

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

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* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 01 and date 22/11/2011

Title: BUNDLED WIND ENERGY POWER PROJECTS (2003 POLICY) IN RAJASTHAN
Project reference number: 1167
Monitoring period number: 01 and Date: 17/05/2011 – 31/10/2011(first and last days included)

SECTION A. General description of the project activity

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

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The project a bundled wind power project, with a total capacity of 30.59 MW (“Project”) in the state of Rajasthan to provide reliable, renewable power to the State electricity grid, which is a part of the Northern regional electricity grid of India. The Project will lead to reduction of greenhouse gas (GHG) emissions by displacing electricity generation from fossil fuel based electricity generation plants.

The Project harnesses renewable resources in the region and thereby displacing non-renewable natural resources and ultimately leading to sustainable economic and environmental development. The details of the sub-projects comprising the Project are as under:

▪ Enercon Wind Farm Rajasthan:	24 MW
▪ ¹ Jitendra K. Newaskar (formerly Perna Pharma Intermediates Pvt. Ltd.):	0.23 MW
▪ Modular Power:	0.23 MW
▪ Vijay Traders:	0.23 MW
▪ Vijay Developers:	0.23 MW
▪ Vikas Agencies:	0.23 MW
▪ G. C. Chemie Pharmie Ltd.:	0.23 MW
▪ Cooper Metals Pvt. Ltd.:	0.46 MW
▪ Kataria Infrastructure Corporation:	0.6 MW
▪ ² Dempo Industries Pvt. Ltd.:	0.6 MW
▪ D.P. Power:	0.23 MW
▪ Kataria Infrastructure Corporation:	0.23 MW
▪ Kataria Wires:	0.23 MW
▪ Ratlam Wires:	0.23 MW
▪ Kwaliti Tobacco Products:	0.23 MW
▪ D P Power:	0.6 MW
▪ Unique Power Corporation:	0.6 MW
▪ P.V. Chandran:	0.6 MW
▪ Srinivaas Sirigeri:	0.6 MW

The first machine under the project activity was commissioned on 29/07/2003 and the last machine under the project activity was commissioned on 29/05/2005. The expected operational lifetime of the project is for 20 years. The total emission reductions achieved under this monitoring period (17/05/2011 to 31/10/2011) is **17, 952 tCO₂**.

¹ The supportive document has been provided to the DOE.

² Has been de-commissioned. The supportive document has been provided to the DOE.

A.2. Project Participants

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Enercon (India) Limited
Japan Carbon Finance, Ltd.

A.3. Location of the project activity:

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The project activity is located in Jaisalmer district of Rajasthan. The sites are located at a distance of 35 km from Jaisalmer by road. The nearest railway station is at Jaisalmer. The unique identification details along with the geo – coordinates have been provided below:

Sl. No.	Name of customers	Unique Identification No.	Latitude			Longitude		
			Deg.	Min.	Sec.	Deg.	Min .	Sec.
1.	Enercon Wind Farm Rajasthan	EW RPL 01	26	38	44.5	70	51	23.4
		EW RPL 02	26	38	50.4	70	51	19.7
		EW RPL 03	26	38	54.2	70	51	12.3
		EW RPL 04	26	38	56.5	70	51	37.4
		EW RPL 05	26	38	48.3	70	51	44.0
		EW RPL 06	26	38	32.3	70	51	54.0
		EW RPL 07	26	38	27.2	70	51	43.1
		EW RPL 08	26	38	19.0	70	51	52.5
		EW RPL 09	26	38	16.9	70	52	4.3
		EW RPL 10	26	38	10.6	70	52	8.7
		EW RPL 11	26	38	14.6	70	52	27.8
		EW RPL 12	26	38	18.1	70	52	21.8
		EW RPL 13	26	38	26.2	70	52	15.0
		EW RPL 14	26	38	35.1	70	52	9.2
		EW RPL 15	26	38	51.5	70	51	58.5
		EW RPL 16	26	38	55.1	70	51	52.9
		EW RPL 17	26	39	0.9	70	52	9.2
		EW RPL 18	26	38	56.4	70	52	15.0
		EW RPL 19	26	38	49.6	70	52	19.7
		EW RPL 20	26	38	47.0	70	52	26.4
		EW RPL 21	26	38	42.9	70	52	32.2
		EW RPL 22	26	38	36.7	70	52	36.8
		EW RPL 23	26	38	30.5	70	52	41.6
		EW RPL 24	26	38	36.6	70	52	56.9
		EW RPL 25	26	38	42.7	70	52	51.9
		EW RPL 26	26	38	47.3	70	52	46.5
		EW RPL 27	26	38	56.3	70	52	43.3
		EW RPL 28	26	39	2.6	70	52	39.3
		EW RPL 29	26	39	8.7	70	52	35.3
		EW RPL 30	26	39	23.2	70	52	45.2
2.	D.P. Power	DPP-02	26	44	43.5	70	54	0.3
3.	Unique Power	UPC-01	26	44	46.8	70	53	58.9

	Corporation							
4.	Cooper Metals Pvt. Ltd.	CMPL-01	26	37	45.4	70	52	55.1
5.	Srinivaas Sirigeri	SS -01	26	43	29.1	70	53	5.5
6.	Cooper Metals Pvt. Ltd.	CMPL-02	26	37	28.0	70	52	54.7
7.	G. C. Chemie Pharmie Ltd.	GCCPL -01	26	37	15.9	70	53	20.9
8.	Modular Power	MPPL -01	26	37	24.9	70	52	56.2
9.	Jitendra K. Newaskar (formerly Prerna Pharma Intermediates Pvt. Ltd.)	PPIPL-01	26	37	19.2	70	53	20.5
10.	Vijay Developers	VD-01	26	37	23.0	70	52	59.0
11.	Vijay Traders	VT -01	26	37	13.6	70	52	58.1
12.	Vikas Agencies	VA-01	26	37	22.1	70	53	4.8
13.	P.V. Chandran	PVC -01	26	42	53.6	70	53	14.3
14.	Kataria Infrastructure Corporation	KIC -01	26	45	1.3	70	53	57.3
15.	D.P. Power	DPP -01	26	45	38.6	70	53	22.4
16.	Kataria Infrastructure Corporation	KIC -02	26	45	42.7	70	53	21.2
17.	Kataria Wires	KWPL -02	26	45	45.3	70	53	19.0
18.	Kwality Tobacco Products	KTP -01	26	45	57.0	70	53	13.4
19.	Ratlam Wires	RWPL -02	26	45	51.1	70	53	15.8

A.4. Technical description of the project

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The project activity involves 30 numbers of wind energy converters (WECs) of Enercon make 800 kW E - 48, 6 WECs of Enercon make 600 kW E- 40 and 13 WECs of Enercon make 230 kW E – 30, with a total capacity of 30.59 MW, with internal electrical lines connecting the Project with local evacuation facility. The WEGs generate 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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The approved consolidated baseline and monitoring methodology ACM0002, Version 6.0 (19 May, 2006) has been used. The title of the baseline and monitoring methodologies are "Consolidated baseline methodology for grid – connected electricity generation from renewable sources" and "Consolidated monitoring methodology for grid – connected electricity generation from renewable sources".

A.6. Registration date of the project activity:

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17/ 05/ 2011

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). The crediting period start date is 17/05/2011 and length of crediting period is from 17/05/2011 to 16/05/2021.

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

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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:	+91-22-66924848
FAX:	+91-22-66921177
E-Mail:	yogesh.mehra@enerconindia.net
URL:	
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Mehra
Middle Name:	
First Name:	Yogesh
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Organization:	Japan Carbon Finance, Ltd.
Street/P.O. Box:	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:	in21@jcarbon.co.jp
URL:	
Represented by:	
Title:	Director General
Salutation:	Mr.
Last Name:	Toshio
Middle Name:	
First Name:	Matsuda
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

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 29/07/2003 and last machine under the project activity was commissioned on 29/05/2005. The project activity involves 30 numbers of wind energy converters (WECs) of Enercon make 800 kW E- 48, 6 WECs of Enercon make 600 kW E- 40 and 13 WECs of Enercon make 230 kW E – 30, with a total capacity of 30.59 MW. The commissioning dates for all the machines included in the project activity are given in the table below.

S. No.	Name of customers	Unique Identification no.	Type of M/C	No. of M/C	Capacity (MW)	Date of Commissioning
1	Enercon Wind Farm Rajasthan	EWRPL 01	0.80	30	24	29/05/2005
		EWRPL 02				
		EWRPL 03				
		EWRPL 04				
		EWRPL 05				
		EWRPL 06				
		EWRPL 07				
		EWRPL 08				
		EWRPL 09				
		EWRPL 10				
		EWRPL 11				
		EWRPL 12				
		EWRPL 13				
		EWRPL 14				
		EWRPL 15				
		EWRPL 16				
		EWRPL 17				
		EWRPL 18				
		EWRPL 19				
		EWRPL 20				
		EWRPL 21				

		EWRPL 22				
		EWRPL 23				
		EWRPL 24				
		EWRPL 25				
		EWRPL 26				
		EWRPL 27				
		EWRPL 28				
		EWRPL 29				
		EWRPL 30				
2	Jitendra K. Newaskar (formerly Prerna Pharma Intermediates Pvt. Ltd.)	PPIPL-01	0.23	1	0.23	29/03/2004
3	Modular Power	MPPL -01	0.23	1	0.23	29/03/2004
4	Vijay Traders	VT -01	0.23	1	0.23	29/03/2004
5	Vijay Developers	VD-01	0.23	1	0.23	29/03/2004
6	Vikas Agencies	VA-01	0.23	1	0.23	29/03/2004
7	G. C. Chemie Pharmie Ltd.	GCCPL -01	0.23	1	0.23	29/03/2004
8	Cooper Metals Pvt. Ltd.	CMPL-01	0.23	2	0.46	29/03/2004 & 12/06/2004
		CMPL-02				
9	Kataria Infrastructure Corporation	KIC -01	0.60	1	0.60	29/07/2003
10	Dempo Industries Pvt. Ltd. (has been de- commissioned)	DIPLG-01	0.60	1	0.60	10/03/2004
11	D.P. Power	DPP -01	0.23	1	0.23	29/07/2003
12	Kataria Infrastructure Corporation	KIC -02	0.23	1	0.23	29/07/2003
13	Kataria Wires	KWPL -02	0.23	1	0.23	29/07/2003
14	Ratlam Wires	RWPL -02	0.23	1	0.23	29/07/2003
15	Kwality Tobacco Products	KTP -01	0.23	1	0.23	29/07/2003
16	D P Power	DPP-02	0.60	1	0.60	30/06/2004
17	Unique Power Corporation	UPC-01	0.60	1	0.60	30/06/2004
18	P.V. Chandran	PVC -01	0.60	1	0.60	30/11/2003
19	Srinivaas Sirigeri	SS -01	0.60	1	0.60	03/03/2004

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 (WECs), 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 staff 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.

B.2. Revision of the monitoring plan

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Not applicable

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.

This approved monitoring methodology requires monitoring of the following:

- Electricity generation from the project activity; and
- Operating margin emission factor and build margin emission factor of the grid, where *ex-post* determination of grid emission factor has been chosen

Since the baseline methodology is based on ex-ante determination of the baseline, the monitoring of operating margin emission factor and build margin emission factor is not required. The sole parameter for monitoring is the net electricity supplied by the Project to the grid.

In order to determine the net electricity supplied to the grid by the project, the following procedure is followed:

All the WEGs of the Project along with the other wind firms are connected to the backup/check meter at Temdarai sub-station, which is further connected to the Sub-station at Amarsagar at 220 kV. The generation readings of all WECs of all the customers are collectively displayed at this Main Billing meter at 220 kV Amarsagar substation. Therefore, the main meter reading reflects the aggregate electricity supplied by all these wind farms, including the project activity.

Representatives of Discom and Enercon will jointly take the main meter reading at Amarsagar and sign the meter reading on the first day of every month. Simultaneously, the joint meter reading of the backup metering system at Temdarai substation will also be taken by representatives of the Discom and Enercon.

To calculate the net amount of electricity generation from each wind turbine, apportionment of this collective meter reading of the main billing meter (recorded at Main meter 1 & Main meter 2³) is done on the basis of the controller panel reading at the individual wind turbine end. This controller panel reading is recorded and maintained by Enercon.

³ Please refer to Appendix I.

The apportionment procedure has been explained as follows:

$E_{JMR, Export}$	= 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
$\Sigma E_{Controller, Export}$	= 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 export recorded at the controller of each WEG and the electricity export at the main meter as mentioned in the JMR. The export multiplication factor is calculated as follows:

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

Therefore, the energy exported by a WEG to the grid is calculated as:

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

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

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

Therefore, the energy imported by a WEG to the grid is calculated as:

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

Hence, the net electricity exported by a WEG of the project is calculated as:

$$E_{WEG, Export} - E_{WEG, Import}$$

The net electricity exported by all the WEGs of the project activity is calculated as:

$$\begin{aligned} EG_y &= \Sigma \text{Project } E_{WEG, Export} - \Sigma \text{Project } E_{WEG, Import} \\ &= EG_{Export} - EG_{Import} \end{aligned}$$

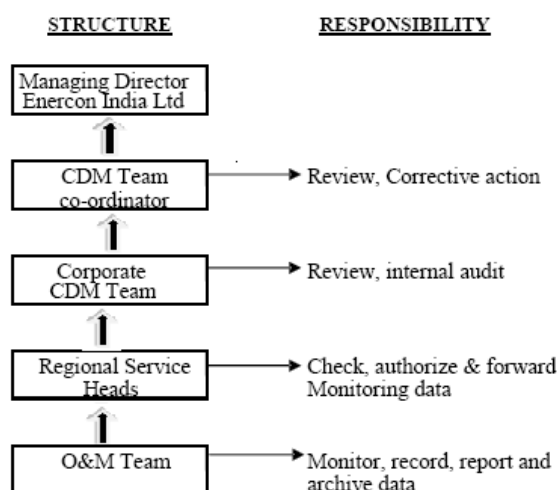
Where,

$\Sigma \text{Project } E_{WEG, Export}$ = Export from all the WEGs under the project activity

$\Sigma \text{Project } E_{WEG, Import}$ = Import from all the WEGs under the project activity

The summation is done considering the WEGs which belong to the project activity.

The Project is operated and managed by Enercon (India) Ltd. The operational and management structure implemented by Enercon is as follows:



The details of the metering arrangement have been described below:

Metering:

- The project along with the other wind firms are connected to grid through common metering point (backup meter) at Temdarai substation and further connected to Amarsagar sub-station (EB main meter), where metering is done for billing purpose. The line diagram of the relevant metering points has been shown below as Appendix I. The calibration details for both the main and backup/check meters for the monitoring period has been provided below:

Meter Type	Meter no.	Sr.	Sub station	Accuracy class	Make	Calibration prior to monitoring period	Latest Calibration done	Calibration due on
Main Meter	TNU00946		Amarsagar Sub-station (220 KV)	0.2	Secure	26-Mar-11	26-Mar-11	25-Mar-12
	TNU00945					26-Mar-11	26-Mar-11	25-Mar-12
Check/ back up Meter	RJB0052		Temdarai -Sub-station (132 KV)	0.2	Secure	28-Mar-11	28-Mar-11	27-Mar-12
	ABB00691					28-Mar-11	28-Mar-11	27-Mar-12

Calibration has been done on annual basis. During this calibration, the meters were found to be performing beyond permissible limit of error. Therefore, as per annex 60 of EB 52, Para 4 (b), the energy generation data has been adjusted for the whole monitoring period under conservative approach applying the maximum error found during the calibration⁴.

⁴ Please refer to the emission reduction (ER) calculation spreadsheet. The copy of the calibration reports have been provided to the DOE.

Meter Reading:

- Representatives of Discom and Enercon will jointly take the main reading and sign the meter reading on the first day of every month at Temdarai and Amarsagar substation.
- The export, import and net electricity supplied to the grid by individual customer will be sourced from the credit notes and can be cross-checked with the invoices raised to the DISCOM and will be used for calculation of emission reduction.

Metering Equipment:

- The meters used are Tri-vector of accuracy class 0.2 and the manufacturer is the Secure Meters Ltd. The meters are two-way meters and measure the electricity import and export.

Meter Test Checking:

- The main and backup/ check meters will jointly inspected/tested once in a year as per the terms of the PPA.
- The LCS meters (for panel reading) 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.

Inspection of Energy Meters:

- In case the meters are found to operate outside the permissible limits, the meters will be either replaced immediately or calibrated. Whenever a main meter goes defective, the consumption recorded by the backup meter will be referred.
- The main and the backup metering systems will be sealed in presence of representatives of Enercon and RRVPNL/Jodhpur Discom.

Training and maintenance:

In order to ensure that Enercon's staffs who are positioned to take care all the activities starting from project construction to operation and maintenance, Enercon Training Academy provides need based periodical training to meet the requirements of the project. The training is contemporary, which results in imparting focused knowledge leading to value addition to the attitude and skills of all the trainees. The training facility is located at Daman and is fully functional and equipped with qualified trainers, training equipments, classrooms and hostel facilities.

SECTION D. Data and parameters

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

(Copy this table for each data and parameter. To report multiple values, a table may be used)

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 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector”, version 01.1 is available at www.cea.nic.in.</p>						
Value(s) :	<table border="1"> <tr> <td>2002 – 03</td><td>0.9993</td></tr> <tr> <td>2003 – 04</td><td>0.9869</td></tr> <tr> <td>2004 – 05</td><td>0.9756</td></tr> </table>	2002 – 03	0.9993	2003 – 04	0.9869	2004 – 05	0.9756
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 Emission Calculations						
Additional comment:	None						

Data Unit / 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 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector”, version 01.1 is available at www.cea.nic.in.</p>		
Value (s):	<table border="1"> <tr> <td>2004 – 05</td><td>0.5335</td></tr> </table>	2004 – 05	0.5335
2004 – 05	0.5335		
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emission Calculations		
Additional comment:	None		

Data Unit / Parameter:	$EF_{CM,y}$
Data unit:	tCO ₂ e/MWh
Description:	Combined Margin Emission Factor of Northern Regional Electricity Grid
Source of data used:	<p>“CO₂ Baseline Database for Indian Power Sector”, version 01.1 published by the Central Electricity Authority, Ministry of Power, Government of India.</p> <p>The “CO₂ Baseline Database for Indian Power Sector” is available at www.cea.nic.in.</p>
Value (s):	0.87387

Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations):	Baseline Emission Calculations
Additional comment:	None

D.2. Data and parameters monitored	
<i>(Copy this table for each data and parameter. To report multiple values, a table may be used)</i>	
Data / Parameter:	EG_y
Data unit:	MWh (Mega-Watt hour)
Description:	Net electricity supplied to the grid by the Project
Measured /Calculated /Default:	Calculated
Source of data:	Calculated as the difference of EG _{Export} and EG _{Import} and sourced from the credit notes. This value can be cross-checked from the invoices raised to the DISCOM.
Value(s) of monitored parameter:	20, 712
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	Calculated as per the procedures shown in section C.
Measuring/ Reading/ Recording frequency:	Monthly basis
Calculation method (if applicable):	<p>The net electricity supply is calculated as $= (EG_{Export} - EG_{Import})$</p> <p>This value is directly used for calculation of emission reduction.</p>
QA/QC procedures applied:	<p>QA/QC procedures will be as implemented by DISCOM pursuant to the provisions of the Power Purchase Agreement (PPA).</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>

Data / Parameter:	EG_{JMR, Export}
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported as recorded by the main meter at EB substation.
Measured /Calculated /Default:	Measured
Source of data:	Export value from the Joint Meter reading taken at the substation in the presence of Enercon representatives and the State Utility representatives.
Value(s) of monitored parameter:	91, 151
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions

Leakage emission calculations)	
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	<p><u>Type:</u> Three phase energy meters (Secure make)</p> <p><u>Accuracy class:</u> 0.2</p> <p><u>Serial no. (Main meters)</u></p> <p>Main meter 1: TNU00946 Main meter 2: TNU00945</p> <p><u>Calibration Frequency:</u> Annually</p> <p><u>Date of last calibration:</u> 26-Mar-11</p> <p><u>Validity:</u> one year (due date: 25-March, 2012)</p> <p><u>Serial no. (Check/ Back up meters)</u></p> <p>Check/ Back up meter 1: RJB0052 Check/ Back up meter 2: ABB00691</p> <p><u>Calibration Frequency:</u> Annually</p> <p><u>Date of last calibration:</u> 28-Mar-11</p> <p><u>Validity:</u> one year (due date: 27-March, 2012)</p>
Measuring/ Reading/ Recording frequency:	Monthly basis
Calculation method (if applicable):	-
QA/QC procedures applied:	<p>The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in section C.</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>

Data / Parameter:	EG_{JMR, Import}
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity import as recorded by the main meter at EB substation.
Measured /Calculated /Default:	Measured
Source of data:	Import value from the Joint Meter reading taken at the substation in the presence of Enercon representatives and the State Utility representatives.
Value(s) of monitored parameter:	144
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><u>Type:</u> Three phase energy meters (Secure make)</p> <p><u>Accuracy class:</u> 0.2</p> <p><u>Serial no. (Main meters)</u></p> <p>Main meter 1: TNU00946 Main meter 2: TNU00945</p> <p><u>Calibration Frequency:</u> Annually</p> <p><u>Date of last calibration:</u> 26-Mar-11</p> <p><u>Validity:</u> one year (due date: 25-March, 2012)</p> <p><u>Serial no. (Check/ Back up meters)</u></p> <p>Check/ Back up meter 1: RJB0052 Check/ Back up meter 2: ABB00691</p> <p><u>Calibration Frequency:</u> Annually</p> <p><u>Date of last calibration:</u> 28-Mar-11</p> <p><u>Validity:</u> one year (due date: 27-March, 2012)</p>
Measuring/ Reading/ Recording frequency:	Monthly basis
Calculation method (if applicable):	-
QA/QC procedures applied:	<p>The meters will be calibrated once in a year. Details of the QA/QC procedures have been described in section C.</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>

Data / Parameter:	EG Controller, Export
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported by a WEG, as measured at the controller panel.
Measured /Calculated /Default:	Measured
Source of data:	This value is monitored on continuous basis by online monitoring system at the site and can also be seen at the electronic panel inside the WTG tower.
Value(s) of monitored parameter:	As measured
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions
Monitoring equipment (type, accuracy class, serial number, calibration	The LCS meters (for panel reading) 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

frequency, date of last calibration, validity)	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.
Measuring/ Reading/ Recording frequency:	Monthly basis; This value is monitored on continuous basis by online monitoring system at the site.
Calculation method (if applicable):	-
QA/QC procedures applied:	<p>The LCS meters (for panel reading) 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.</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>

Data / Parameter:	EG <small>WEG, Export</small>
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported to the grid by a WEG
Measured /Calculated /Default:	Calculated
Source of data:	The calculation procedure has been shown in the section C.
Value(s) of monitored parameter:	As calculated
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 the procedures shown in section C.
Measuring/ Reading/ Recording frequency:	Monthly basis
Calculation method (if applicable):	This value is sourced from the credit notes and can be cross-checked from the invoices raised to the DISCOM.
QA/QC procedures applied:	<p>QA/QC procedures will be as implemented by DISCOM pursuant to the provisions of the Power Purchase Agreement (PPA).</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>

Data / Parameter:	EG <small>WEG, Import</small>
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity Import from the grid by a WEG
Measured /Calculated /Default:	Calculated
Source of data:	The calculation procedure has been shown in the section C.

Value(s) of monitored parameter:	As calculated
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 the procedures shown in section C.
Measuring/ Reading/ Recording frequency:	Monthly basis
Calculation method (if applicable):	This is sourced from the credit notes and can be cross-checked from the invoices raised to the DISCOM.
QA/QC procedures applied:	<p>QA/QC procedures will be as implemented by DISCOM pursuant to the provisions of the Power Purchase Agreement (PPA).</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>

Data / Parameter:	EG _{Export}
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity exported to the grid by the project activity
Measured /Calculated /Default:	Calculated
Source of data:	The calculation procedure has been shown in the section C.
Value(s) of monitored parameter:	20, 746
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 the procedures shown in section C.
Measuring/ Reading/ Recording frequency:	Monthly basis
Calculation method (if applicable):	Calculated as per the procedures shown in section C.
QA/QC procedures applied:	<p>QA/QC procedures will be as implemented by DISCOM pursuant to the provisions of the Power Purchase Agreement (PPA).</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>

Data / Parameter:	EG _{Import}
Data unit:	MWh (Mega-Watt hour)
Description:	Electricity Import from the grid by the project activity
Measured /Calculated	Calculated

/Default:	
Source of data:	The calculation procedure has been shown in the section C.
Value(s) of monitored parameter:	33
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 the procedures shown in section C.
Measuring/ Reading/ Recording frequency:	Monthly basis
Calculation method (if applicable):	Calculated as per the procedures shown in section C.
QA/QC procedures applied:	QA/QC procedures will be as implemented by DISCOM pursuant to the provisions of the Power Purchase Agreement (PPA). 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.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

>>

As described in the registered PDD, the baseline emission (BE_y) = $EG_y * EF_y$

Where,

BE is baseline emissions in year y, tCO₂e

EG_y is the net electricity supplied to the grid in year y and is sourced from the credit notes and can be cross-checked with the invoices raised to the DISCOM.

EF_y is the CO₂ emission factor of the grid (0.87387 tCO₂e/ MWh; fixed ex-ante).

Therefore, Baseline Emission calculation for the period of 17/05/2011 to 31/10/2011⁵ is as follows:

$$\begin{aligned}
 \text{Baseline Emission (BE}_y) &= 620,544 \text{ (MWh)} * 0.87387 \text{ (tCO}_2\text{/MWh)} \\
 &= 17,952 \text{ tCO}_2
 \end{aligned}$$

E.2. Project emissions calculation

>>

The project activity uses wind power to generate electricity and hence, the emissions from the project activity have been taken as zero.

$$PE_y = 0$$

⁵ The crediting period start date as per CDM registration date is from 17th May, 2011. As the date of the JMR reading taken in on 1st of every month, PP has considered the net supply to the grid from 1st June, 2011 – 31st October, 2011, while estimating the emission reduction for the monitoring period.

⁶ After applying the correction factor due to the error in calibration

E.3. Leakage calculation

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No leakage has been considered from the project activity as per approved methodology ACM0002.
Hence, $L_y = 0$

E.4. Emission reductions calculation / table

>>

The estimated emission reductions during the monitoring period is 17, 952 tCO₂. The details have been provided below as well as in the Emission Reduction (ER) spread sheet.

Total baseline emissions: 17, 952 tCO₂

Total project emissions: Zero

Total leakage: Zero

Total Emission reductions (ER_y) = BE_y – PE_y - L_y
= 17, 952 tCO₂

The summary of the estimated emission reduction throughout the monitoring period is as follows:

Month	Export (MWh)	Import (MWh)	Net Electricity supplied to Grid (MWh) (after correction factor)	Emission Reduction (tCO ₂ e/year)
*17/5/2011 - 31/10/2011	20, 746	33	20,544	17,952
Total	20,746	33	20,544	17,952

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

>>

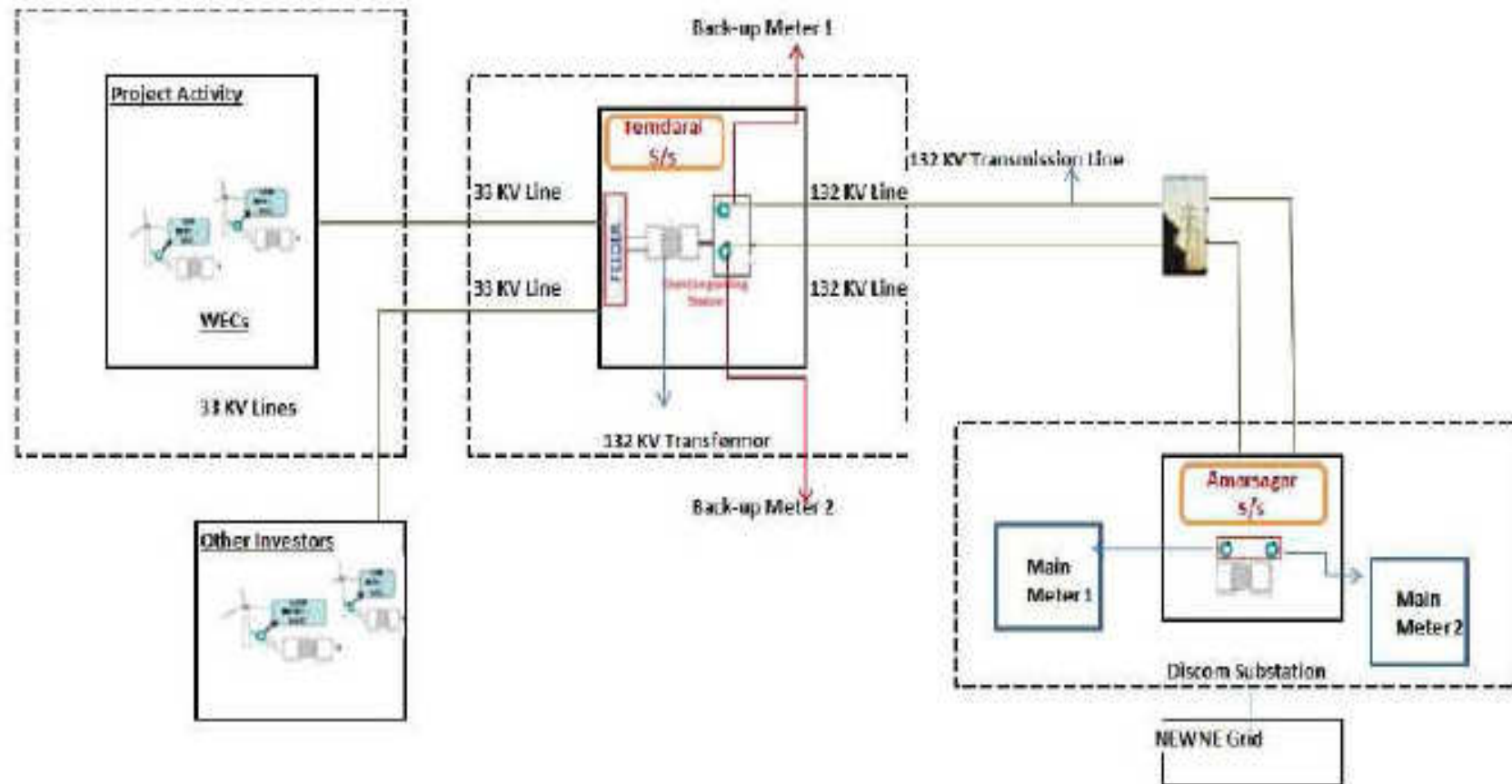
Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO₂e)	21, 465 (5 months equivalent of annually 51, 517 emission reductions estimated in the registered PDD)	17,952

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

>>

The Emission Reduction (ER) value in the monitoring period is 16.37% lower as compared to the value estimated in the PDD, which is due to lower PLF observed at project site during the monitoring period.

Appendix I: Line diagram showing relevant metering points:



* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

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		

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).