

**MONITORING REPORT FORM (CDM-MR)**
Version 01 in effect as of: 28/09/2010**CONTENTS**

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MONITORING REPORT
Version 1.0 and Date 11/09/2011

Title: “BUNDLED WIND ENERGY POWER PROJECTS (2004 POLICY) IN RAJASTHAN”
Project Reference No: 1166
Monitoring Period – THIRD MONITORING PERIOD
Monitoring Period - FROM 1/09/2010 TO 31/08/2011 (including first and last day)

SECTION A. General description of the project activity

A.1. Brief description of the project activity: >>

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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. Enercon (India) Ltd (“Enercon” or “EIL”) 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:

• CEPCO Industries:	12 MW
• Ushdev International:	2.4 MW
• Brindavan Agro Industries:	1.6 MW
• Amrit Bottlers Ltd:	0.8 MW
• Deedee Enterprises:	0.8 MW
• JN Investment:	0.8 MW
• Metalfab Hightech Private Limited:	0.8 MW
• SE Investment:	0.8 MW
• Brindavan Bottlers Ltd.:	0.8 MW
• Delta Enterprises:	2.4 MW
• Sankalp International:	0.8 MW
• Malani Impex Inc.:	0.8 MW

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 total emission reductions achieved under this monitoring period (1 September 2010 to 31 August 2011) is **38,371 tCO₂**.

A.2. Project Participants

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Enercon (India) Limited from host Party India
 Japan Carbon Finance Ltd. from Annex –I Party Japan

**A.3. Location of the 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 RRVPNL 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.No.	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
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A.4. Technical description of the project

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The Project involves 31-wind energy converters (WEGs) of Enercon 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.

Enercon (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.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

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Baseline Methodology: *Consolidate monitoring methodology for grid-connected electricity generation from renewable sources, ACM0002, Version 6.*

Monitoring Methodology: *Consolidated monitoring methodology for grid-connected electricity generation from renewable sources, ACM0002, Version 6*

A.6. Registration date of the project activity:

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30/10/2008

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

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The length of the Crediting period of the project activity as per registered PDD is 10 years (Fixed) starting from 30/10/2008 to 29/10/2018. Joint Meter Reading is generated on 1st day of every month. In



first CER verification, the monitoring period considered was the period from 30-October-2008 to 30-November-2009. The second monitoring period was considered from 01-December-2009 to 31-August-2010. The third monitoring period is considered from 01-September-2010 to 31- August -2011.

A.8. Name of responsible person(s)/entity (ies):

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Contact Information of project proponents are given in the table below:

Organization:	Enercon (India) Limited
Street/P.O.Box:	A-9, Veera Industrial Estate, Veera Desai Road, Andheri West
Building:	Enercon Tower
City:	Mumbai
State/Region:	Maharashtra
Postfix/ZIP:	400 053
Country:	India
Telephone:	+91-22-2671 7176
FAX:	+91 22 66921177
E-Mail:	yogesh.mehra@enerconindia.net
URL:	www.enerconindia.net
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Mehra
Middle Name:	
First Name:	Yogesh
Department:	Corporate
Mobile:	+91-9820040301
Direct FAX:	+91 22 66921177
Direct tel:	+91-22-6692 4848 extn. 7111
Personal E-Mail:	yogesh.mehra@enerconindia.net

Organization:	Japan Carbon Finance, Ltd.
Street/P.O.Box:	6 th Floor, 1-3 Kundankita, 4-chrome
Building:	Chiyoda-ku
City:	Tokyo
State/Region:	
Postfix/ZIP:	102-0073
Country:	Japan
Telephone:	+81 3 5212 8870
FAX:	+81 3 5212 8886
E-Mail:	jcf@jcarbon.co.jp
URL:	http://www.japancarbon.co.jp/
Represented by:	
Title:	Deal Manager
Salutation:	Mr.
Last Name:	Shozo
Middle Name:	



First Name:	Watanabe
Department:	Carbon Finance Department
Mobile:	
Direct FAX:	+81 3 5212 8886
Direct tel:	+81 3 5212 8878
Personal E-Mail:	s-watanabe@jcarbon.co.jp

SECTION B. Implementation of the project activity

B.1. Implementation status of the 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 Enercon 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

Enercon 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 for any of the machines that are included in the project activity. 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. Revision of the monitoring plan

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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.3. Request for deviation applied to this monitoring period

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Not Applicable

B.4. Notification or request of approval of changes

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Not Applicable

SECTION C. Description of the 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 Enercon 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 Enercon. 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 snapshot 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 Enercon and RRVN/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 Enercon 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:

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

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

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

$\sum E_{Controller,Export}$ = 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-



$$1. \quad \text{Export Multiplication factor} = \frac{E_{\text{JMR,Ex}}}{\sum E_{\text{Controls}}} \dots\dots\dots (1)$$

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

$$1. \quad E_{\text{WEG}} = \text{Export Multiplication factor} \times 1. \quad E_{\text{Control}} \dots\dots\dots (2)$$

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-

$$1. \quad \text{Import Multiplication factor} = \frac{E_{\text{JMR,in}}}{\sum E_{\text{Controls}}} \dots\dots\dots (3)$$

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

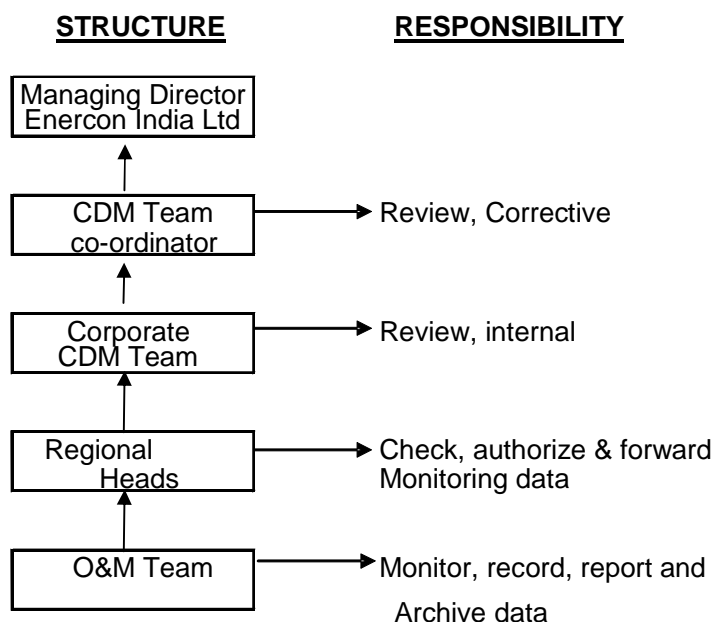
$$1. \quad E_{\text{WEG,import}} = \text{Import Multiplication factor} \times E_{\text{Control}} \dots\dots\dots (4)$$

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

$$1. \quad EG_y = \sum_{\text{Project}} E_{\text{WEG}} - 1. \quad \sum_{\text{Project}} E_{\text{WEG}} \dots\dots\dots (5)$$

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

The operational and management structure implemented by Enercon 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 Enercon'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 Enercon Training Academy provides need-based training to meet the training requirements of Enercon 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 Due date	Latest date of calibration	Calibration Due date
Main meter (Line I)	TNU00946	Secure	0.2	Amarsagar Substation	30-Mar-10	29-Mar-11	26-Mar-11	25-Mar-12
Backup meter (Line I)	RJB00052	Secure	0.2	Temdarai Substation	31-Mar-10	30-Mar-11	28-Mar-11	27-Mar-12
Main meter (Line II)	TNU00945	Secure	0.2	Amarsagar Substation	30-Mar-10	29-Mar-11	26-Mar-11	25-Mar-11
Backup meter (Line II)	ABB00691	Secure	0.2	Temdarai Substation	31-Mar-10	30-Mar-11	28-Mar-11	27-Mar-12



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

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D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	$EF_{OM,y}$		
Data unit:	tCO ₂ e/MWh		
Description:	Operating Margin Emission Factor of Northern Regional Electricity Grid		
Source of data used:	<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) :	2002 – 03	0.9993	
	2003 – 04	0.9869	
	2004 – 05	0.9756	
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions		
Additional comment:	None		

Data / Parameter:	$EF_{BM,y}$		
Data unit:	tCO ₂ e/MWh		
Description:	Build Margin Emission Factor of Northern Regional Electricity Grid		
Source of data used:	<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) :	0.5335		
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions		
Additional comment:	None		



Data / Parameter:	$EF_{CM,r}$
Data unit:	tCO ₂ e/GWh
Description:	Combined Margin Emission Factor of North East West North-east (NEWNE)
Source of data used:	<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) :	873.87
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Additional comment:	None

D.2. Data and parameters monitored	
Data / Parameter:	EG_y
Data 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 state utility (Discom).
Value(s) of monitored parameter:	43909.443 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated as per formulas better described under section C.
Measuring/ Reading/ Recording frequency:	Monthly: The apportioning is done as per the procedure described in section C.
Calculation method (if applicable):	$EG_y = \sum_{\text{Project}} E_{WEG, \text{Export}} - \sum_{\text{Project}} E_{WEG, \text{Import}}$ <p>Refer section C for details and description of the above variables</p>
QA/QC procedures applied:	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.



Data / Parameter:	E_{MR}Export
Data 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 Enercon and state utility
Value(s) of monitored parameter:	177409.375 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<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>Line I and Line II Main Meter Last date of Test-26 March 11 Validity of Test-25 March 12</p> <p>Line I and Line II Check Meter Last date of Test-28 March 11 Validity of Test-27 March 12</p> <p>Frequency of Calibration- Annual</p>
Measuring/ Reading/ Recording frequency:	Monthly: The reading is jointly noted by the representatives of state utility and Enercon.
Calculation method (if applicable):	NA
QA/QC procedures applied:	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.

Data / Parameter:	E_{MR}Import
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity imported, as recorded by the main meter at the EB substation
Measured /Calculated	Measured: The import reading is jointly noted from the main meter



/Default:	installed at the EB substation.
Source of data:	Import value from Joint meter reading taken at Substation in the presence of representatives of Enercon and state utility
Value(s) of monitored parameter:	348.125 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<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>Line I and Line II Main Meter Last date of Test-26 March 11 Validity of Test-25 March 12</p> <p>Line I and Line II Check Meter Last date of Test-28 March 11 Validity of Test-27 March 12</p> <p>Frequency of Calibration- Annual</p>
Measuring/ Reading/ Recording frequency:	Monthly: The reading is jointly noted by the representatives of state utility and Enercon.
Calculation method (if applicable):	NA
QA/QC procedures applied:	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.

Data / Parameter:	EController Export
Data 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:	46972.976 MWh
Indicate what the data are used for (Baseline/ Project/	Baseline Emissions



Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<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):	NA
QA/QC procedures applied:	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.

Data / Parameter:	$E_{WEG,Export}$
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported by a WEG to the grid
Measured /Calculated /Default:	$E_{WEG,Export}$ 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:	45852.536 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated using the formulas better described under section C.
Measuring/ Reading/ Recording frequency:	Calculated using the formulas better described under section C.
Calculation method (if applicable):	$E_{WEG,Export} = \text{Export Multiplication factor} \times E_{Controller,Export}$ Refer to Section C for details and description of the above variables.
QA/QC procedures applied:	The value is calculated. Please refer Section C for QA/QC procedures.



Data / Parameter:	$E_{WEG,Import}$
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity imported by a WEG from the grid
Measured /Calculated /Default:	$E_{WEG,Import}$ denotes the electricity imported by a WEG from 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:	70.541 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated using the formulas better described under section C.
Measuring/ Reading/ Recording frequency:	Monthly: The reading is jointly noted by the representatives of state utility and Enercon.
Calculation method (if applicable):	$E_{WEG,Import} = Import\ Multiplication\ factor \times E_{Controller,Export}$ Refer to Section C for details and description of the above variables.
QA/QC procedures applied:	The value is calculated. Please refer Section C for QA/QC procedures.

Data / Parameter:	$\sum_{Project} E_{WEG,Export}$
Data 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:	$\sum_{Project} E_{WEG,Export}$ 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:	43987.822 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated using the formulas better described under section C.
Measuring/ Reading/ Recording frequency:	Monthly: Calculated using the formulas better described under section C.
Calculation method (if applicable):	$\sum_{Project} E_{WEG,Export}$ 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 applied:	The value is calculated and can be cross checked from the invoices raised on the state utility.
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Data / Parameter:	$\sum_{\text{Project}} E_{\text{WEG.Import}}$
Data 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:	$\sum_{\text{Project}} E_{\text{WEG.Import}}$ 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:	78.380 MWh
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated using the formulas better described under section C.
Measuring/ Reading/ Recording frequency:	Monthly: Calculated using the formulas better described under section C.
Calculation method (if applicable):	$\sum_{\text{Project}} E_{\text{WEG.Import}}$ 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 applied:	The value is calculated and can be cross checked from the invoices raised on the state utility.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

“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).



Emission reduction calculation for the period 1st September 2010 to 31st August 2011:

$$\begin{aligned}\text{Emission Reductions (ER)} &= 43.909443 \text{ (GWh)} * 873.87 \text{ (tCO}_2\text{/GWh)} \\ &= \mathbf{38,371 \text{ tCO}_2}\end{aligned}$$

E.2. Project emissions calculation

>>

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. Leakage calculation

>>

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

E.4. Emission reductions calculation / table

>>

The total emission reductions achieved during the monitoring period is **38,371 tCO₂**.

Total baseline emissions: **38,371 tCO₂**

Total project emissions: Zero

Total leakage: Zero

$$\begin{aligned}\text{Total Emission reductions, ER} &= \text{BEy} - \text{PEy} \\ &= \mathbf{38,371 \text{ tCO}_2}\end{aligned}$$

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

>>

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO ₂ e)	41,766 (Emission reductions estimated in the registered PDD)	38,371

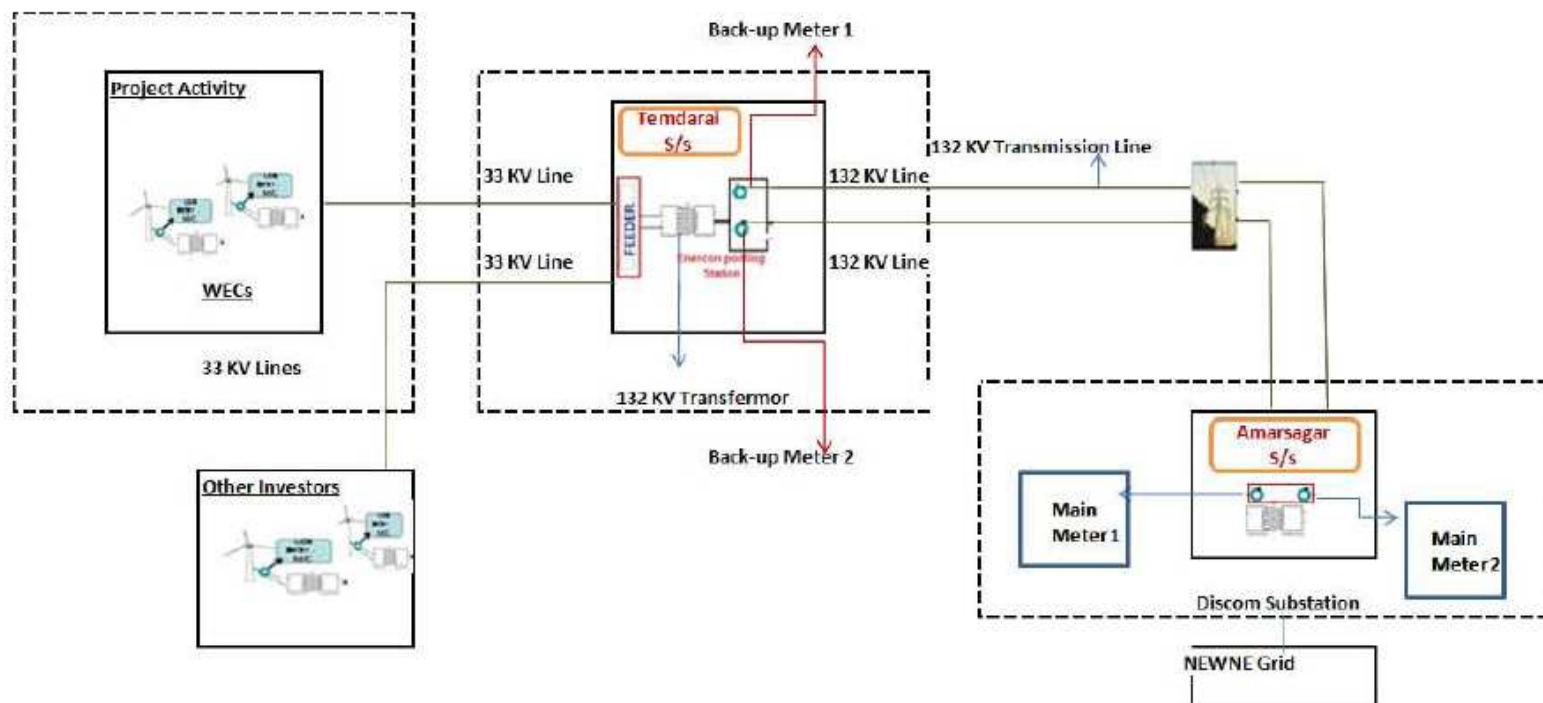
E.6. Remarks on difference from estimated value in the PDD

>>

There is change of 8.1 % ((41,766-38,371)/41,766) in the expected and annual emission reductions. The difference in the total CERs is due to low wind availability leading to low plant load factor.



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	BAIL-01	Class-I	466478	NZR	ITZR



23	Limited	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
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



Appendix 3: Net Electricity Exported to Grid (EGy)

Sr No	Name of the Customer	M/C Model	Capacity of M/C	No. of M/ C	Capacity (MW)	Sep-10			Oct-10			Nov-10			Dec-10		
						E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy
1	CEPCO	E-48	0.8	15	12.00	558264	3781	554483	149411	800	148611	487151	3029	484122	698228	2600	695628
2	Ushdev International	E-48	0.8	3	2.40	126619	858	125761	56001	300	55701	96762	602	96160	144435	538	143897
3	Brindavan Agro Industries	E-48	0.8	2	1.60	78909	535	78374	79984	428	79556	66867	416	66451	97258	362	96896
4	Amrit Bottlers Ltd.	E-48	0.8	1	0.80	42029	285	41744	46615	249	46366	32569	203	32366	47604	177	47427
5	Deedee Enterprises	E-48	0.8	1	0.80	42127	285	41842	41489	222	41267	31738	197	31541	44034	164	43870
6	JN Investment	E-48	0.8	1	0.80	44263	300	43963	110047	589	109458	31998	199	31799	49258	183	49075
7	Metalfab Hightech Private Limited	E-48	0.8	1	0.80	38501	261	38240	58065	311	57754	29827	186	29641	45615	170	45445
8	SE Investment	E-48	0.8	1	0.80	41561	282	41279	54853	294	54559	32510	202	32308	48116	179	47937
9	Brindavan Bottlers Ltd.	E-48	0.8	1	0.80	44472	301	44171	128511	688	127823	32290	201	32089	48433	180	48253
10	Delta Enterprises	E-48	0.8	3	2.40	132068	895	131173	1598494	8555	1589939	100463	625	99838	147358	549	146809
11	Sankalp International	E-48	0.8	1	0.80	43389	294	43095	53845	288	53557	33600	209	33391	46401	173	46228
12	Malani Impex Inc.	E-48	0.8	1	0.80	41227	279	40948	625007	3345	621662	32735	204	32531	48800	182	48618
	Total			31	24.80	1233429	8356	1225073	3002322	16069	2986253	1008510	6273	1002237	1465540	5457	1460083



Sr No	Name of the Customer	M/C Model	Capacit y of M/C	No. of M/ C	Capacit y (MW)	Jan-11			Feb-11			Mar-11			Apr-11		
						E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy
1	CEPCO	E-48	0.8	15	12.00	749902	1710	748192	708600	2410	706190	872078	1602	870476	301007	453	300554
2	Ushdev International	E-48	0.8	3	2.40	158181	361	157820	145599	495	145104	174174	320	173854	48793	73	48720
3	Brindavan Agro Industries	E-48	0.8	2	1.60	101155	231	100924	94954	323	94631	115773	213	115560	50418	76	50342
4	Amrit Bottlers Ltd.	E-48	0.8	1	0.80	51246	117	51129	46177	157	46020	57810	106	57704	3297099	4957	3292142
5	Deedee Enterprises	E-48	0.8	1	0.80	49503	113	49390	47489	162	47327	57498	106	57392	49273	74	49199
6	JN Investment	E-48	0.8	1	0.80	50499	115	50384	47278	161	47117	57244	105	57139	145871	219	145652
7	Metalfab Hightech Private Limited	E-48	0.8	1	0.80	50045	114	49931	46518	158	46360	58500	107	58393	49211	74	49137
8	SE Investment	E-48	0.8	1	0.80	51943	118	51825	47805	163	47642	57682	106	57576	53689	81	53608
9	Brindavan Bottlers Ltd.	E-48	0.8	1	0.80	52924	121	52803	46259	157	46102	57572	106	57466	99994	150	99844
10	Delta Enterprises	E-48	0.8	3	2.40	153373	350	153023	147774	503	147271	175335	322	175013	48557	73	48484
11	Sankalp International	E-48	0.8	1	0.80	50278	115	50163	46888	159	46729	57597	106	57491	46964	71	46893
12	Malani Impex Inc.	E-48	0.8	1	0.80	50405	115	50290	47036	160	46876	57693	106	57587	51139	77	51062
	Total			31	24.80	1569454	3580	1565874	1472377	5008	1467369	1798956	3305	1795651	4242015	6378	4235637



Sr No	Name of the Customer	M/C Model	Capacity of M/C	No. of M/ C	Capacity (MW)	May-11			Jun-11			Jul-11			Aug-11		
						E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy	E WEG, Export	E WEG, Import	EGy
1	CEPCO	E-48	0.8	15	12.00	826808	177	826631	1117876	477	1117399	725007	551	724456	427006	1452	425554
2	Ushdev International	E-48	0.8	3	2.40	142408	30	142378	184761	79	184682	123032	94	122938	73808	251	73557
3	Brindavan Agro Industries	E-48	0.8	2	1.60	145735	31	145704	185782	79	185703	125738	96	125642	73719	251	73468
4	Amrit Bottlers Ltd.	E-48	0.8	1	0.80	5754040	1228	5752812	6170229	2632	6167597	3781531	2874	3778657	2579555	8766	2570789
5	Deedee Enterprises	E-48	0.8	1	0.80	132313	28	132285	185412	79	185333	118916	90	118826	70495	240	70255
6	JN Investment	E-48	0.8	1	0.80	428972	92	428880	557564	238	557326	360782	274	360508	216936	737	216199
7	Metalfab Hightech Private Limited	E-48	0.8	1	0.80	149586	32	149554	187349	80	187269	126546	96	126450	72672	247	72425
8	SE Investment	E-48	0.8	1	0.80	150138	32	150106	185596	79	185517	125824	96	125728	70924	241	70683
9	Brindavan Bottlers Ltd.	E-48	0.8	1	0.80	289137	62	289075	368789	157	368632	243711	185	243526	132386	450	131936
10	Delta Enterprises	E-48	0.8	3	2.40	145473	31	145442	186710	80	186630	121688	92	121596	75161	255	74906
11	Sankalp International	E-48	0.8	1	0.80	150903	32	150871	185571	79	185492	123605	94	123511	74471	253	74218
12	Malani Impex Inc.	E-48	0.8	1	0.80	144836	30	144806	186420	80	186340	121383	93	121290	67915	231	67684
	Total			31	24.80	8460349	1805	8458544	9702059	4139	9697920	6097763	4635	6093128	3935048	13374	3921674



History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory Document Type: Guideline, Form Business Function: Issuance		