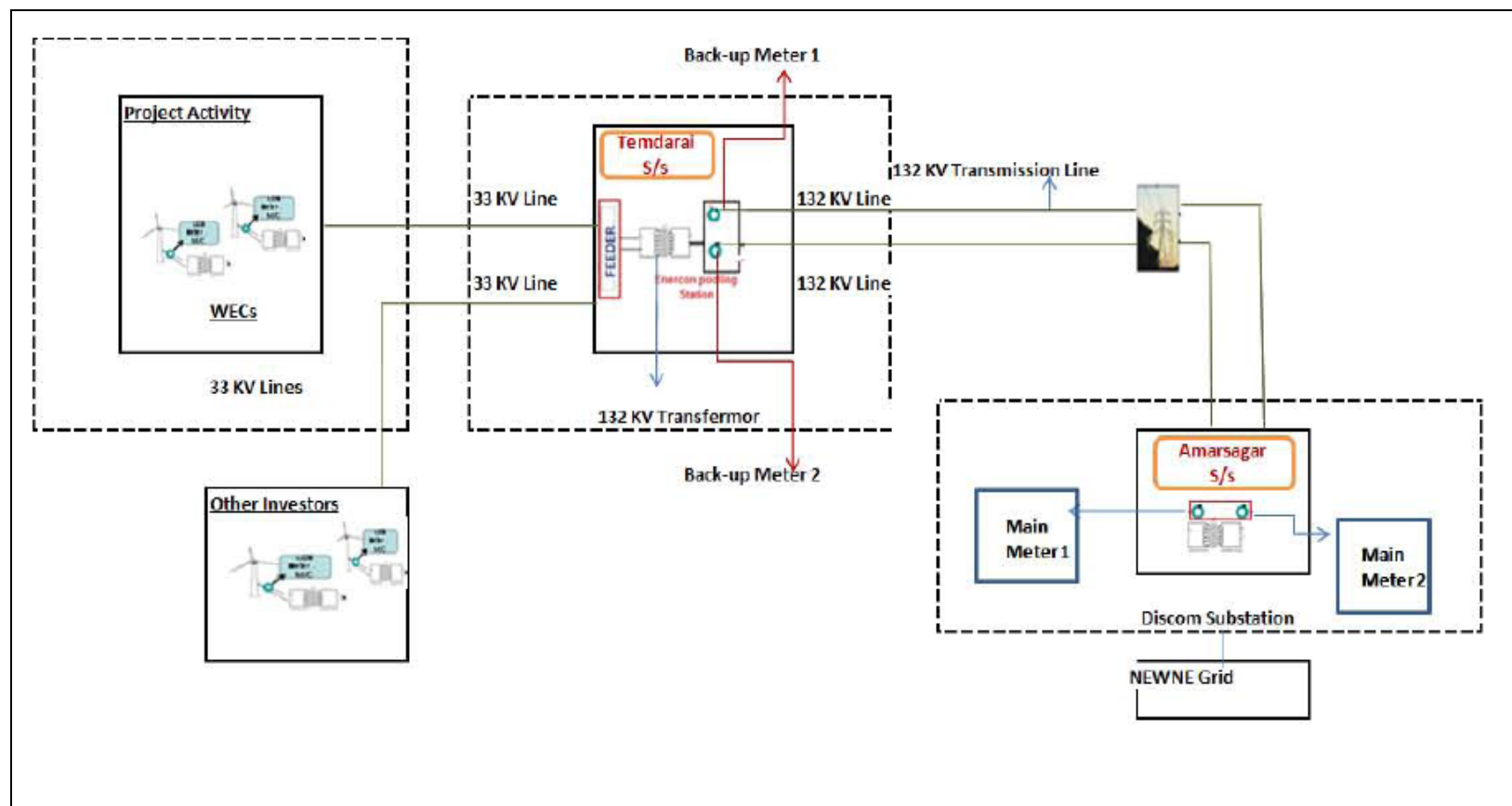
There is change of 48.92 % (downside) in the expected and actual emission reductions. The difference in the total CERs is due to low wind availability leading to low plant load factor

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)	2,440	31,338

- - - - -

Appendix 1: Line Diagram Showing Relevant Metering Points



Appendix 2: Controller Meter Details

Serial No	Project Proponent	Unique Identification No.	Accuracy Class	Panel Meter Serial No	Supplier	Type
1	Cepco Industries Private Limited	Cepco-01	Class-I	466706	NZR	ITZR
2		Cepco-02	Class-I	466699	NZR	ITZR
3		Cepco-03	Class-I	466657	NZR	ITZR
4		Cepco-04	Class-I	466690	NZR	ITZR
5		Cepco-05	Class-I	466694	NZR	ITZR
6		Cepco-06	Class-I	466683	NZR	ITZR
7		Cepco-07	Class-I	466382	NZR	ITZR
8		Cepco-08	Class-I	466385	NZR	ITZR
9		Cepco-09	Class-I	466303	NZR	ITZR
10		Cepco-10	Class-I	466689	NZR	ITZR
11		Cepco-11	Class-I	466398	NZR	ITZR
12		Cepco-12	Class-I	466269	NZR	ITZR
13		Cepco-13	Class-I	466659	NZR	ITZR
14		Cepco-14	Class-I	466408	NZR	ITZR
15		Cepco-15	Class-I	466693	NZR	ITZR
16	Delta Enterprises	DE-01	Class-I	466685	NZR	ITZR
17		DE-02	Class-I	466390	NZR	ITZR
18		DE-03	Class-I	466532	NZR	ITZR
19	Ushdev International Limited	UIL-01	Class-I	466702	NZR	ITZR
20		UIL-02	Class-I	466404	NZR	ITZR
21		UIL-03	Class-I	466670	NZR	ITZR
22	Brindavan Agro Industries Limited	BAIL-01	Class-I	466478	NZR	ITZR
23		BAIL-02	Class-I	466701	NZR	ITZR
24	Amrit Bottlers Ltd.	ABL-01	Class-I	466704	NZR	ITZR
25	Brindavan Bottlers Ltd.	BBL-01	Class-I	466678	NZR	ITZR

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26	Deedee Enterprises	DDE-01	Class-I	266705	NZR	ITZR
27	JN Investment	JNI-01	Class-I	466397	NZR	ITZR
28	Malani Impex Inc.	MII-01	Class-I	466526	NZR	ITZR
29	Metalfab Hightech Private Limited	MHPL-01	Class-I	466281	NZR	ITZR
30	Sankalp International	SI-01	Class-I	466304	NZR	ITZR
31	SE Investment	SE-01	Class-I	466389	NZR	ITZR

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Month	Export Multiplication Factor	Import Multiplication Factor	E _{Controller, Export}	E _{WEG, Export}	E _{WEG, Import}	E _{JMR, Export}	E _{JMR, Import}	S _{Project} E _{WEG, Export}	S _{Project} E _{WEG, Import}	EG _y
			kWh	kWh	kWh	kWh	kWh	kWh	kWh	kWh
Oct-12	0.9427688180 9	0.0177750121 2	832143	784520	14790	4760250	89750	784518	14791	769727
Nov-12	0.9418817601 9	0.0161285276 3	690575	650439	11135	3883500	66500	650440	11138	639302
Dec-12	0.9562893305 4	0.0043091297 0	1453325	1389799	6263	9209750	41500	1389799	6263	1383537
Jan-13	0.9461998202 9	0.0100655075 0	1041803	985755	10485	5616750	59750	985754	10486	975268
Feb-13	0.9585654614 6	0.0007428820 4	1935492	1855295	1437	10645250	8250	1855296	1438	1853858
Mar-13	0.9686651853 8	0.0027264400 1	1808194	1751536	4927	10569750	29750	1751535	4930	1746605
Apr-13	0.9430658913 3	0.0026712281 7	1861124	1755163	4972	11562250	32750	1755163	4971	1750191
May-13	0.9701042077 8	0.0006787596 7	4301087	4172505	2919	23225000	16250	4172503	2919	4169583
Jun-13	0.9539515334 6	0.0005867620 3	5545593	5290227	3255	30890000	19000	5290227	3254	5286973
Jul-13	0.9538918453 2	0.0004703656 0	4400177	4197291	2068	24842750	12250	4197293	2070	4195223
Aug-13	0.9671915972 1	0.0003406848 2	3567616	3450569	1215	19163000	6750	3450568	1215	3449353
Sep-13	0.9561080788 6	0.0006671978 1	3083870	2948513	2057	19163000	6750	2948513	2058	2946455
Oct-13	0.9454208800 5	0.0052906601 6	1262119	1193233	6678	17554500	12250	1193234	6677	1186556
Nov-13	0.9479524968 9	0.0053649901 9	1000834	948744	5369	5742500	32500	948743	5369	943374
Dec-13	0.9583302484 5	0.0046541741 0	1057784	1013707	4922	6692000	32500	1013706	4923	1008783
Jan-14	0.9580006603 1	0.0014324715 6	2064764	1978046	2957	11870750	17750	1978045	2958	1975088

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Feb-14	0.9556502926 4	0.0029216105 2	1497252	1430850	4374	8422750	25750	1430849	4374	1426475
Mar-14	0.9550509077 9	0.0014960212 6	1805341	1724193	2702	10533500	16500	1724193	2701	1721492
Apr-14	0.9527035891 1	0.0049080157 0	1293337	1232165	6347	8249750	42500	1232167	6348	1225819
Total			40502430	3875255 0	98872	24259700 0	569000	38752545	98884	38653661

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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