

MONITORING REPORT

Tungabhadra wind power project in Karnataka

UNFCCC Reference No: 1268

Registration date: 27th October 2008

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

Total Emission Reduction in monitoring period: **54066** tCO₂e

Version: 2.0

Date: 30th December 2009

Prepared By: Enercon (India) Limited,

Index

<u>Description</u>	<u>Page No.</u>
1. Project Detail.....	03
2. Monitoring methodology and plan.....	08
3. GHG Calculations.....	12
4. Calibration	14
5. Structure of monitoring team.....	15
Annexure 1: Location Map.....	16

1. Project Details:

Title of Project: Tungabhadra wind power project 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.

Web-link of this registered project activity in UNFCCC:

<http://cdm.unfccc.int/Projects/DB/DNV-CUK1185867846.4/view>

Date of Project Registration: 27/10/2008

Project ID: 1268

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:

Villages : Singatalur, Koralahalli and Hammigi
Taluka : Mundargi
District : Gadag
State : Karnataka

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

1.1 Project Activity:

Objective of the Project

The objective is development, design, engineering, procurement, finance, construction, operation and maintenance of Tungabhadra 22.8 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.

Nature of Project

The Project harnesses renewable resources in the region, and thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. Enercon (India) Ltd ("Enercon") 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")/ Mangalore Electricity Supply Company Ltd ("MESCOM") under a longterm power purchase agreement (PPA). The Project is owned by Enercon (India) Ltd.

1.2 Project Proponent Details:

The project activity is promoted and developed by Enercon (India) Limited (EIL) hence EIL is the project proponent for 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:	www.enerconindia.net

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

1.3 Details of Wind Energy Generators (WEG's):

The Project is located at Kapattagudda –South, (Kapattagudda Wind Zone),

Villages Singatalur, Koralahalli and Hammigi

Taluka Mundargi

District Gadag

State Karnataka

The information allowing the unique identification and distribution of Wind Energy Generators is as follows:

Unique ID No.	District	Taluka	Village	No. of WEG's
EIL- KGS 01 to EIL- KGS 38	Gadag	Mundargi	Koralahalli	6
			Singatalur	12
			Hammagi	20
Total WEG's			38	

The project area extends between latitude 13°31' & 13°45' North and longitude 76°30' & 76°44' east. The Project is connected to the KPTCL 110/33/11 kV substation at Dambal village.

The information in regard of the Wind Energy Generators i.e. unique identification number, location number, location details(Village, Taluk & District) & latitude & longitude are defined in the table as follows:

The Details of WEGs:

Project Proponent	Unique Identification No.	Site :- KGudda South(TBhadra), Gadag.						
		Loc. No.	Latitude			Longitude		
			Degree	Minutes	Seconds	Degree	Minutes	Seconds
Enercon (India) Ltd.	EILKGS 1	1	15	3	27.4	75	52	4.0
	EILKGS 2	2	15	3	30.0	75	52	2.0
	EILKGS 3	3	15	3	29.9	75	51	57.9
	EILKGS 4	4	15	3	32.4	75	51	51.3
	EILKGS 5	5	15	3	36.1	75	51	43.0
	EILKGS 6	6	15	3	37.3	75	51	39.6
	EILKGS 7	7	15	3	38.3	75	51	34.1
	EILKGS 8	8	15	3	45.3	75	51	40.0
	EILKGS 9	9	15	3	49.2	75	51	39.1
	EILKGS 10	10	15	3	52.2	75	51	36.7
	EILKGS 11	11	15	3	54.1	75	51	32.7
	EILKGS 12	12	15	3	54.3	75	51	16.4
	EILKGS 13	13	15	3	58.1	75	51	15.3
	EILKGS 14	14	15	4	4.2	75	51	17.2
	EILKGS 15	15	15	4	7.5	75	51	14.4
	EILKGS 16	16	15	4	5.7	75	51	4.8
	EILKGS 17	17	15	4	9.5	75	51	1.6
	EILKGS 18	18	15	4	20.9	75	51	0.7
	EILKGS 19	19	15	4	23.2	75	50	58.1
	EILKGS 20	20	15	4	27.2	75	50	54.0
	EILKGS 21	21	15	4	34.3	75	51	5.4
	EILKGS 22	22	15	4	36.7	75	50	58.9
	EILKGS 23	23	15	4	38.9	75	50	51.6
	EILKGS 24	24	15	4	38.1	75	50	40.6
	EILKGS 25	25	15	4	37.1	75	50	30.2
	EILKGS 26	26	15	4	42.4	75	50	38.5
	EILKGS 27	27	15	4	45.6	75	50	35.0
	EILKGS 28	28	15	4	48.0	75	50	30.7

EILKGS 29	29	15	4	51.0	75	50	26.8
EILKGS 30	30	15	4	54.5	75	50	22.4
EILKGS 31	31	15	4	57.0	75	50	19.9
EILKGS 32	32	15	5	0.6	75	50	16.6
EILKGS 33	33	15	4	16.5	75	51	3.5
EILKGS 34	34	15	5	4.8	75	50	33.7
EILKGS 35	35	15	5	8.0	75	50	30.8
EILKGS 36	36	15	5	11.5	75	50	26.1
EILKGS 37	37	15	5	12.7	75	50	19.3
EILKGS 38	38	15	5	15.5	75	50	16.3

2. Monitoring Methodology and Plan:

2.1 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/ MESCOM.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	58014.986 MW
Description of measurement methods and procedures to be applied:	Net electricity supplied to grid will be measured by a main meter (two way export import meter). The procedures for metering and meter reading will be as per the provisions of the power purchase agreement. 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/MESCOM pursuant to the provisions of the power purchase agreement. Refer Annex – 4 for an illustration of the provisions for QA/QC procedures.
Any comment:	The data (electricity supplied to the grid) 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 or the last issuance of CERs for the project activity whichever occur.

2.2 Monitoring Plan:

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 detail monitoring plan is described below:

- **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.
- **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.
- **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.
- **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.
- **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.

2.3 Quality Control (QC) and Quality Assurance (QA):

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.

2.4 Calibration/Maintenance of Measuring and Analytical Instruments:

The meter is calibrated by SEB periodically. Meter reading is taken every month jointly by SEB and plant personnel.

2.5 Frequency:

Monthly

2.6 Monitored Data:

Electricity Wheeled to Grid

Month	Net Exports (kWH)
October 2008*	0
November 2008	3194272
December 2008	3214343
January 2009	3415351
February 2009	1894199
March 2009	1640820
April 2009	3587383
May 2009	4772635
June 2009	7180499
July 2009	11693105
August 2009	6554582
September 2009	4050965
October 2009	3638972
November 2009	3177860

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.

3. GHG Calculations:

Project Activity Emissions

Since, the project activity is a renewable energy project which generates electricity using wind power; no anthropogenic emissions by sources of greenhouse gases within the project boundary are identified. Hence, no formulae are applicable.

Leakages

No anthropogenic greenhouse gases by sources outside the project boundary that are significant, measurable and attributable to the project activity are identified. Hence, no leakage is considered from the project activity. In addition, project proponents confirm that the renewable energy technology is not equipment transferred from another activity. Hence, no leakage calculation is required.

Baseline Emissions

“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- baseline emissions in year y, tCO₂e

Eg_y- is the electricity supplied to the grid in year y,

Ef_y- is the CO₂ emission factor of the grid (fixed ex-ante)

The project activity falls in the Indian state Karnataka hence ‘Southern Regional Grid’ is selected as baseline grid. The baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient calculated in a transparent and conservative manner and fixed ex-ante.

Grid emission factor: 932.04 tCO₂e/GWh (As per the value of registered PDD)

Month	Electricity Supplied to Grid (MWh)	Emission Factor (tCO ₂ e/MWh)	Baseline Emissions (tCO ₂ e)
October 2008*	0	0.93204	0
November 2008	3194.272	0.93204	2977
December 2008	3214.343	0.93204	2995
January 2009	3415.351	0.93204	3183

February 2009	1894.199	0.93204	1765
March 2009	1640.820	0.93204	1529
April 2009	3587.383	0.93204	3343
May 2009	4772.635	0.93204	4448
June 2009	7180.499	0.93204	6692
July 2009	11693.105	0.93204	10898
August 2009	6554.582	0.93204	6109
September 2009	4050.965	0.93204	3775
October 2009	3638.972	0.93204	3391
November 2009	3177.860	0.93204	2961
Total	58014.986	0.93204	54066

Emission Reductions: The emission reductions are provided in the table below:

Month	Baseline Emissions (tCO ₂ e)	Project Emissions (tCO ₂ e)	Emission Reductions (tCO ₂ e)
October 2008*	0	0	0
November 2008	2977	0	2977
December 2008	2995	0	2995
January 2009	3183	0	3183
February 2009	1765	0	1765
March 2009	1529	0	1529
April 2009	3343	0	3343
May 2009	4448	0	4448
June 2009	6692	0	6692

July 2009	10898	0	10898
August 2009	6109	0	6109
September 2009	3775	0	3775
October 2009	3391	0	3391
November 2009	2961	0	2961
Total	58014.986	0.93204	54,066

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 emissions reductions for the crediting period are **54,066**.

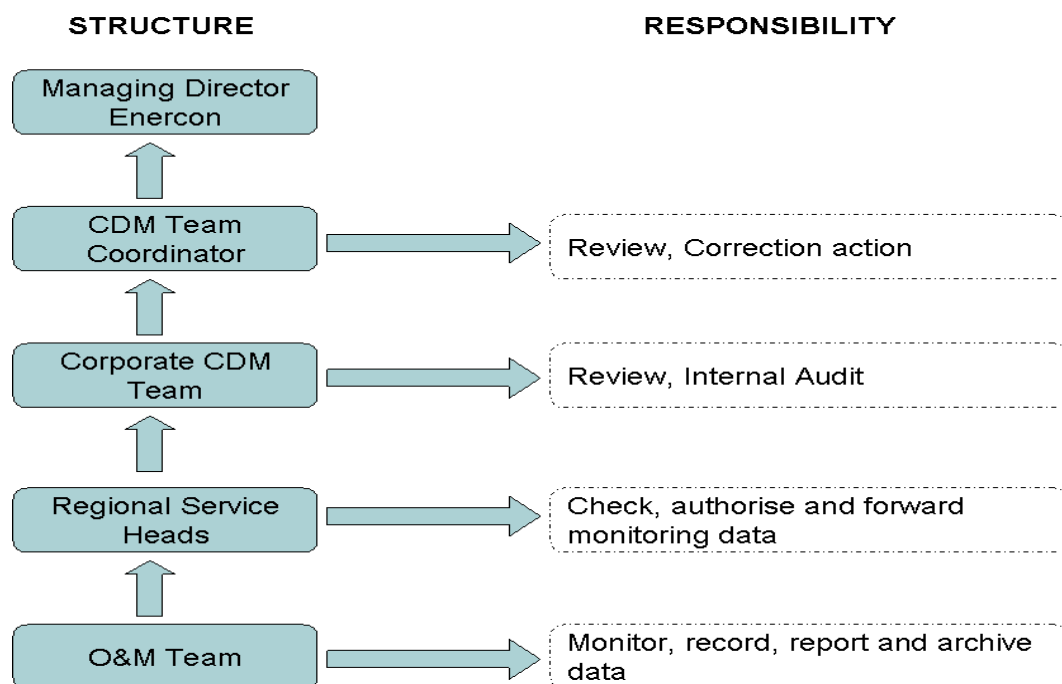
4. Calibration

The metering equipments were inspected & calibrated quarterly/periodically by HESCOM(HUBLI Electricity Supply Company Limited) 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
Net Electricity Generated from RR No. GDG/TL&SS/WF/EILSG/LOCNO 1-38/97	Main meter	06767626	L&T	0.2	33KV metering point
	Check Meter	06767637	L&T	0.2	

5. 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:



Annexure 1: Location Map

