

**Monitoring Report
Voluntary Carbon Standard**

VERSION 3 DATED 12/11/2009

**FOR THE PERIOD
17/12/2007 TO 14/01/2009**

**"Wind power project by HZL in Karnataka"
Reference no. UNFCCC00001824CDMP**

Project Location:
District- Gadag
Villages- Kurthkoti and Malasamudra

**Hindustan Zinc Limited
Yashad Bhawan
Udaipur
Rajasthan**

INDEX

Project Description	3
Current Status of Project	4
Monitoring Period.....	5
Contribution to Sustainable Development	6
Monitoring Parameters.....	7
Emission Reductions.....	9
Measures to Ensure the Results/Uncertainty Analysis	11
Roles and Responsibilities	12

Project Description

The project activity is a 34.4 MW wind power project consisting of 43 WEGs of individual capacity 0.8 MW at Gadag in Karnataka, India. The electricity generated from the wind farm is being exported to the regional electricity grid and sold to the state electricity utility, thereby marginally contributing to reducing the energy demand supply gap in the state of Karnataka.

Purpose

The project activity is an initiative by Hindustan Zinc Limited to export Wind Electric Generator (WEG) generated renewable electricity to the power deficit regional grid in order to decrease power shortage, diversify the grid and reduce greenhouse gas emissions.

Technology

Enercon India Limited has supplied the wind energy technology to HZL. WEG is ingeniously devised to convert kinetic energy from the “air in motion” directly into electricity without using conventional sources like coal, oil or natural gas for power generation. The project activity implements gearless Enercon E-48 SL WEGs with synchronous generator, pitch regulation, low cut-in speed and aerodynamic braking system.

E-48 SL TECHNICAL DATA

Rated capacity	: 800 kW
Rotor diameter	: 53 m
Hub height	: 75 m
Rotor Type	: Upwind rotor with active pitch control
Direction of rotation	: Clockwise
Number of blades	: 3
Blade material	: Fiberglass (reinforced epoxy) with integral lightning Protection
Tip speed	: 80 m/s max
Pitch control	: Continuous variable pitching mechanism

This is a multi-pole variable speed generator. Due to this and Power electronics, the Gear Box which steps up the speed to meet the speed of Induction Generator is eliminated resulting in reduced transmission losses, and elimination of wear and tear of the Gear Box and oil leakage associated with it.

Hub	: Casted Steel
Bearings	: Tapered roller bearings
Grid Feeding	: AC-DC-AC through Converter - Inverter
Braking System	: 3 independent Aero Brakes with power back up supply.
Yaw Control	: Active through adjustment gears, friction damping
Cut-in Wind Speed	: 3 m/s
Rated Wind Speed	: 12 m/s
Tower	: E-48 SL – Concrete, 74 m height

Current Status of Project

The project activity has been exporting electricity to the western regional grid continuously since commissioning. The first WEG was commissioned on 17th December 2007 and the last WEG was commissioned on 28th July 2008. The project was registered as a CDM project activity with the UNFCCC on 15th January 2009 under the approved consolidated baseline methodology - ACM0002 Version 06 (<http://cdm.unfccc.int/Projects/DB/BVQI1208874936.63/view>). Voluntary emission reductions are being claimed for the period preceding the date of registration with the UNFCCC.

Monitoring Period

This is the only monitoring report claiming voluntary emission reductions associated with the project activity.

The period covered in this monitoring report is from 17/12/2007 to 14/01/2009 (Both days included). This monitoring report does not cover any period of time covered by any other monitoring report.

Contribution to Sustainable Development

The project activity has contributed to sustainable development in the region as follows:

Social well being

- The project activity has led to alleviation of poverty by establishing direct and indirect benefits through employment generation and improved economic activities by strengthening of local grid of the state electricity utility.
- The infrastructure in and around the project area has also improved due to project activity. This includes development of road network and improvement of electricity quality, frequency and availability as the electricity is fed into a deficit grid.

Economic well-being

- The generated electricity is fed into the southern regional grid through local grid, thereby improving the grid frequency and availability of electricity to the local consumers (villagers & sub-urban habitants) which will provide new opportunities for industries and economic activities to be setup in the area thereby resulting in greater local employment, ultimately leading to overall development.
- The project activity also leads to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

Environmental well being

- The project utilizes wind energy for generating electricity which otherwise would have been generated through alternate fossil fuel based power plants, contributing to reduction in specific emissions (emissions of pollutant/unit of energy generated) including GHG emissions.
- As wind power projects produce no end products in the form of solid waste (ash etc.), they address the problem of solid waste disposal encountered by most other sources of power.
- Being a renewable resource, using wind energy to generate electricity contributes to resource conservation. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

Technological well being

- The project activity leads to the promotion of Wind Electric Generators (WEGs) into the region (demonstrating the success of wind based renewable energy generation), which is fed into the nearest sub-station (part of the Southern Regional Grid), thus increasing energy availability and improving quality of power under the service area of the substation. Hence the project leads to technological well being.

Monitoring Parameters

For the project, following parameters were monitored on a continuous basis.

<i>1. Net Quantity of Electricity supplied to KPTCL facility</i>	
Symbol	EG _y
Data unit	MWh/yr
Frequency	Monthly
Source of data	Calculated from Joint meter reading sheets
Monitoring Method	Net electricity generated has been calculated from the readings of electricity exported to the grid and imported from the grid indicated by the main meter connected to the incoming feeder of KPTCL and the HESCOM meter at the VCB. The WEGs of HZL are connected to a Vacuum Circuit Breaker metering yard (VCB) where HESCOM has installed a main and a check meter which intun connects to a feeder that ultimately leads to the shared main KPTCL meter at the substation. Data monitoring takes place at the VCB metering yard (by HESCOM) and WEG. The electricity metered at the KPTCL meter is proportionally divided among the customers connected to the meter on the basis of the prorata readings taken by the HESCOM meter installed at the VCB end. The emission reduction calculations are done on the basis of the KPTCL Main meter reading and HESCOM main meter reading.
QA/QC	Annual calibration of the meters at the VCB and KPTCL end has been undertaken.
<i>2. Quantity of Electricity exported to KPTCL facility</i>	
Symbol	EG _{y,Export}
Data unit	MWh
Frequency	Monthly
Source of data	Joint meter sheets
Monitoring Method	Electricity exported to KPTCL has been measured at the main meter connected to the incoming feeder of KPTCL corresponding to the Main HESCOM meter at the VCB.
QA/QC	Annual calibration of the meters at the VCB and KPTCL end has been undertaken.
<i>3. Quantity of Electricity imported from KPTCL</i>	
Symbol	EG _{y,Import}
Data unit	MWh
Frequency	Monthly
Source of data	Joint meter sheets
Monitoring Method	Electricity imported from KPTCL has been measured at the main meter connected to the incoming feeder of KPTCL corresponding to the HESCOM main meter at the VCB end.
QA/QC	Annual calibration of the meters at the VCB and KPTCL end has been undertaken.

4. Electricity generated by each WEG	
Symbol	EG_{WEG}
Data unit	kWh
Frequency	Daily
Source of data	Daily generation reports provided by Enercon India Limited
Monitoring Method	Each WEG is equipped with an integrated electronic meter. These meters are connected to the Central Monitoring Station (CMS) of the entire wind farm through communication cables. The generation data of individual WEG has been monitored as a real-time entity at CMS. This data for each individual WEG has been recorded daily.
QA/QC	The meters on each WEG are auto tracking type which is an auto calibration mechanism
5. Electricity generation recorded at the Vacuum Circuit Breaker (VCB)	
Symbol	EG_{VCB}
Data unit	kWh
Frequency	Daily
Source of data	Daily generation reports provided by Enercon India Limited
Monitoring Method	The individual WEGs of HZL are connected to a HESCOM main and check meter at the VCB end where the secondary metering is done and reported in the daily generation report.
QA/QC	Annual calibration of the meters at the VCB end has been undertaken.

Emission Reductions

The emission reductions for the monitoring period are shown below:

Month	Year	Quantity of Electricity exported to KPTCL facility (EG _{y,Export})	Quantity ¹ of Electricity imported to KPTCL facility (EG _{y,Import})	Transmission Losses for 33kV system	Net Quantity of Electricity exported to KPTCL facility (EG _y)	Baseline Emission Factor (EF _y)	Baseline Emission (BE _y)
		MWh	MWh	MWh	MWh	tCO ₂ /MWh	tCO ₂
Dec	2007	184.5	0.0	5.3	179	0.9293	166
Jan	2008	409.5	0.0	11.1	398	0.9293	370
Feb	2008	281.3	0.0	11.9	269	0.9293	250
Mar	2008	713.3	0.0	13.5	699	0.9293	650
Apr	2008	1,419.8	2.6	13.8	1,403	0.9293	1,304
May	2008	3,152.3	0.0	18.0	3,134	0.9293	2,912
Jun	2008	7,911.0	0.0	47.4	7,863	0.9293	7,307
Jul	2008	8,158.5	2.6	35.5	8,120	0.9293	7,546
Aug	2008	7,677.0	2.6	27.5	7,646	0.9293	7,105
Sep	2008	6,333.8	2.6	20.2	6,310	0.9293	5,864
Oct	2008	3,390.8	5.2	13.4	3,372	0.9293	3,134
Nov	2008	4,281.8	0.0	14.2	4,267	0.9293	3,965
Dec	2008	4,189.5	2.6	18.1	4,168	0.9293	3,873
Jan	2009	4392.0 ²	0.0	13.6	2088.4 ³	0.9293	1,940
Total	-	52495	18	264	49,916	-	46,386

¹ The energy import by HZL is calculated as 115% of the actual energy imported by HZL from KPTCL facility (which is a conservative figure), in accordance with the PPA signed between HZL and HESCOM.

² For the period from 01 January 2009 to 31 January 2009

³ Calculated by apportioning the net electricity exported by HZL from 01 January 2009 to 31 January 2009 on the basis of VCB readings

Baseline Emissions:

Carbon Emission Factor as per the baseline adopted (tCO_2/MWh) = 0.9293 tCO_2/MWh

Net Electricity exported by HZL to KPTCL (MWh) = 49916 (After rounding down to nearest integer for each month)

Baseline emissions (tonnes CO_2) = 46386

Project Emissions: 0

Leakage: 0

Emission Reductions:

Baseline emissions – Project emissions

= 46394 t CO_2 – NIL

= **46386 tCO_2**

Measures to Ensure the Results/Uncertainty Analysis

It is to be noted that no meter has been replaced in the current monitoring period. The following table indicates the details of meters installed at the KPTCL substation including their accuracy levels and calibration dates:

KPTCL main and check meters:

Meter Type	Meter S/No.	Accuracy Level	Make	Calibration	
				KPTCL	KPTCL
Main Meter	07022944	0.2 s	L & T	17/12/2007	20/05/2009
Main Meter	07022908	0.2 s	L & T	11/06/2008	20/05/2009
Check Meter	07022903	0.2 s	L & T	17/12/2007	20/05/2009
Check Meter	07022915	0.2 s	L & T	11/06/2008	20/05/2009

VCB main and check meters:

Meter Type	Meter S/No.	Accuracy Level	Make	Calibration		
				L & T	HESCOM	HESCOM
Main Meter	07022932	0.2 s	L & T	29/03/07	03/12/07	27/02/09
Check Meter	07022952	0.2 s	L & T	29/03/07	03/12/07	27/02/09

The above tables indicate that there has been a slight delay in the calibration of meters beyond one year. It is being clarified that the delay is beyond the control of the project proponent since the project proponent has to completely rely on the state authorities for calibration of the meters sealed by them. However, the project proponent had ensured follow up for calibration of the meters both at the VCB end (vide letters dated 23/06/2008, 15/12/2008 and 07/02/2009) and at the substation end (vide letter dated 07/02/2009) through the O&M contractor Enercon.

Roles and Responsibilities

To ensure trouble free operations and efficient generations through all the wind turbines, HZL has entered into a comprehensive Operation and Maintenance agreement with the manufactures of the turbines. The contractor EIL, under the O&M contract with HZL is responsible for the operation and maintenance of the project activity for the entire crediting period.

The project team formulated by HZL ensures proper and continuous monitoring of the performance of turbines and generation of power. The same has been outlined as follows:

