MONITORING REPORT

"Enercon Wind Farm (Hindustan) Ltd in Karnataka"

UNFCCC Reference No: 1259

Registration date: 27th October 2008

Monitoring Period: From **27/10/2008** to **30/11/2009** (*Inclusive of both the days*)

Total Emission Reduction in monitoring period: **114,429** tCO_2e

Version 2.0

Date: **30th December 2009**

Prepared By: Enercon (India) Limited

Project Title: Enercon Wind Farm (Hindustan) Ltd in Karnataka

Project Type: I– Renewable Energy Projects

Methodology: ACM0002 Version 6.0 (19 May 2006), Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources.

Date of CDM Project Registration: 27/10/2008

Web-link of this registered project activity in UNFCCC:
http://cdm.unfccc.int/Projects/DB/DNV-CUK1185356859.49/view

Project ID: 1259

Date: 30/12/2009

Project Participants:

Name of Party involved ((host) indicates a host Party)	**Private and/or public entity (ies) project participants (*) (as applicable)**	**Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)**
Government of India (Host)	Enercon (India) Ltd	No

Project Location:

Tumkur & Chitradurga Districts in the state of Karnataka

Monitoring Periods:

Start date: 27th October 2008[1]
End date: 30th November 2009

Crediting Period: From 27th October 2008 to 26th October 2018 (Fixed)

[1] Inclusive of both start and end days

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1. Introduction

The purpose of this Monitoring Report is to calculate the emission reductions achieved by the project activity in the period covered by this report, and to serve as the basis for the verification of these reductions and issuance of the CERs.

The Project is connected to the KPTCL 220/66/11 kV substation at Hiriyur village. Electricity supplied to the grid is metered by the Parties (KPTCL & Enercon officials) at the high voltage side of the step up transformer installed at the Project Site.

The meters will be jointly inspected/tested periodically as per the terms of the PPA. Joint inspection and testing will also be carried out as and when difference in monthly meter readings exceeds the sum of maximum error as per accuracy class of main and back up meters.

The Net electricity supplied to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of Officials from off-taking Utility and Enercon India Limited. The Joint meter reading contains the value of energy imported and exported and the net export to the grid during the recording period. This Joint meter reading is certified by the Executive engineer of the utility and by Enercon Officials. The DISCOM officials to prepare the tariff invoices then use these certified readings. Thus the sole monitoring parameter for the project activity is the net electricity supplied to the grid as mentioned in the JMR, which will be crosschecked with the value mentioned in the invoices.

1.1 Monitoring period

From 27th October 2008 to 30th November 2009

1.2 Project Crediting Period: From 27th October 2008 to 26th October 2018 (Fixed)

2. Project description

2.1 Title

Enercon Wind Farm (Hindustan) Ltd in Karnataka

2.2 UNFCCC Reference Number

1259

2.3 Project summary

2.3.1 Objective of the Project: The objective is development, design, engineering, procurement, finance, construction, operation and maintenance of Enercon Wind Farm (Hindustan) Ltd. (EWHPL) 68.8 MW wind power project ("Project") in the Indian state of Karnataka 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 fossil fuel based electricity generation plants. The project is expected to supply 159,712 MWh of electricity. The project in the Monitoring period has supplied 122,779 MWh of electricity.

2.3.2 Nature of Project: The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources which ultimately leads to sustainable economic and environmental development. Enercon (India) Ltd ("Enercon") will be the equipment supplier and the operations and maintenance contractor for the Project. The generated electricity will be supplied to Karnataka Power Transmission Company Ltd ("KPTCL")/ Bangalore Electricity Supply Company Ltd ("BESCOM") under a long-term Power Purchase Agreement (PPA). 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 totaling to the capacity of 68.8 MW. The Project considered harness renewable resources in the region, thereby displacing non-renewable natural resources and ultimately leading to sustainable, economic and environmental development. Enercon (India) Ltd ("Enercon" or "EIL") is the equipment supplier and the operations and maintenance contractor for the Project.

2.3.3 Project Location: The site is located at a distance of 200 km from Bangalore by road. The nearest railway station is Bangalore. The Project consists of 86 E-48 WECs of 800 kW each. The turbines are uniquely identified as EWFHL-01 to EWFHL-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 No. of WEG's		**86**

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

S.No..	WEG Unique Identification Number	Location No.	Latitude			Longitude		
			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

Location Map of project activity is attached in annex 2 of monitoring report.

2.3.4 Project Performance: The project has supplied 122.779 GWh of electricity to the grid in the monitoring period which indicates that the project has performed reasonably during the monitoring period (27 October 2008 to 30 Nov 2009). The details of the net electricity exported to the grid for the monitoring period is detailed as follows:

Year	Electricity Exported (kWH)
27 October 2008* to 31 December 2008	13,525,143
01 January 2009 to 30 November 2009	109,254,573
Total Electricity exported in the given monitoring period (GWh)	**122,779,716**

Note: * Joint Meter Reading is generated on 1st day of every month. Carving out generation details for only 4 days i.e., from 27/10/2008 to 31/10/2008 is difficult. Hence, the project proponent wishes to forego the generation for those 4 days for the purpose of simplicity in the calculation of Emission reductions during this Verification.

2.4 Category of project activity

Methodology: ACM0002 Version 6.0 (19 May 2006), Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources.

Sectoral scope : 1, Energy Industries (renewable/- non renewable sources)

Type and Category: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"

Approved baseline Methodology : ACM0002 Version 6.0 (19 May 2006),

Approved monitoring methodology: ACM0002 Version 6.0 (19 May 2006),

Web link of registered project activity:

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

3. Project timeline

Registration date	27th October 2008
Crediting Period	27th October 2008 – 26th October 2018 (Fixed)
First monitoring period	27th October 2008 – 30th November 2009

4. Baseline

4.1 Methodology

The project participants propose to use the approved consolidated monitoring methodology ACM0002 (version 06) titled "Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources", which has to be used in conjunction with the ACM0002 baseline methodology.

The baseline emissions factor has been fixed for the fixed crediting period. In each year the amount of CERs actually generated by the project will vary depending on the net electricity supplied to the grid.

4.2 Calculation for Emission Reductions

The project participants used the approved baseline and monitoring methodology ACM0002 (version 6) "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".
Using ACM0002, the emission reductions achieved by the project activity can be calculated by multiplying the electricity supplied to the grid by the project and the appropriate emissions factor of the grid.
As per methodology ACM0002, the emission reduction $\mathbf{ER_Y}$ is calculated as

$$\mathbf{ER_Y = EFy * EGy \text{ ---------- } (1)}$$

Where EGy is the net electricity supplied to the grid, EFy is the CO_2 emission factor of the grid.

Baseline emission factor (EF_y) has been calculated ex-ante and will not be updated during the crediting period of ten years. As per PDD registered, EF_y= **932.04 tCO_2/GWh or 0.93204 tCO_2/MWh**

5. Monitoring Procedure & Emission reduction calculations

5.1 Monitoring Procedure

Metering system for the project activity consists of one main and one check meter. Both the meters are **two-way trivector meters capable of recording import and export of electricity** and provide output in the form of net electricity supplied to the grid. The procedures for metering and meter reading will be as per the provisions of the power purchase agreement. Monitoring information for the project activity is detailed out below:-

Monitoring Information

5.1.1 **Metering:** Electricity supplied to the grid is metered by the Parties (KPTCL, Enercon and the Project) at the high voltage side of the step up transformer installed at the Project Site.

5.1.2 **Metering Equipment:** Metering system for the project activity consists of one main and one check meter. Both the meters are two-way Trivector meters capable of recording import and export of electricity and provide output in the form of net electricity supplied to the grid. The main meter is installed and owned by the Project, whereas check meters are owned by KPTCL. The metering equipment is maintained in accordance with electricity standards prevalent in Karnataka. The meters installed are capable of recording and storing half hourly readings of all the electrical parameters for a minimum period of 35 days with digital output.

5.1.3 **Meter Readings:** The Net electricity supplied to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of Officials from off-taking Utility and Enercon India Limited. The Joint meter reading contains the value of energy imported and exported and the net export to the grid during the recording period. This Joint meter reading is certified by the Executive engineer of the utility and by Enercon Officials. These certified readings are then used by the Discom officials to prepare the tariff invoices. Thus the sole monitoring parameter for the project activity is the net electricity supplied to the grid as mentioned in the JMR, which will be crosschecked with the value mentioned in the invoices.

5.1.4 **Inspection of Energy Meters:** All main and check energy meters (export and import) 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 accredited representatives.

5.1.5 **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 KPTCL. 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.

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.

- If during any of the monthly meter readings, the variation between the main meter and the check meter is more than the permissible limit for meters of 0.2% accuracy class; all the meters shall be re-tested and calibrated immediately.

5.2 Monitoring parameters

Data and Parameters Monitored:

Data / Parameter:	**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 the tariff invoices raised on KPTCL/ BESCOM.
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 as per the JMR and tariff invoices 27th October 2008 to 31 December 2008 = 13,525.143 1 January 2009 to 30 November 2009 = 109,254.474
Description of measurement methods and procedures to be applied:	Metering system for the project activity consists of one main and one check meter. Both the meters are **two-way tri-vector meters capable of recording import and export of electricity** and provide output in the form of net electricity supplied to the grid. Refer Monitoring Plan for an illustration of the provisions for measurement methods.
QA/QC procedures to be applied:	QA/QC procedures will be as implemented by KPTCL/BESCOM pursuant to the provisions of the power purchase agreement. Refer section 6 of MR for an illustration of the provisions for QA/QC procedures.

5.3 Emission reduction calculations

Monitored electricity data and calculation for project activity:-

Month	**Net Generation for 68.8 MW [MWh] EGy**	**Baseline Emission Factor (tCO2e/MWh) EFy**	**Emission Reductions (tCO2e) ERy**
Oct-08*	0	0.9320	0
Nov-08	6,853.212	0.9320	6,387
Dec-08	6,671.931	0.9320	6,218
Jan-09	7,515.088	0.9320	7,004
Feb-09	5,389.575	0.9320	5,023
Mar-09	4,403.502	0.9320	4,104
Apr-09	5,997.012	0.9320	5,589
May-09	9,188.152	0.9320	8,563
Jun-09	12,807.720	0.9320	11,937
Jul-09	22,564.768	0.9320	21,031
Aug-09	14,364.102	0.9320	13,387
Sep-09	11,379.780	0.9320	10,606

Oct-09	8,751.400	0.9320	8,156
Nov-09	6,893.474	0.9320	6,424
	115,886.242	**Total CERs**	**114,429**

Note: * Joint Meter Reading is generated on 1st day of every month. Carving out generation details for only 4 days i.e., from 27/10/2008 to 31/10/2008 is difficult. Hence, the project proponent wishes to forego the generation for those 4 days for the purpose of simplicity in the calculation of Emission reductions during this Verification.

Total Emission Reductions for the period 27th October 2008 to 30th November 2009:

= 114,429 tCO_2e

6. Quality assurance and quality control measures

Variable	QA/QC procedures in PDD	QA/QC procedures in practice
EGy The electricity supplied to grid	The data directly used for calculation of emission reductions shall be the Electricity supplied to the grid as per the tariff invoices raised on KPTCL/BESCOM. The meter for monitoring and validation will be used for electricity sales to the grid.	EGy is measured by two calibrated meters, which shall calculate the electricity supplied to the Grid. Both the meter readings are available to officials for cross verification purpose.

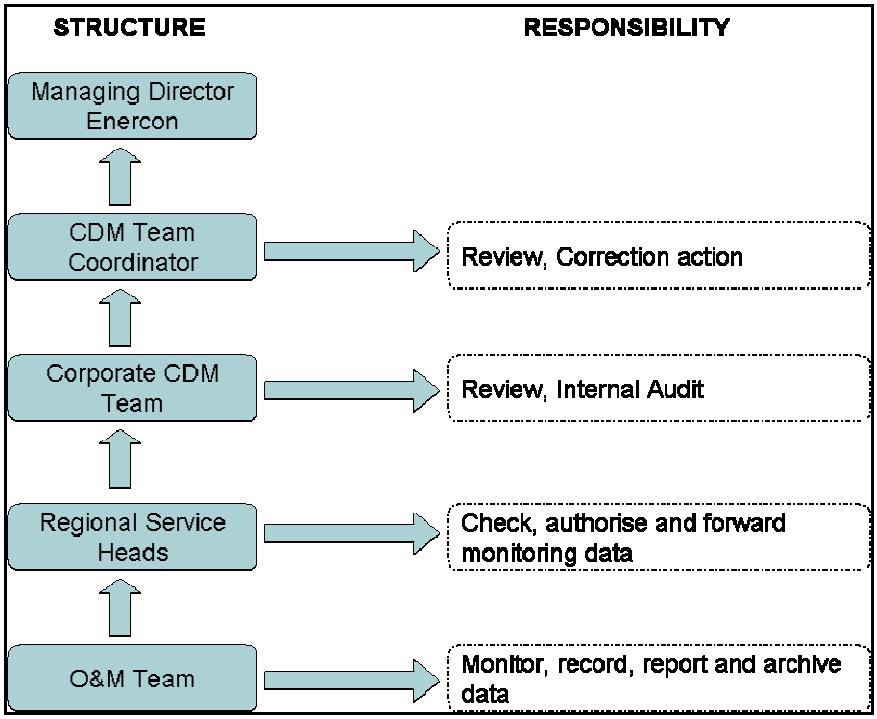
6.1 Calibrations

The metering equipments were inspected & calibrated quarterly/periodically by KPTCL officials. The metering equipments have an accuracy class of 0.2 %. Meter details for the all the main and check meters are as follows:-

Parameter	Meter description	Meter Serial No.	Meter Make	Accuracy class	Metering point
EGy from RR No: KBCWP-2 (56.8 MW)	Main Meter	05389967	L&T	0.2	33KV metering point
	Check Meter	05389970	L&T	0.2	
EGy from RR No: KBCWP-3 (12 MW)	Main Meter	05463844	L&T	0.2	
	Check Meter	05463845	L&T	0.2	

7. Structure of monitoring team

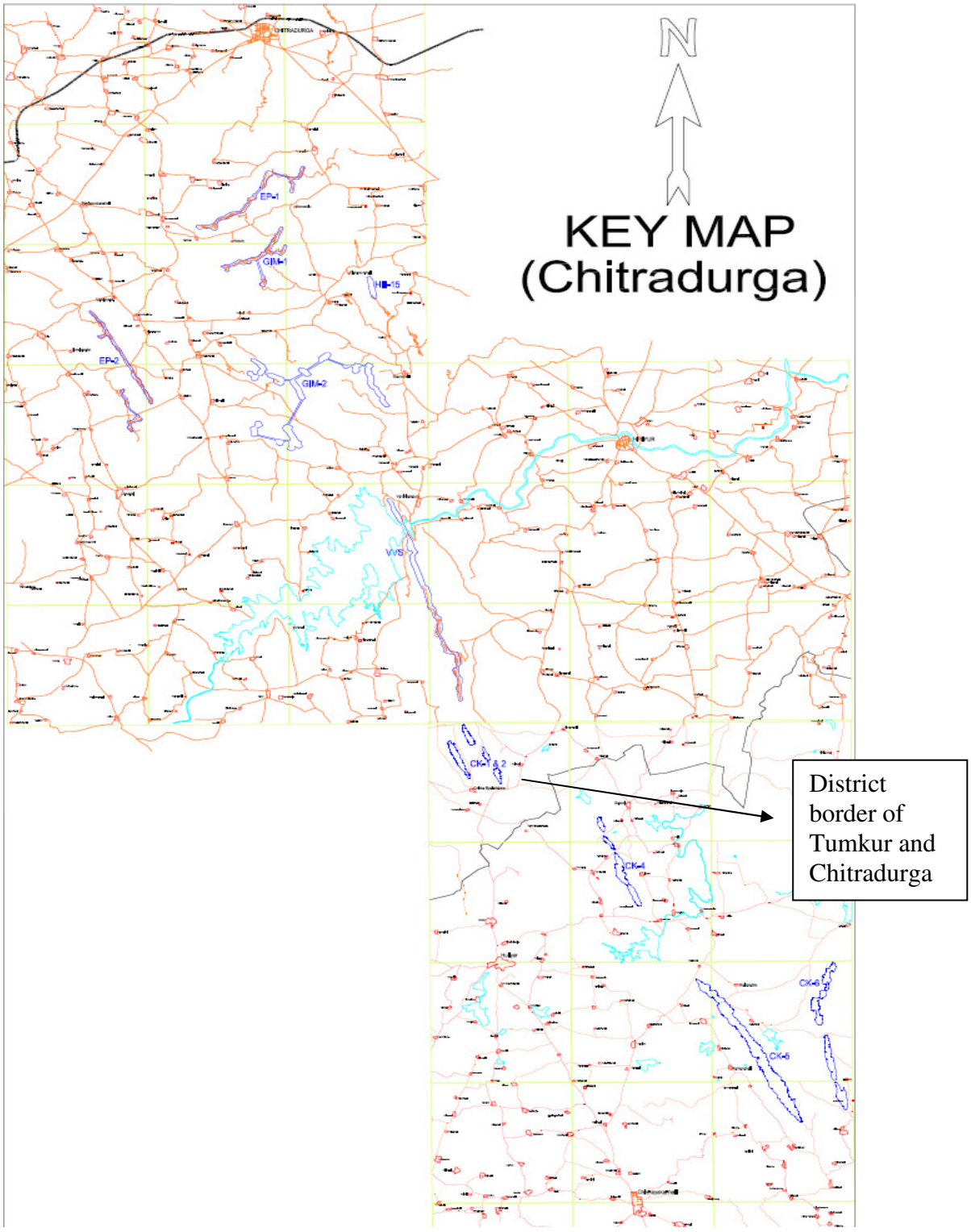
The sole parameter for monitoring is the electricity supplied to the grid. The Project is operated and managed by Enercon (India) Ltd. The structure of monitoring team implemented by Enercon is as follows:

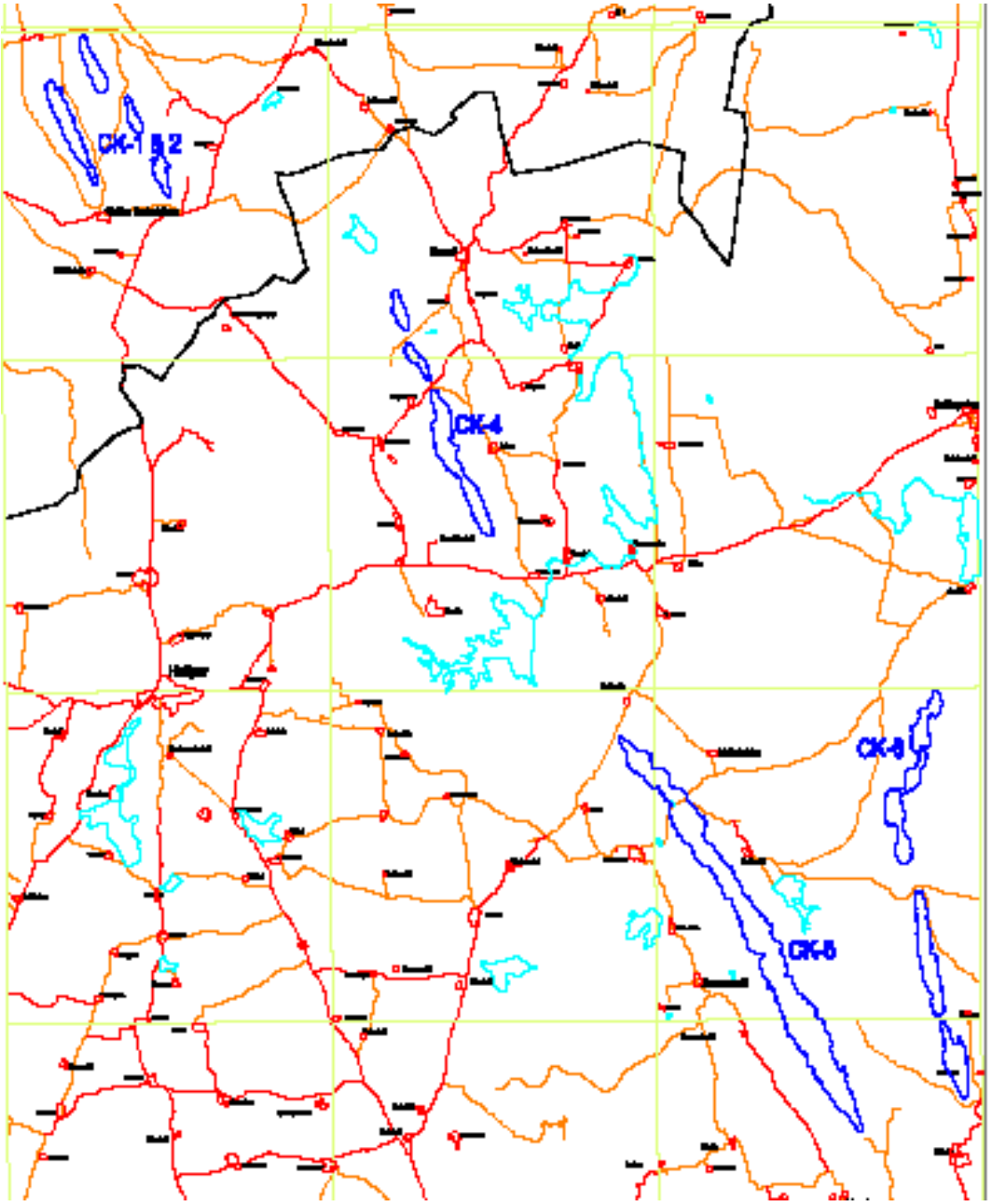


Annex 1: Contact Information on Participants in the Project Activity

Organization:	Enercon (India) Limited
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:	+91-22-5522 7794
FAX:	+91-22-5692 1175
E-Mail:	a.raghavan@enerconindia.net
URL:	
Represented by:	
Title:	Associate Vice President
Salutation:	Mr.
Last Name:	Raghavan
Middle Name:	
First Name:	A
Department:	Corporate
Mobile:	+91-9820045724
Direct FAX:	+91-22-5692 1175
Direct tel:	+91-22-6692 4848 extn. 7169
Personal E-Mail:	a.raghavan@enerconindia.net

Annex 2 – Location Map




CK-1
CK-2
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