

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 3.0 and Date 31/10/2011

Title: Enercon Wind Farm (Hindustan) Ltd in Karnataka
Project Reference No: 1259

Monitoring Period No 2- FROM 01/12/2009 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: >>

>>

The project activity includes development, design, engineering, procurement, finance, construction, operation and maintenance of Enercon Wind Farm (Hindustan) Ltd. (EWHPL) 68.8 MW wind power project ("Project") in Karnataka state of India to provide reliable, renewable power to the Karnataka state electricity grid which is part of the Southern regional electricity grid. The Project will lead to reduced greenhouse gas emissions because it displaces electricity from grid connected fossil fuel based electricity generation plants. The Project Company (EWHPL) is owned by Enercon (India) Ltd. and Enercon GmbH. The project activity consists of 86 WEGs and each machine capacity is of 800 kW (E-48) totalling to the capacity of 68.8 MW. The specifications of E-48 machine are given in section A.4 of the monitoring report.

The first machine under the project activity was commissioned on 29 September 2006 and last machine under the project activity was commissioned on 28 December 2006. The expected operational lifetime of the project is for 20 years. The total emission reductions achieved under this monitoring period (01 December 2009 to 31 Aug 2011) is **173,795 tCO₂**.

A.2. Project Participants

>>

- 1) Enercon (India) Limited
- 2) Rabobank International

A.3. Location of the project activity:

>>

Project activity is located in Karnataka state of India. The turbines are uniquely identified as EWHPL-01 to EWHPL-86. The details of the physical location are as follows:

S.No.	District	Taluka	Village	No. of WEG's
1	Tumkur	Chikkanayakanahalli	Dasudi	20
		Chikkanayakanahalli	Nelenuru	5
		Chikkanayakanahalli	Ganadu	6
		Gubbi	Annenhalli	6
		Gubbi	Siddapura	9
2	Chitradurga	Hosadurga	Chikkabyaledakere	16
		Hosadurga	Kanubehalli	11
		Hosadurga	Arasinagundi	8
		Hosadurga	Elladakere	5
			Total	86

Individual WEG location numbers and coordinates are detailed out in below table:-

S.No.	WEG	Location	Latitude (N)	Longitude (E)
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	Unique Identification Number	No.	Degree	Minutes	Seconds	Degree	Minutes	Seconds
1	EWHPL 01	1	13	43	20.9	76	31	3.9
2	EWHPL 02	2	13	43	25.4	76	31	1.5
3	EWHPL 03	3	13	43	30.0	76	30	59.0
4	EWHPL 04	4	13	43	34.6	76	30	57.2
5	EWHPL 05	5	13	43	39.3	76	30	55.6
6	EWHPL 06	6	13	43	43.8	76	30	53.1
7	EWHPL 07	7	13	43	50.0	76	30	50.5
8	EWHPL 08	8	13	43	54.5	76	30	48.0
9	EWHPL 09	9	13	44	3.9	76	30	44.9
10	EWHPL 10	10	13	45	33.0	76	31	5.9
11	EWHPL 11	11	13	45	28.2	76	31	6.4
12	EWHPL 12	12	13	45	23.4	76	31	7.0
13	EWHPL 13	13	13	45	18.9	76	31	7.7
14	EWHPL 14	14	13	45	14.3	76	31	8.3
15	EWHPL 15	15	13	45	10.2	76	31	9.5
16	EWHPL 16	16	13	44	54.0	76	31	12.3
17	EWHPL 17	17	13	44	49.2	76	31	13.1
18	EWHPL 18	18	13	44	44.5	76	31	14.7
19	EWHPL 19	19	13	44	39.8	76	31	16.7
20	EWHPL 20	20	13	44	35.4	76	31	19.9
21	EWHPL 21	21	13	44	30.5	76	31	19.8
22	EWHPL 22	22	13	44	25.6	76	31	20.2
23	EWHPL 23	23	13	44	21.7	76	31	26.4
24	EWHPL 24	24	13	44	16.9	76	31	27.7
25	EWHPL 25	25	13	44	12.0	76	31	28.2
26	EWHPL26	26	13	44	8.0	76	31	29.8
27	EWHPL 27	27	13	43	57.6	76	31	53.8
28	EWHPL 28	28	13	43	54.1	76	31	55.1
29	EWHPL 29	29	13	43	49.5	76	31	57.1
30	EWHPL 30	30	13	43	44.8	76	31	58.6
31	EWHPL 31	31	13	43	40.0	76	31	59.5
32	EWHPL 32	32	13	43	35.4	76	32	1.9
33	EWHPL 33	33	13	43	30.6	76	32	4.8
34	EWHPL 34	34	13	43	0.6	76	32	22.1
35	EWHPL 35	35	13	42	54.7	76	32	19.9
36	EWHPL 36	36	13	42	50.3	76	32	23.0
37	EWHPL 37	37	13	42	45.6	76	32	24.7
38	EWHPL 38	38	13	42	40.9	76	32	26.3
39	EWHPL 39	39	13	42	36.3	76	32	28.5
40	EWHPL 40	40	13	42	31.1	76	32	31.4
41	EWHPL 41	41	13	40	57.2	76	35	58.1
42	EWHPL 42	42	13	40	52.4	76	35	59.4
43	EWHPL 43	43	13	40	47.7	76	36	0.9
44	EWHPL 44	44	13	40	43.1	76	36	2.6
45	EWHPL 45	45	13	40	38.4	76	36	4.2
46	EWHPL 46	46	13	40	33.7	76	36	5.8
47	EWHPL 47	47	13	40	13.7	76	36	10.7
48	EWHPL 48	48	13	40	9.1	76	36	12.6
49	EWHPL 49	49	13	40	4.7	76	36	15.7
50	EWHPL 50	50	13	39	2.8	76	36	34.8
51	EWHPL 51	51	13	38	58.7	76	36	36.8

52	EWHPL 52	52	13	38	54.1	76	36	38.9
53	EWHPL 53	53	13	38	49.5	76	36	41.3
54	EWHPL 54	54	13	38	44.9	76	36	43.1
55	EWHPL 55	55	13	38	40.2	76	36	44.9
56	EWHPL 56	56	13	38	35.6	76	36	46.9
57	EWHPL 57	57	13	38	30.9	76	36	48.7
58	EWHPL 58	58	13	38	26.4	76	36	50.9
59	EWHPL 59	59	13	38	22.3	76	36	56.3
60	EWHPL 60	60	13	38	17.8	76	36	58.8
61	EWHPL 61	61	13	38	11.8	76	37	2.5
62	EWHPL 62	62	13	38	7.2	76	37	4.6
63	EWHPL 63	63	13	38	2.6	76	37	6.8
64	EWHPL 64	64	13	37	58.0	76	37	9.2
65	EWHPL 65	65	13	37	53.5	76	37	11.5
66	EWHPL 66	66	13	37	48.9	76	37	13.7
67	EWHPL 67	67	13	37	44.3	76	37	16.0
68	EWHPL 68	68	13	37	39.8	76	37	18.4
69	EWHPL 69	69	13	37	35.1	76	37	20.3
70	EWHPL 70	70	13	37	30.5	76	37	22.3
71	EWHPL 71	71	13	37	25.9	76	37	24.7
72	EWHPL 72	72	13	32	25.1	76	43	45.2
73	EWHPL 73	73	13	32	30.0	76	43	44.4
74	EWHPL 74	74	13	32	34.8	76	43	44.7
75	EWHPL 75	75	13	32	39.7	76	43	44.5
76	EWHPL 76	76	13	32	44.6	76	43	43.9
77	EWHPL 77	77	13	32	49.5	76	43	42.5
78	EWHPL 78	78	13	32	54.4	76	43	42.1
79	EWHPL 79	79	13	33	6.1	76	43	33.2
80	EWHPL 80	80	13	33	11.0	76	43	34.1
81	EWHPL 81	81	13	33	15.9	76	43	34.6
82	EWHPL 82	82	13	33	20.8	76	43	34.5
83	EWHPL 83	83	13	34	19.9	76	44	0.8
84	EWHPL 84	84	13	34	27.5	76	44	2.3
85	EWHPL 85	85	13	34	50.5	76	44	14.8
86	EWHPL 86	86	13	34	54.9	76	44	14.8

A.4. Technical description of the project

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The Project involves 86 wind energy generators (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 drawal (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 System.
- 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. Diagram of main component of Enercon make E-48 is shown in below picture:-

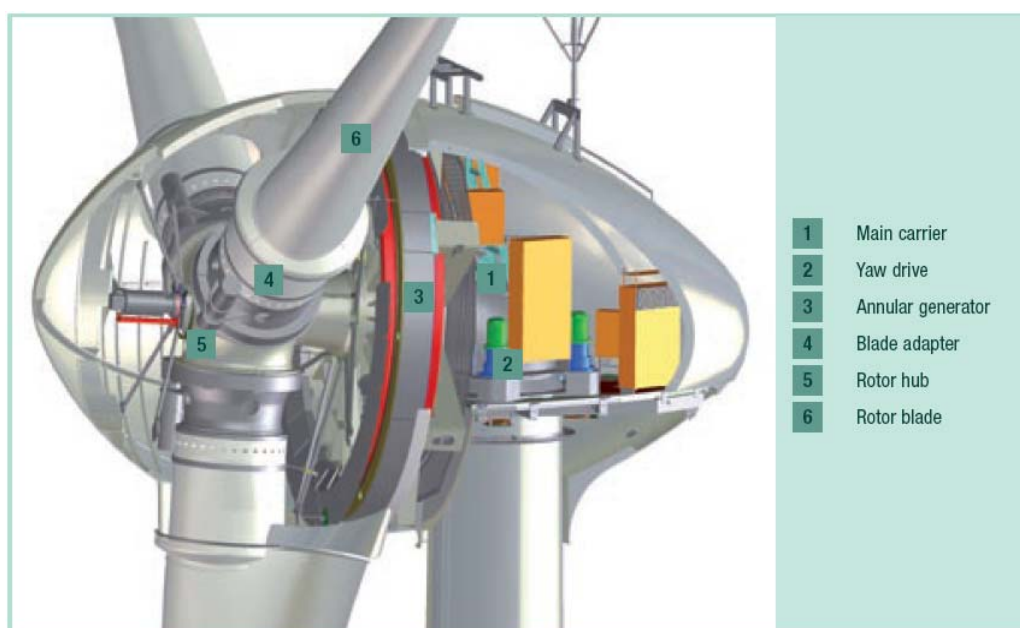


Figure: Enercon make E-48 Diagram.

Layout of the project activity along with the metering points is shown in Appendix 1.

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

>>

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

Reference: Approved consolidated baseline methodology ACM0002 (Version 06, EB 24), effective from 19 May 2006¹.

Baseline Methodology²: Consolidate baseline methodology for grid-connected electricity generation from renewable sources,

Monitoring Methodology: "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources"

¹ <http://cdm.unfccc.int/methodologies/DB/C505BVV9P8VSNNV3LTK1BP3OR24Y5L/view.html>

² http://cdm.unfccc.int/UserManagement/FileStorage/CDMWF_AM_BW759ID58ST5YEEV6WUCN5744MN763
(Refer page no. 1 & 14)

A.6. Registration date of the project activity:

>>

27/10/2008³**A.7. Crediting period of the project activity and related information (start date and choice of crediting period):**

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27 October 2008 to 26 October 2018 (Fixed).

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

>>

Contact Information of responsible person(s)/entity(ies) is given in the table below:

Organization:	Enercon (India) Ltd.
Street/P.O.Box:	A-9, Veera Industrial Estate, Veera Desai Road, Andheri (West)
Building:	Enercon Towers
City:	Mumbai
State/Region:	Maharashtra
Postfix/ZIP:	400 053
Country:	India
Telephone:	+91-22-66924848
FAX:	+91-22-66921175
E-Mail:	yogesh.mehra@enerconindia.net
URL:	
Represented by:	
Title:	Managing Director
Salutation:	Mr.
Last Name:	Mehra
Middle Name:	
First Name:	Yogesh
Department:	Corporate
Mobile:	
Direct FAX:	+91-22-66921175
Direct tel:	+91-22-66924848
Personal E-Mail:	yogesh.mehra@enerconindia.net

Organization:	Coöperatieve Centrale Raiffeisen-Boerenleenbank B.A. (trading as Rabo Bank International)
Street/P.O.Box:	One Queenhithe, Thames Court, EC4V3RL
Building:	
City:	London,
State/Region:	
Postfix/ZIP:	
Country:	United Kingdom of Great Britain and Northern Ireland
Telephone:	+4476649716
FAX:	+4478093552
E-Mail:	
URL:	
Represented by:	
Title:	

³ <http://cdm.unfccc.int/Projects/DB/DNV-CUK1185356859.49/view>

Salutation:	Mr.
Last Name:	Carratu
Middle Name:	
First Name:	Domenic
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	Domenic.Carratu@Rabobank.com

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

>>

The project activity consists of 86 machines (800 kW) of Enercon make E-48. The first machine under the project activity was commissioned on 29 September 2006 and last machine under the project activity was commissioned on 28 December 2006. Project activity WEGs were commissioned in three phases between 29 September 2006 & 28 December 2006. 56 WEGs under phase-I were commissioned on 29 Sep 2006, 9 WEGs under phase-II were commissioned on 26 Oct 2006 & 21 WEGs under phase-III were commissioned on 28 Dec 2006. The commissioning dates for all the machines include in the project activity are given in the table below.

Loc. no.	Unique Identification Number	Date of Commissioning
1	EWHPL 01	26-Oct-06
2	EWHPL 02	26-Oct-06
3	EWHPL 03	26-Oct-06
4	EWHPL 04	28-Dec-06
5	EWHPL 05	28-Dec-06
6	EWHPL 06	28-Dec-06
7	EWHPL 07	28-Dec-06
8	EWHPL 08	28-Dec-06
9	EWHPL 09	28-Dec-06
10	EWHPL 10	29-Sep-06
11	EWHPL 11	29-Sep-06
12	EWHPL 12	29-Sep-06
13	EWHPL 13	29-Sep-06
14	EWHPL 14	29-Sep-06
15	EWHPL 15	29-Sep-06
16	EWHPL 16	29-Sep-06
17	EWHPL 17	29-Sep-06
18	EWHPL 18	29-Sep-06
19	EWHPL 19	29-Sep-06
20	EWHPL 20	29-Sep-06
21	EWHPL 21	29-Sep-06
22	EWHPL 22	29-Sep-06
23	EWHPL 23	29-Sep-06
24	EWHPL 24	29-Sep-06
25	EWHPL 25	29-Sep-06
26	EWHPL26	26-Oct-06
27	EWHPL 27	29-Sep-06
28	EWHPL 28	29-Sep-06

29	EWHPL 29	29-Sep-06
30	EWHPL 30	29-Sep-06
31	EWHPL 31	29-Sep-06
32	EWHPL 32	29-Sep-06
33	EWHPL 33	29-Sep-06
34	EWHPL 34	29-Sep-06
35	EWHPL 35	29-Sep-06
36	EWHPL 36	29-Sep-06
37	EWHPL 37	29-Sep-06
38	EWHPL 38	29-Sep-06
39	EWHPL 39	29-Sep-06
40	EWHPL 40	29-Sep-06
41	EWHPL 41	29-Sep-06
42	EWHPL 42	29-Sep-06
43	EWHPL 43	29-Sep-06
44	EWHPL 44	29-Sep-06
45	EWHPL 45	29-Sep-06
46	EWHPL 46	29-Sep-06
47	EWHPL 47	29-Sep-06
48	EWHPL 48	29-Sep-06
49	EWHPL 49	29-Sep-06
50	EWHPL 50	26-Oct-06
51	EWHPL 51	26-Oct-06
52	EWHPL 52	29-Sep-06
53	EWHPL 53	29-Sep-06
54	EWHPL 54	29-Sep-06
55	EWHPL 55	29-Sep-06
56	EWHPL 56	29-Sep-06
57	EWHPL 57	29-Sep-06
58	EWHPL 58	29-Sep-06
59	EWHPL 59	26-Oct-06
60	EWHPL 60	26-Oct-06
61	EWHPL 61	26-Oct-06
62	EWHPL 62	29-Sep-06
63	EWHPL 63	29-Sep-06
64	EWHPL 64	29-Sep-06
65	EWHPL 65	29-Sep-06
66	EWHPL 66	29-Sep-06
67	EWHPL 67	29-Sep-06
68	EWHPL 68	29-Sep-06
69	EWHPL 69	29-Sep-06
70	EWHPL 70	29-Sep-06
71	EWHPL 71	29-Sep-06
72	EWHPL 72	28-Dec-06
73	EWHPL 73	28-Dec-06
74	EWHPL 74	28-Dec-06
75	EWHPL 75	28-Dec-06
76	EWHPL 76	28-Dec-06
77	EWHPL 77	28-Dec-06
78	EWHPL 78	28-Dec-06
79	EWHPL 79	28-Dec-06
80	EWHPL 80	28-Dec-06
81	EWHPL 81	28-Dec-06
82	EWHPL 82	28-Dec-06

83	EWHPPL 83	28-Dec-06
84	EWHPPL 84	28-Dec-06
85	EWHPPL 85	28-Dec-06
86	EWHPPL 86	28-Dec-06

Enercon operation and maintenance activities are ISO 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. Further the performance report of project WEGs during the monitoring period including the down time, machine availability, grid availability, etc. has been added in appendix 2. During the monitoring period there were no events or situations occurred, which may impact the applicability of the methodology.

B.2. Revision of the monitoring plan

>>

There is a revision in Monitoring Plan which has been approved on date 15th March 2011 by UNFCCC.

B.3. Request for deviation applied to this monitoring period

>>

Not Applicable

B.4. Notification or request of approval of changes

>>

Not Applicable

SECTION C. Description of the monitoring system

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Approved monitoring methodology ACM0002 / Version 06 Sectoral Scope: 1, "Consolidated methodology for grid-connected electricity generation from renewable sources --- Version 6", 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. There are two main and check meters dedicated to project activity at 33 kV metering point for the project activity. The one set of main and check meter is connected to 56.8 MW and other set of the main and check meter is connected to 12 MW of the project activity. In addition to this there is one set of main and check meter (bulk meter) at 220 kV metering point at the Enercon substation is connected to the machines of the project activity and the machines commissioned by the other project developers. Therefore in order to determine the net electricity supplied to the grid by the project at 220 kV at the Enercon substation, the state utility applies the transmission loss to the meter reading recorded at the 33 kV metering point.

The transmission loss calculated by the state utility is endorsed / confirmed jointly by the representatives of Enercon and the state utility. The transmission loss applied to the project activity by the state utility is reflected in the JMR (Form B) recorded at 33kV metering point. Net electricity supplied to the grid is calculated by applying transmission loss to the meter readings taken at 33 kV metering location of the project activity.

The procedure for calculation of transmission loss as given in the PPA is set-out below:-

$$Z = \frac{(X1 + X2 + X3 + X4 + \dots + Xn) - Y}{(X1 + X2 + X3 + X4 + \dots + Xn)} \times 100$$

Where,

Z = Percentage transmission loss for export incurred in transmission line between the meters located at 33 kV metering point (including the machines of the project activity and other project developers) and the meters located at 220kV metering point (bulk meter: main and check) at high voltage side of receiving sub-station. **Refer Appendix 1 for schematic of the flow diagram.**

Summation of meter readings at 33 kV metering points for all the project developers connected to receiving substation (including the machines of the project activity and other project developers)

$$= (X1 + X2 + X3 + X4 + \dots + Xn)$$

Xi = Energy Export Reading (Xi) noted at energy meter installed at 33kV metering point where i vary from 1 to n which represents the meters connected to project activity and other project developers. X1, X2, X3,...Xn are the meters that are installed at 33kV metering point (including the machines of the project activity and other project developers) and further connected to the receiving substation at 220 kV by internally connected lines. **Refer Appendix 1 for schematic of the flow diagram**

Y = Energy Export Reading at bulk meter installed at high voltage side of transformer of the receiving sub-station at 220 kV connecting machines of the project activity and other project developers. **Refer Appendix 1 for schematic of the flow diagram.**

Energy Export by the project activity at 33 kV metering point is as follows:

$$EG_{\text{export}} = X1 + X2$$

Where, X1 & X2 is the export reading recording at 33kV metering points for project activity.

$$\text{Transmission Loss in Export (TE)} = \text{Transmission Loss (Z)} * \text{Energy Export at 33kV metering point (EG}_{\text{export}})$$

Empirical Formula for Energy Export after adjustment of transmission loss (Equation 1)

$$\text{Net Energy Export after adjustment of transmission loss} = EG_{\text{export}} - \text{Transmission Loss (TE)}$$

The transmission loss in export is generally less than 5%. However in case of Energy Import, the state utility conservatively applies adjustment of 15% to the import values noted at 33 kV metering point.

$$\text{Transmission Loss in Import (TI)} = 15\% * \text{Energy Import at 33kV metering point (EG}_{\text{import}})$$

Empirical Formula for Energy Import after adjustment of transmission loss (Equation 2)

$$\begin{aligned} \text{Net Energy Import after adjustment of transmission loss} &= EG_{\text{import}} + 15\% * EG_{\text{import}} \\ &= 115\% * EG_{\text{import}} \end{aligned}$$

Therefore Energy Supplied to Grid after adjustment of transmission loss is difference of equation 1 and 2 as given in the JMR (Form B) signed jointly by Enercon and the state utility.

$$EG_y = EG_{\text{export}} - 115\% * EG_{\text{import}} - \text{Transmission Loss (TE)}$$

The Joint meter reading noted at 33 kV metering location contains the following data:-

1. Electricity Export (EGexport)
2. Electricity Import (EGimport)
3. Transmission Loss (TE) between 33 kV metering point and 220 kV metering point at Enercon substation
4. Net Electricity supplied to the Grid $[EG_{\text{export}} - 115\% * EG_{\text{import}} - TE]$

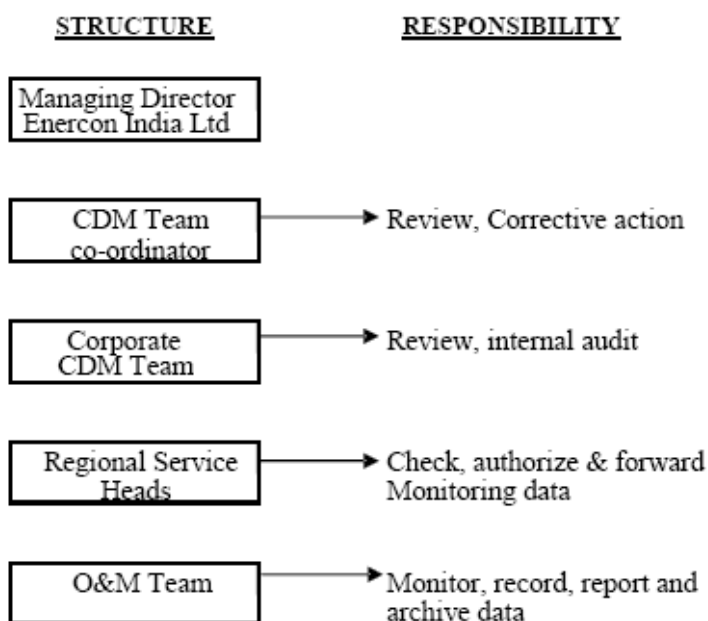
JMR is signed by the representatives of Enercon and the state utility. The meter readings (both export and import), transmission loss and net electricity supplied to the grid are recorded in the JMR (33 kV metering point). Hence all these values will be reproduced from the JMR for calculation of emission reductions.

In addition to the JMR (Form B) at 33kV metering location for the project activity, the following documents will also be provided to the DoE for verification:

1. JMR (Form B) at 220kV metering point (bulk meters: main and check) at Enercon substation
2. Transmission loss calculation endorsed / confirmed jointly by the representatives of Enercon and the state utility.

The net electricity supplied to the grid can be cross checked from the invoices raised on the state utility for supply of net electricity supplied to the grid. Refer Annex – 2 for an illustration of the provisions for measurement methods.

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



Calibrations Details of Meters:

The metering equipments were inspected & calibrated by State Utility. Meter details for the all the main and check meters are as follows:-

Parameter	Meter description	Meter Serial No.	Make	Accuracy class
KBCWP-01 (88.0 MW)	Main Meter	6605121	L&T	0.2
	Check Meter	6605122	L&T	0.2

KBCWP-02 (56.8 MW)	Main Meter	5389967	L&T	0.2
	Check Meter	5389970	L&T	0.2
KBCWP-03 (12 MW)	Main Meter	5463844	L&T	0.2
	Check Meter	5463845	L&T	0.2

Calibration details of meter during monitoring period are as follows:-

Parameter	Meter description	Meter Serial No.	Last dates of calibration before monitoring period	Calibration Dates during Monitoring Period			
				2009	2010	2011	Due date of Calibration
KBCWP-01 (88.0 MW)	Main Meter	6605121	29-Sep-09	29-Sep-09	25 June 10	10 June 11	9-Jun-12
	Check Meter	6605122					
KBCWP-02 (56.8 MW)	Main Meter	5389967	2-Jan-08	14-Dec-09	18 Oct 10	13-Apr-11	12-Apr-12
	Check Meter	5389970					
KBCWP-03 (12 MW)	Main Meter	5463844	6-Feb-08	-	16 Apr 10	13-Apr-11	12-Apr-12
	Check Meter	5463845					

The main and check meters are tested and in case of error, are calibrated by state utility.

We refer to the Guidelines For Assessing Compliance With The Calibration Frequency Requirements – Annex 60 to EB 52, Paragraph 4(a) states that where calibration is not carried out in line with the frequency mentioned in the monitoring plan, as a conservative approach, the energy export and import values (as mentioned in the JMR) can be considered after applying the maximum possible value of error of the instrument to the measured values.

Since the latest test certificates for main and check meters for KBCWP-03 between year 2008 to 2010 wasn't done annually, and calibration certificate dated 16 April 2010 clearly show that meters are performing within their accuracy class, in accordance with Annex 60, EB 52 we have applied a correction factor of +0.2% for imports & transmission loss and -0.2% for exports for the period of Dec 2009 to April 2010. Similarly for the main and check meters for KBCWP-02 there is a delay of calibration during the month of Dec 2009, hence being conservative PP has applied correction factor of +0.2% for imports & transmission loss and -0.2% for exports for the period of Dec 2009.

The line diagram showing all relevant monitoring points for the project activity has been given in Appendix 1.

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

Data / Parameter:	$EF_{CM,r}$
Data unit:	tCO ₂ e/MWh
Description:	Combined Margin Emission Factor of Southern 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” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</p>
Value(s) :	= 0. 93204
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions
Additional comment:	None

Data / Parameter:	$EF_{OM,V}$						
Data unit:	tCO2e/MWh						
Description:	Operating Margin Emission Factor of Southern 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” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</p>						
Value(s) :	<table border="1"> <tr> <td>2002 – 03</td><td>0.9970</td></tr> <tr> <td>2003 – 04</td><td>1.0094</td></tr> <tr> <td>2004 – 05</td><td>1.0038</td></tr> </table>	2002 – 03	0.9970	2003 – 04	1.0094	2004 – 05	1.0038
2002 – 03	0.9970						
2003 – 04	1.0094						
2004 – 05	1.0038						
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions						
Additional comment:	None						

Data / Parameter:	$EF_{BM,V}$		
Data unit:	tCO2e/MWh		
Description:	Build Margin Emission Factor of Southern 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” is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm</p>		
Value(s) :	<table border="1"> <tr> <td>2004 – 05</td><td>0.718</td></tr> </table>	2004 – 05	0.718
2004 – 05	0.718		
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline Emissions		
Additional comment:	None		

Please refer Annex 1 for combined margin calculation.

D.2. Data and parameters monitored

>>

Data / Parameter:z	EGy
Data unit:	MWh (Mega-Watt hour)
Description:	Net electricity supplied to the grid by the Project
Source of data to be used:	Electricity supplied to the grid as per two joint meter readings (Form B) taken at 33 kV metering point.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	Annual electricity supplied to the grid by the Project = 186478.770 MWh ((This value is arrived after adjusting the EG_{export} , EG_{import} and T_E for the delayed calibration period inline with EB 52 Annex 60)
Description of measurement methods and procedures to be applied:	<p>Monitoring: The procedures for metering and meter reading will be as per the provisions of the power purchase agreement and details of metering has been explained in monitoring plan in section C. Metering system for the project activity consists of two sets of main and check meters at 33 kV metering location. Both sets of meters are two-way trivector meters capable of recording import and export of electricity.</p> <p>In addition to this there is one set of main and check meter (bulk meter) at 220 kV metering point at the Enercon (India) Ltd. (hereafter referred as “Enercon” in the revised monitoring plan) substation. The bulk meter is connected to the machines of the project activity and the machines commissioned by the other project developers. Therefore in order to determine the net electricity supplied to the grid by the project activity at high voltage (220 kV) side of Enercon substation, the KPTCL/Discom (hereafter referred as “state utility” in the revised monitoring plan) applies the transmission loss between 220 kV metering point at Enercon substation at Dasudi village and meter reading recorded at the 33 kV metering points for all the machines that are connected to 220 kV bulk meter at Enercon substation. The transmission loss calculated by the state utility is endorsed / confirmed jointly by the representatives of Enercon and the state utility. The transmission loss applied to the project activity by the state utility is reflected in the JMR (Form B) recorded at 33kV metering point. Refer Appendix 1 for location of metering points at 33kV and 220 kV.</p> <p>Frequency of recording data: Monthly</p> <p>Recording: The values of net electricity supplied to the grid is sourced from two JMR for 56.8 MW and 12 MW at 33 kV metering point.</p> <p>Responsibility: Joint responsibility of Enercon and state utility.</p> <p>Refer section C and Annex – 2 for an illustration of the provisions for measurement methods.</p>
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility pursuant to the provisions of the power purchase agreement except or otherwise explicitly stated in the PDD. The values of net electricity supplied to the grid mentioned in the two JMRs of the project for 56.8 MW and 12 MW at 33kV metering point can be cross checked with values mentioned in the invoice raised on the state utility. Refer Annex – 2 for an illustration of the provisions for QA/QC procedures. Refer Appendix 1 for location of metering points at 33kV and 220 kV.
Any comment:	The will be archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period. During the current monitoring there was a delay in annual calibration and in accordance with Annex 60, EB 52

	we have applied a correction factor of +0.2% for imports & transmission loss and -0.2% for exports values (refer Section C for details). The value of EGy has been derived after applying error correction factor due to delayed calibration.
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Data / Parameter:	EGexport
Data unit:	MWh (Mega-Watt hour)
Description:	Summation of electricity Export recorded at meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two JMR issued by BESCOM for 56.8 MW and 12 MW at 33 kV metering point.
Source of data to be used:	Electricity export to the grid as per two joint meter readings (FormB) taken at 33 kV metering point.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	=188706.750 MWh (This value is taken from JMR)
Description of measurement methods and procedures to be applied:	Monitoring: Electricity export to the grid will be recorded by the meters (two main and two check) connecting 86 turbines at 33kV point. Refer section C and Annex – 2 for an illustration of the provisions for measurement methods. Frequency of recording data: Monthly Recording: The values electricity export to the grid is sourced from two JMR for 56.8 MW and 12 MW at 33 kV metering point. Responsibility: Joint responsibility of Enercon and state utility
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer Annex – 2 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data will be archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period. During the current monitoring there was a delay in annual calibration and in accordance with Annex 60, EB 52 we have applied a correction factor of +0.2% for imports & transmission loss and -0.2% for exports values (refer Section C for details).

Data / Parameter:	EGimport
Data unit:	MWh (Mega-Watt hour)
Description:	Summation of electricity Import recorded at the meters (two main and two check) connecting 86 machines of the project activity and can be sourced from two JMR issued by BESCOM for 56.8 MW and 12 MW at 33 kV metering point.
Source of data to be used:	Electricity import from the grid as per two joint meter reading taken at 33kV metering point.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	=76.800 MWh (This value is taken from JMR)
Description of measurement methods and procedures to be applied:	Monitoring: Electricity import from the grid will be recorded by meters (two main and two check) connected to the 86 machines at 33kV point. Refer section C and Annex – 2 for an illustration of the provisions for measurement methods.

	<p>Frequency of recording data: Monthly</p> <p>Recording: The values electricity import to the grid is sourced from two JMR for 56.8 MW and 12 MW at 33 kV metering point.</p> <p>Responsibility: Joint responsibility of Enercon and state utility</p>
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP except or otherwise explicitly stated in the PDD. Refer section C. Annex – 2 for an illustration of the provisions for QA/QC procedures.
Any comment:	<p>The data will be archived on electronic media as well as on paper. The archive will be kept for the period up to two years after the completion of the crediting period.</p> <p>During the current monitoring there was a delay in annual calibration and in accordance with Annex 60, EB 52 we have applied a correction factor of +0.2% for imports & transmission loss and -0.2% for exports values (refer Section C for details).</p>

Data / Parameter:	T_E
Data unit:	MWh (Mega-Watt hour)
Description:	Transmission loss for export between the metering location at 33 kV point and the metering location at 220 kV at the Enercon substation.
Source of data to be used:	Transmission Loss for export will be sourced from the joint meter reading (Form B) taken at 33kV metering point for the project activity.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	<p>=2119.615 MWh</p> <p>(This value is taken from JMR)</p>
Description of measurement methods and procedures to be applied:	<p>Monitoring: Transmission loss between metering location at 33 kV and the metering location at 220 kV at Enercon substation is applied to the meter reading taken at meters connected at 33 KV point for the project activity.</p> <p>Enercon Substation is connected to the machines of the project activity and the machines commissioned by the other project owners. Therefore transmission loss is applied by the state utility as reflected in the JMR (Form B) taken at 33kV point. The JMR is signed by the representatives of Enercon and the state utility. Refer section C and Annex – 2 for an illustration of the provisions for measurement methods.</p> <p>Frequency of recording data: Monthly</p> <p>Recording: The value of transmission loss is sourced from two JMR for 56.8 and 12 MW at 33 kV metering point.</p> <p>Responsibility: Joint responsibility of Enercon and state utility</p> <p>Refer section C and Annex – 2 for an illustration of the provisions for measurement methods.</p>
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by state utility and the PP. Refer section C and Annex – 2 for an illustration of the provisions for QA/QC procedures.
Any comment:	<p>The data will be stored in hard format and values will be taken from JMR.</p> <p>During the current monitoring there was a delay in annual calibration and in accordance with Annex 60, EB 52 we have applied a correction factor of +0.2% for imports & transmission loss and -0.2% for exports values (refer Section C for details). The value of EGy has been derived</p>

after applying error correction factor due to delayed calibration.

The data will be stored in hard format and soft format by PP (Enercon) at the project site office. Joint meter reading is taken in the presence of the persons representing Enercon [Operation and Maintenance Contractor]. The archive 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

>>

“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, tCO₂e

EG_y is the net electricity supplied to the grid in year y and is applied directly from JMR (Form B) certified by state utility. This value can also be cross checked from the invoice.

EF_y is the CO₂ emission factor of the grid (932.04 tCO₂e/GWh fixed ex-ante).

1) Generation details for meter KBCWP-02 (56.8 MW)

Months	Export (kWh)	Import (kWh)	Transmissi on loss (kWh)	Error correction factor due to delayed calibration *	Net Export to grid as per JMR (kWh)	Net Export to grid (kWh) after applying error correction due to delayed calibration	Net electricity supplied to the grid by the Project** (kWh)
	[EGexport]	[EGimport]	[TE]				[EGy]
1-Dec-09 to 31-Dec-09	5418750	3750	74941	0.20%	5339496	5328500	5328500
1-Jan-10 to 31-Jan-10	4020000	3750	51376		3964312	3964311	3964311
1-Feb-10 to 28-Feb-10	3176250	0	56156		3120094	3120094	3120094
1-Mar-10 to 31-Mar-10	4927500	3750	75933		4847255	4847254	4847254
1-Apr-10 to 30-Apr-10	4530000	3750	64190		4461497	4461497	4461497
1-May-10 to 31-May-10	3941250	3750	52813		3884125	3884124	3884124
1-June-10 to 30-June-10	11235000	0	139988		11095012	11095012	11095012
1-July-10 to 31-July-10	13387500	0	155161		13232339	13232339	13232339
1-Aug-10 to 31-Aug-10	11853750	0	153032		11700718	11700718	11700718
1-Sep-10 to 30-Sep-10	7530000	3750	107604		7418084	7418083	7418083
1-Oct-10 to	5043750	3750	69906		4969531	4969531	4969531

31-Oct-10							
1-Nov-10 to 30-Nov-10	3618750	7500	53449		3556676	3556676	3556676
1-Dec-10 to 31-Dec-10	4365000	0	60062		4304938	4304938	4304938
1-Jan-11 to 31-Jan-11	4867500	3750	72574		4790613	4790613	4790613
1-Feb-11 to 28-Feb-11	4245000	3750	47586		4193101	4193101	4193101
1-Mar-11 to 31-Mar-11	4818750	3750	60572		4753866	4753865	4753865
1-Apr-11 to 30-Apr-11	3727500	3750	22253		3700934	3700934	3700934
1-May-11 to 31-May-11	7650000	3750	76347		7569340	7569340	7569340
1-June-11 to 30-June-11	18187500	0	37830		18149670	18149670	18149670
1-July-11 to 31-July-11	18172500	0	198444		17974056	17974056	17974056
1-Aug-11 to 31-Aug-11	14947500	0	159490		14788010	14788010	14788010

** Based on guidelines for assessing compliance with the calibration frequency requirement (EB 52 annex 60)*

*** Minimum of Net Export values sourced from JMR & Net Export to grid after applying error correction due to delayed calibration*

2) Generation details for meter KBCWP-03 (12 MW)

Months	Export (kWh)	Import (kWh)	Transmission loss (kWh)	Error correction factor due to delayed calibration *	Net Export to grid as per JMR (kWh)	Net Export to grid (kWh) after applying error correction due to delayed calibration	Net electricity supplied to the grid by the Project** (kWh)
	[EGexport]	[EGimport]	[TE]				[EGy]
1-Dec-09 to 31-Dec-09	985500	900	13629	0.20%	970836	968836	968836
1-Jan-10 to 31-Jan-10	1001700	900	12802	0.20%	987863	985832	985832
1-Feb-10 to 28-Feb-10	945900	1800	16724	0.20%	927106	925177	925177
1-Mar-10 to 31-Mar-10	1163700	900	17933	0.20%	1144732	1142367	1142367
1-Apr-10 to 30-Apr-10	347400	5400	4923	0.20%	336267	335550	335550
1-May-10 to 31-May-10	681300	900	9129		671136	671136	671136
1-June-10 to 30-June-10	2060100	900	25669		2033396	2033396	2033396
1-July-10 to 31-July-10	1939500	0	22479		1917021	1917021	1917021
1-Aug-10 to 31-Aug-10	1872900	900	24179		1847686	1847686	1847686
1-Sep-10 to	1266300	900	18095		1247170	1247170	1247170

30-Sep-10							
1-Oct-10 to 31-Oct-10	1035000	900	14345		1019620	1019620	1019620
1-Nov-10 to 30-Nov-10	853200	1800	12602		838528	838528	838528
1-Dec-10 to 31-Dec-10	877500	900	12074		864391	864391	864391
1-Jan-11 to 31-Jan-11	1117800	900	16666		1100099	1100099	1100099
1-Feb-11 to 28-Feb-11	999000	900	11199		986766	986766	986766
1-Mar-11 to 31-Mar-11	1275300	1800	16031		1257199	1257199	1257199
1-Apr-11 to 30-Apr-11	773100	1800	4615		766415	766415	766415
1-May-11 to 31-May-11	1356300	1800	13536		1340694	1340694	1340694
1-June-11 to 30-June-11	3265200	0	6792		3258408	3258408	3258408
1-July-11 to 31-July-11	2885400	0	31509		2853891	2853891	2853891
1-Aug-11 to 31-Aug-11	2340900	0	24977		2315923	2315923	2315923

** Based on guidelines for assessing compliance with the calibration frequency requirement (EB 52 annex 60)*

*** Minimum of Net Export values sourced from JMR & Net Export to grid after applying error correction due to delayed calibration*

Baseline Emission Reductions calculation for project activity:-

Months	Net electricity supplied to the grid by the Project 68.8 [kWh] *	Baseline Emission Factor (tCO ₂ e/MWh)	Baseline Emissions (tCO ₂ e)
	[EGy]	[EFy]	[BEy]
1-Dec-09 to 31-Dec-09	6297.34	0.93204	5869
1-Jan-10 to 31-Jan-10	4950.14	0.93204	4613
1-Feb-10 to 28-Feb-10	4045.27	0.93204	3770
1-Mar-10 to 31-Mar-10	5989.62	0.93204	5582
1-Apr-10 to 30-Apr-10	4797.05	0.93204	4471
1-May-10 to 31-May-10	4555.26	0.93204	4245
1-June-10 to 30-June-10	13128.41	0.93204	12236
1-July-10 to 31-July-10	15149.36	0.93204	14119
1-Aug-10 to 31-Aug-10	13548.40	0.93204	12627
1-Sep-10 to 30-Sep-10	8665.25	0.93204	8076
1-Oct-10 to 31-Oct-10	5989.15	0.93204	5582
1-Nov-10 to 30-Nov-10	4395.20	0.93204	4096
1-Dec-10 to 31-Dec-10	5169.33	0.93204	4817
1-Jan-11 to 31-Jan-11	5890.71	0.93204	5490
1-Feb-11 to 28-Feb-11	5179.87	0.93204	4827
1-Mar-11 to 31-Mar-11	6011.06	0.93204	5602
1-Apr-11 to 30-Apr-11	4467.35	0.93204	4163

1-May-11 to 31-May-11	8910.03	0.93204	8304
1-June-11 to 30-June-11	21408.08	0.93204	19953
1-July-11 to 31-July-11	20827.95	0.93204	19412
1-Aug-11 to 31-Aug-11	17103.93	0.93204	15941
	186478.77	Total	1,73,795

** Minimum of Net Export values sourced from JMR & Net Export to grid after applying error correction due to delayed calibration*

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 **173,795 tCO₂**.

Total baseline emissions: tCO₂

Total project emissions: Zero

Total leakage: Zero

$$\begin{aligned}
 \text{Emission reductions } \quad E R_y &= B E_y - P E_y \\
 &= \mathbf{173,795 \text{ tCO}_2}
 \end{aligned}$$

Months	Baseline Emissions [tCO ₂ e]	Project Emissions [tCO ₂ e]	Emission Reductions [tCO ₂ e]
	[BE _y]	[PE _y]	[ER _y] = [BE _y] - [PE _y]
1-Dec-09 to 31-Dec-09	5869	0	5,869
1-Jan-10 to 31-Jan-10	4613	0	4,613
1-Feb-10 to 28-Feb-10	3770	0	3,770
1-Mar-10 to 31-Mar-10	5582	0	5,582
1-Apr-10 to 30-Apr-10	4471	0	4,471
1-May-10 to 31-May-10	4245	0	4,245
1-June-10 to 30-June-10	12236	0	12,236
1-July-10 to 31-July-10	14119	0	14,119
1-Aug-10 to 31-Aug-10	12627	0	12,627
1-Sep-10 to 30-Sep-10	8076	0	8,076
1-Oct-10 to 31-Oct-10	5582	0	5,582
1-Nov-10 to 30-Nov-10	4096	0	4,096
1-Dec-10 to 31-Dec-10	4817	0	4,817
1-Jan-11 to 31-Jan-11	5490	0	5,490

1-Feb-11 to 28-Feb-11	4827	0	4,827
1-Mar-11 to 31-Mar-11	5602	0	5,602
1-Apr-11 to 30-Apr-11	4163	0	4,163
1-May-11 to 31-May-11	8304	0	8,304
1-June-11 to 30-June-11	19953	0	19,953
1-July-11 to 31-July-11	19412	0	19,412
1-Aug-11 to 31-Aug-11	15941	0	15,941
Total (tCO ₂ e)	173,795	0	173,795

Total Emission Reductions for the monitoring period are **173795**.

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)	260,501 (21 months equivalent of annually 148,858 emission reductions estimated in the registered PDD)	173,795

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

>>

There is change of 33.28% (downside) 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.

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		

Annex 1

BASELINE INFORMATION

The Operating Margin data for the most recent three years and the Build Margin data for the Southern Region Electricity Grid as published in the CEA database version 1.1⁴ are as follows:

Simple Operating Margin

	tCO₂e/GWh
Simple Operating Margin - 2002-03	997.02
Simple Operating Margin - 2003-04	1,009.37
Simple Operating Margin - 2004-05	1,003.76
Average Operating Margin of last three years	1,003.38

Build Margin

	tCO₂e/GWh
Build Margin- 2004-05	717.99

Combined Margin calculations

	Weights	tCO₂e/GWh
Operating Margin	0.75	1003.38
Build Margin	0.25	717.99
Combined Margin		932.04

Detailed information on calculation of Operating Margin Emission Factor and Build Margin Emission Factor is available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm.

⁴ http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm

Annex 2

MONITORING INFORMATION

- **Metering:** Net electricity supplied to the grid is metered jointly by state utility and Enercon through two sets of main and check meters at 33 kV metering point connecting exclusively the machines of project activity after adjusting for transmission loss.

In addition to this there is one set of main and check meter (Bulk meter) at 220 KV metering point at Enercon substation covering machines of the project activity and machines of other project developers. The schematic diagram indicating location of meters at 33 kV and 220 kV metering points for the project activity is attached as Appendix 1.

- **Metering Equipment:** Metering system for the project activity consists of two sets of main and checks meters at 33kV metering point and one set of main and check meters at 220 kV metering point. All the meters are **two-way Trivector meters capable of recording import and export of electricity**. The meters installed are capable of recording and storing half hourly readings of all electrical parameters for a minimum period of 35 days with digital output.
- **Meter Readings:** The electricity supplied to the grid is recorded by taking two JMRs at 56.8 MW and 33 MW at 33kV metering point in the presence of representatives of state utility and Enercon. The JMRs at 33kV metering point contains the value of energy exported, energy imported, transmission loss and net electricity supplied to the grid during the recording period. This JMR is certified by the Executive Engineer of the state utility and Enercon. These certified readings are then used to prepare the invoices to be raised on Discom. Thus the net electricity supplied to the grid as mentioned in the JMR can be crosschecked with the value mentioned in the invoices.
- **Inspection of Energy Meters:** All main and check energy meters and all associated instruments, transformers installed at the Project are of 0.2% accuracy class. Each meter is jointly inspected and sealed on behalf of the Parties and is not to be interfered with by either Party except in the presence of the other Party or its authorized representatives.

Meter Test Checking: All main and check meters are tested for accuracy with reference to a portable standard meter. The portable standard meter is owned by state utility. The main and check meters shall be deemed to be working satisfactorily if the errors are within specifications for meters of 0.2 accuracy class. The consumption registered by the main meters alone will hold good for the purpose of metering electricity supplied to the grid as long as the error in the main meters is within the permissible limits. All main & check meters connected at metering points with RR. No. KBCWP 01 (220kV metering point), KBCWP 02 (33kV metering point) & KBCWP03 (33kV metering point) (please refer project layout Appendix 1) will be tested / calibrated for accuracy annually by either of KPTCL or BESCOM based on the availability of EB officials. KPTCL is a transmission utility and BESCOM is distribution licensee in the state of Karnataka.

If during the meter test checking,

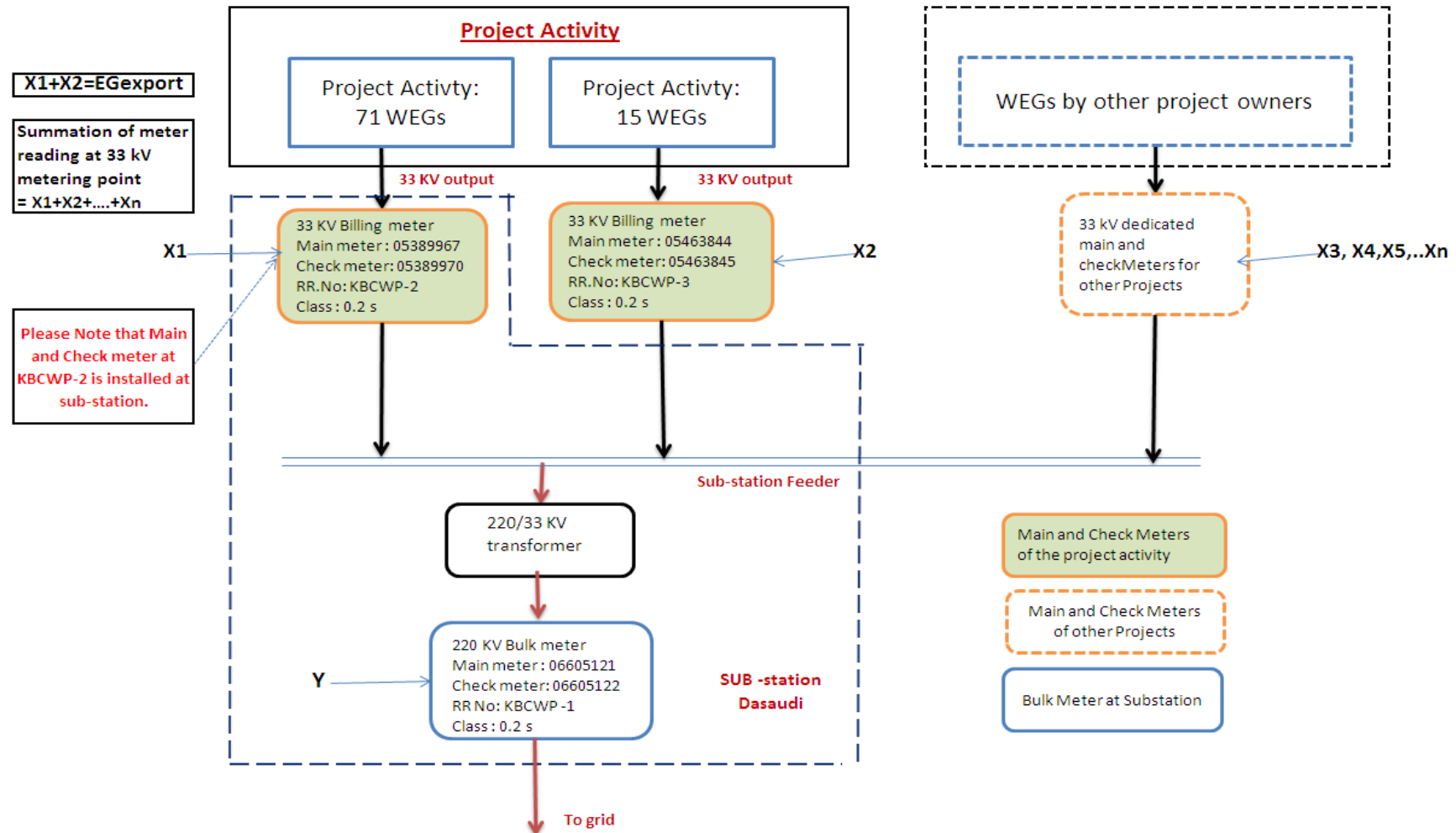
- The main meter is found to be within the permissible limit of error and the corresponding check meter is beyond the permissible limits, then the meter reading will be as per the main meter as usual. The check meter shall, however, be calibrated immediately.
- The main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible of error, then the meter reading for the month up to the date and time of such test shall be as per the check meter. There will be a revision in the meter reading for the period from the previous calibration test up to the current test based on the readings of the check meter. The main meter shall be calibrated immediately and meter reading

for the period thereafter till the next monthly meter reading shall be as per the calibrated main meter.

- Both the main meters and the corresponding check meters are found to be beyond the permissible limits of error, both the main meters shall be immediately calibrated and the correction applied to the reading registered by the main meter to arrive the correct reading of energy supplied for metering electricity supplied to the grid for the period from the last month's meter reading up to the current test. Meter reading for the period thereafter till the next monthly reading shall be as per the calibrated main meter.

The schematic showing the location of meters for the project activity is given in Appendix 1:

Appendix 1: Schematic for location of meters at 33kV metering points and the bulk meter at 220 kV at Enercon sub-station.



Appendix 2: WEG Performance Report⁵

State	KARNATAKA			WEG Performance Report						
WEG No.	Generation		Lack Of Wind (hh:mm:ss)	Down Time (hh:mm:ss)				Machine Availability (%)	Capacity Factor (%)	Grid Availability (%)
	KWh	Hrs (hh:mm:ss)		Machine		Grid				
				Fault	Shutdown	Fault	Shutdown			
Site: CK 6,KARNATAKA			ENERCON WINDFARMS (HINDUSTAN) PVT LIMITED						Total WEG : 15	
EWHPL-72	1832459	12408:00	1572:28:00	983:50:00	65:45:00	296:42:00	29:30:00	93.16	14.94	97.87
EWHPL-73	2082837	12526:00	1635:57:00	797:55:00	70:20:00	296:42:00	29:21:00	94.34	16.98	97.87
EWHPL-74	2119972	12553:00	1364:43:00	1041:30:00	70:30:00	296:42:00	29:30:00	92.75	17.28	97.87
EWHPL-75	2069973	12971:00	1603:28:00	393:05:00	66:20:00	296:42:00	29:30:00	97	16.87	97.87
EWHPL-76	2140023	13386:00	1525:13:00	59:55:00	43:20:00	296:42:00	29:30:00	99.33	17.44	97.87
EWHPL-77	1764555	12502:00	1915:35:00	538:30:00	71:53:00	296:42:00	29:30:00	96.02	14.38	97.87
EWHPL-78	1903571	12978:00	1910:03:00	71:20:00	53:30:00	296:42:00	29:30:00	99.19	15.52	97.87
EWHPL-79	2101900	13127:00	1550:28:00	303:20:00	48:25:00	296:42:00	29:30:00	97.71	17.13	97.87
EWHPL-80	2408811	13410:00	1520:43:00	34:45:00	46:15:00	296:42:00	29:30:00	99.47	19.63	97.87
EWHPL-81	2249533	12389:00	1389:08:00	1177:05:00	79:30:00	296:42:00	29:30:00	91.81	18.34	97.87
EWHPL-82	2241359	12786:00	1561:08:00	621:24:00	61:30:00	297:12:00	29:30:00	95.55	18.27	97.87
EWHPL-83	1631366	12454:00	1707:13:00	825:10:00	40:35:00	297:12:00	35:55:00	94.35	13.3	97.83
EWHPL-84	1617302	12761:00	1894:27:00	322:01:00	43:35:00	297:12:00	35:55:00	97.62	13.18	97.83
EWHPL-85	1686587	11916:00	1800:13:00	1262:00:00	46:05:00	297:07:00	35:55:00	91.47	13.75	97.83
EWHPL-86	1842121	12694:00	1752:48:00	523:20:00	53:55:00	297:12:00	35:55:00	96.24	15.01	97.83
Total	29692369	190861:00	24703:35	8955:10:00	861:28:00	4452:55:00	468:01:00	95.73	16.13	97.86
Site: CK 1-4,KARNATAKA			ENERCON WINDFARMS (HINDUSTAN) PVT LIMITED						Total WEG : 71	
EWHPL-01	2201130	13735:00	1158:25:00	41:00:00	63:30:00	329:40:00	13:05	99.32	17.94	97.77
EWHPL-02	2296458	13697:00	1234:25:00	20:00	44:30:00	329:40:00	13:05	99.58	18.72	97.77

⁵ WEG Performance report is provided by O & M contract ("Enercon").

EWHP-03	2231289	13510:00	1409:55:00	18:00	56:00:00	329:40:00	13:05	99.52	18.19	97.77
EWHP-04	2358798	13398:00	1504:15:00	41:00:00	54:20:00	329:40:00	13:05	99.38	19.23	97.77
EWHP-05	2438284	13540:00	1363:25:00	31:00:00	61:00:00	329:40:00	15:05	99.4	19.87	97.75
EWHP-06	2384018	13486:00	1420:30:00	24:00:00	63:00:00	329:40:00	15:05	99.43	19.43	97.75
EWHP-07	2116283	13316:00	1606:25:00	13:00	56:30:00	329:40:00	15:05	99.55	17.25	97.75
EWHP-08	1957685	13233:00	1645:20:00	55:00:00	58:30:00	329:40:00	15:05	99.26	15.96	97.75
EWHP-09	1920508	12852:00	2024:15:00	62:30:00	53:30:00	329:40:00	15:05	99.24	15.65	97.75
EWHP-10	2838520	13577:00	1281:40:00	58:00:00	60:30:00	315:40:00	43:50:00	99.23	23.14	97.66
EWHP-11	2836442	13648:00	1245:55:00	32:00:00	52:00:00	315:40:00	43:50:00	99.45	23.12	97.66
EWHP-12	2468487	13406:00	1434:55:00	70:00:00	71:00:00	315:40:00	43:50:00	99.08	20.12	97.66
EWHP-13	2323340	13323:00	1466:10:00	130:00:00	59:30:00	315:40:00	43:50:00	98.76	18.94	97.66
EWHP-14	2334258	13655:00	1161:35:00	111:00:00	50:00:00	315:40:00	43:50:00	98.95	19.03	97.66
EWHP-15	2310111	13632:00	1185:20:00	118:30:00	42:00:00	315:40:00	43:50:00	98.95	18.83	97.66
EWHP-16	2603355	13446:00	1419:00:00	42:00:00	84:10:00	315:40:00	29:50:00	99.18	21.22	97.75
EWHP-17	2583968	13619:00	1290:40:00	38:45:00	43:00:00	315:40:00	29:50:00	99.47	21.06	97.75
EWHP-18	2621718	13575:00	1362:10:00	19:00	46:30:00	315:40:00	29:50:00	99.57	21.37	97.75
EWHP-19	2770987	13626:00	1287:55:00	29:00:00	50:00:00	315:40:00	29:50:00	99.48	22.59	97.75
EWHP-20	2975211	13788:00	1127:40:00	27:00:00	55:00:00	315:40:00	26:50:00	99.47	24.25	97.77
EWHP-21	3054524	13795:00	1125:45:00	13:00	51:00:00	310:50:00	42:05:00	99.58	24.9	97.7
EWHP-22	3129410	13589:00	1297:00:00	39:00:00	60:00:00	310:50:00	42:05:00	99.35	25.5	97.7
EWHP-23	3093202	13814:00	1105:00:00	17:00	50:00:00	310:50:00	42:05:00	99.56	25.21	97.7
EWHP-24	3305490	13714:00	1176:25:00	26:30:00	69:15:00	310:50:00	42:05:00	99.38	26.94	97.7
EWHP-25	3329595	13818:00	1099:00:00	11:00	58:00:00	310:50:00	42:05:00	99.55	27.12	97.7
EWHP-26	3113400	13819:00	1072:45:00	47:00:00	49:15:00	310:50:00	42:05:00	99.37	25.38	97.7
EWHP-27	2863589	13321:00	1598:35:00	16:00	47:00:00	310:50:00	48:05:00	99.59	23.34	97.66
EWHP-28	2713194	13258:00	1632:55:00	52:40:00	44:00:00	310:50:00	55:15:00	99.37	22.11	97.61
EWHP-29	2673262	13327:00	1496:55:00	42:00:00	123:00:00	310:50:00	45:15:00	98.92	21.79	97.68
EWHP-30	2528296	13540:00	1375:20:00	14:00	56:00:00	310:50:00	46:45:00	99.54	20.61	97.67
EWHP-31	2586300	13647:00	1255:20:00	31:00:00	54:00:00	314:50:00	46:45:00	99.45	21.08	97.64

EWHP-32	2539920	13644:00	1299:50:00	10:00	34:00:00	314:50:00	46:45:00	99.71	20.7	97.64
EWHP-33	2553427	13680:00	1227:20:00	36:00:00	44:00:00	310:50:00	46:45:00	99.48	20.81	97.67
EWHP-34	2660914	13584:00	1334:50:00	20:50	49:00:00	310:50:00	40:45:00	99.54	21.69	97.71
EWHP-35	2720381	13734:00	1199:50:00	07:00	51:00:00	310:50:00	40:45:00	99.62	22.17	97.71
EWHP-36	2770795	13715:00	1198:20:00	43:00:00	32:00:00	310:50:00	40:45:00	99.51	22.58	97.71
EWHP-37	2524263	13535:00	1369:50:00	22:00	59:00:00	310:50:00	40:45:00	99.47	20.57	97.71
EWHP-38	2254818	13420:00	1482:05:00	43:00:00	41:15:00	310:50:00	40:45:00	99.45	18.38	97.71
EWHP-39	2199587	13502:00	1420:25:00	28:30:00	37:15:00	310:50:00	40:45:00	99.57	17.93	97.71
EWHP-40	2170983	13503:00	1397:20:00	38:30:00	48:30:00	310:50:00	40:45:00	99.43	17.7	97.71
EWHP-41	2041901	12964:00	1971:30:00	59:25:00	68:15:00	277:15:00	15:35	99.17	16.64	98.09
EWHP-42	1925965	12820:00	2072:05:00	87:45:00	68:35:00	273:45:00	15:35	98.98	15.7	98.11
EWHP-43	2073836	13092:00	1837:05:00	49:25:00	71:40:00	273:45:00	15:35	99.21	16.9	98.11
EWHP-44	2056448	13130:00	1815:00:00	43:25:00	66:10:00	273:45:00	15:35	99.29	16.76	98.11
EWHP-45	1947537	13087:00	1844:00:00	59:00:00	58:10:00	273:45:00	15:35	99.24	15.87	98.11
EWHP-46	1806662	13028:00	1891:55:00	66:20:00	62:45:00	273:45:00	16:05	99.16	14.73	98.11
EWHP-47	2093713	13100:00	1799:50:00	62:30:00	90:15:00	273:45:00	11:55	99	17.07	98.14
EWHP-48	2058284	13153:00	1801:10:00	37:35:00	60:45:00	273:45:00	11:55	99.36	16.78	98.14
EWHP-49	1951560	13049:00	1900:10:00	48:45:00	66:05:00	278:00:00	11:55	99.25	15.91	98.11
EWHP-50	2285196	13428:00	1422:45:00	87:35:00	59:30:00	260:25:00	79:20:00	98.94	18.63	97.88
EWHP-51	2348499	13415:00	1489:30:00	31:15:00	63:20:00	260:25:00	79:20:00	99.28	19.14	97.88
EWHP-52	2040385	13377:00	1522:05:00	27:35:00	72:55:00	260:25:00	79:20:00	99.25	16.63	97.88
EWHP-53	2123755	13364:00	1558:30:00	28:10:00	48:00:00	260:25:00	79:20:00	99.4	17.31	97.88
EWHP-54	2131829	13574:00	1346:55:00	25:45:00	51:45:00	260:25:00	81:10:00	99.4	17.38	97.87
EWHP-55	2154712	13312:00	1480:20:00	127:20:00	85:20:00	260:45:00	80:20:00	98.51	17.56	97.87
EWHP-56	1957776	13322:00	1559:10:00	57:00:00	59:00:00	260:45:00	80:50:00	99.15	15.96	97.86
EWHP-57	1796210	13229:00	1673:35:00	31:40:00	65:25:00	261:05:00	77:50:00	99.27	14.64	97.88
EWHP-58	1823893	13387:00	1510:35:00	41:55:00	61:35:00	260:45:00	76:50:00	99.23	14.87	97.89
EWHP-59	2009353	13251:00	1447:50:00	102:10:00	201:50:00	260:45:00	74:20:00	97.92	16.38	97.91
EWHP-60	2032573	13513:00	1399:25:00	37:50:00	53:10:00	261:10:00	74:20:00	99.31	16.57	97.9

EWHP-61	2165192	13220:00	1526:25:00	234:00:00	61:20:00	261:30:00	52:05:00	98.07	17.65	97.95
EWHP-62	1938487	13310:00	1588:50:00	64:30:00	65:10:00	261:30:00	53:00:00	99.15	15.8	97.95
EWHP-63	1907735	13351:00	1536:20:00	77:05:00	59:40:00	261:30:00	53:00:00	99.1	15.55	97.95
EWHP-64	1871427	13347:00	1594:10:00	30:15:00	55:00:00	261:30:00	53:00:00	99.44	15.25	97.95
EWHP-65	1762602	13228:00	1702:45:00	35:05:00	62:10:00	263:00:00	53:00:00	99.36	14.37	97.94
EWHP-66	1712635	13060:00	1821:15:00	81:40:00	61:40:00	263:00:00	53:00:00	99.06	13.96	97.94
EWHP-67	1758870	13285:00	1637:00:00	47:35:00	56:25:00	263:00:00	53:00:00	99.32	14.34	97.94
EWHP-68	1748890	13191:00	1734:42:00	21:33	78:25:00	263:00:00	53:00:00	99.34	14.26	97.94
EWHP-69	1703168	13308:00	1596:10:00	67:15:00	55:55:00	263:00:00	53:00:00	99.19	13.88	97.94
EWHP-70	1699508	13167:00	1686:25:00	88:10:00	84:20:00	263:00:00	53:00:00	98.87	13.85	97.94
EWHP-71	1821948	13377:00	1490:45:00	94:10:00	69:40:00	260:45:00	52:05:00	98.93	14.85	97.96
Total	164106749	952460:00	105052:57	3492:28:00	4326:15:00	20887:35	2984:10:00	99.27	18.84	97.82