

**Monitoring Report
Voluntary Carbon Standard Version 2007.1**

VERSION 3 DATED 16/07/2010

**FOR THE PERIOD
01/05/2007 TO 31/08/2009**

"Wind power project by Patnaik Minerals Pvt. Ltd"

Project Location:

District: Jamnagar, Rajkot

Taluk: Kalavad, Upleta

Site: Samana

Village: Dhun Dhoraji, Hakumati, Vadali, Khirsara, Moti Vavdi

Patnaik Minerals Private Limited

Boneikala

Keonjhar

Orissa

INDEX

Project Description	3
Current Status of Project	4
Monitoring Period.....	4
Contribution to Sustainable Development	6
Monitoring Parameters.....	7
Emission Reductions.....	8
Measures to Ensure the Results/Uncertainty Analysis	11
Roles and Responsibilities	12

Project Description

The project activity envisages implementation of a 35.2 MW wind power project consisting of 44 Wind Electric Generators (WEGs) of individual capacity 0.8 MW at Samana Site in Gujarat, India. Out of the 44 WEGs, 38 WEGs are owned by PMPL and Banspani Iron Limited (BIL) owns 6 WEGs. PMPL holds 49.9% shareholding in BIL and is the promoter of the same. In view of PMPL having more knowledge and a better understanding of wind power projects, BIL has opted to entrust the responsibility of negotiating, monitoring and executing the said project activity to PMPL.

Purpose

The proposed project activity is an initiative by PMPL to export renewable electricity produced by Wind Electric Generator (WEG) to the power deficit NEWNE grid in order to decrease power shortage, diversify the grid and reduce greenhouse gas emissions.

Technology

Wind turbines produce electricity by using the natural power of wind to drive a generator. Wind has considerable amount of kinetic energy when blowing at high speeds. When this kinetic energy passes over the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The Project activity envisages installation of 44 WEGs of E-48 Enercon make (800 kW WEGs).

E-48 TECHNICAL DATA

Rated capacity	: 800 kW
Rotor diameter	: 48 m
Hub height	: 74 m
Turbine Type	: Gearless horizontal axis wind turbine with variable rotor speed
Power regulation	: Independent electromechanical pitch system for each blade
Cut-in wind speed	: 3 m/s
Rated wind speed	: 12 m/s
Cut-out wind speed	: 28-34 m/s
Extreme wind speed	: 59.5 m/s
Rated operational wind speed	: 31.5 m/s
Operating range rot. Speed	: 16 – 31.5 m/s
Orientation	: Upwind
No. of blades	: 3
Blade material	: Glass Fiber reinforced Epoxy
Gear box type	: Gearless
Generator type	: Synchronous generator
Braking	: Aerodynamic
Output voltage	: 400 V
Yaw system	: Active yawing with 4 electric yaw drives with brake motor and friction bearing
Tower	: 74 m Concrete

Enercon (India) Ltd has complete control on production through in-house manufacturing of all key components*. Enercon (India) Ltd. has established 4 manufacturing plants at Daman in India besides concrete tower manufacturing facilities in Gujarat and Karnataka†. Further, the project activity does not involve any technology transfer. It is ensured environmentally safe and sound technology is being deployed in the project activity.

Current Status of Project

The project activity has been exporting electricity to the NEWNE grid continuously since commissioning. The first WEG (Phase-I) was commissioned on 21st March 2007 and the last WEG (Phase-II) was commissioned on 3rd September 2007. The project is under validation as a CDM project activity with the UNFCCC under the methodology ACM0002 Version 06 (<http://cdm.unfccc.int/Projects/Validation/DB/GQ56N39MLSZ9QDRL6RUF5YJSFDPD1U/view.html>). Voluntary emission reductions are being claimed for the period 1st May 2007 to 31st August 2009.

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 01st May 2007 to 31st August 2009 (Both days included). This monitoring report does not cover any period of time covered by any other monitoring report.

The commissioning trend of the WEG which starts from 21st March 2007 onwards, and it took some more time to connect to the grid and some 15 days were also taken as trial period for checking that the WEG is working fine and all the connections are OK, hence the project proponent has started claiming the credits from 1st May 2007 onwards and not 21st March 2007.

* <http://www.enerconindia.net/way.jsp?menuName=1&subMenu=&linkMenu=3>

† <http://www.enerconindia.net/profile.jsp?menuName=1&subMenu=&linkMenu=4>

Contribution to Sustainable Development

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

Social well being – *The CDM project activity should lead to alleviation of poverty by generating additional employment, removal of social disparities and contribution to provision of basic amenities to people leading to improvement in quality of life of people.*

- The proposed project activity leads to alleviation of poverty in the region by establishing direct and indirect benefits through employment generation and improved economic activities by strengthening of the 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 power deficit grid.

Economic well-being - *The CDM project activity should bring in additional investment consistent with the needs of the people.*

- The generated electricity is fed into the NEWNE 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 - *This should include a discussion of impact of the project activity on resource sustainability and resource degradation, if any, due to proposed activity; bio-diversity friendliness; impact on human health; reduction of levels of pollution in general.*

- 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 has no negative impact on the surrounding environment contributing to environmental well-being.

Technological well being - *The CDM project activity should lead to transfer of environmentally safe and sound technologies with a priority to the renewable sector or energy efficiency projects that are comparable to best practices in order to assist in up-gradation of technological base.*

- The project activity leads to the promotion of Wind Electric Generators (WEGs) in the region (demonstrating the success of wind based renewable energy generation), which is fed into the nearest sub-station (part of the NEWNE 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 exported</i>	
Symbol	EGy
Data unit	MWh/yr
Frequency	Monthly
Source of data	Monthly Joint Meter Reading Sheets
Monitoring Method	The WEGs of a single customer (PMPL & BIL in this case) in a particular location are connected to metering yards which in turn connects to a feeder that ultimately leads to the bulk main GETCO meter of accuracy class 0.2s, at the substation maintained by Enercon India Limited. The wind farm of PMPL & BIL is connected to meters at respective metering yards which in turn are connected to GETCO meters at the substation. Net electricity generated by the WEGs will be monitored and reported by GEDA in its share certificate on the basis of the metering done at the bulk main meter connected to the incoming feeder of GETCO and the meters installed at the metering yard. Data monitoring has taken place both at the metering yard and the GETCO meters at the substation. The electricity metered at the GETCO meter is proportionally divided among the customers connected to the meter on the basis of the pro-rata readings taken at the metering yard. There are three meters at the GETCO sub-station each of accuracy class 0.2s and one dedicated meter for PMPL and BIL at each metering yard of accuracy class ranging between 0.2s/0.5s. This figure mentioned in the share certificate issued by GEDA on monthly basis has been used to calculate emission reductions.
QA/QC	Regular calibration of the GETCO meters will be undertaken yearly and faulty meters will be duly replaced immediately.

Emission Reductions

Emission reductions are calculated based on the net electricity exported as provided in certificate provided by GUVNL. The emission reductions for the monitoring period are shown below:

Month	Net Electricity Exported (PMPL Phase-I)	Net Electricity Exported (PMPL Phase-II)	Net Electricity Exported (BIL)	Total Net Electricity Exported	Emission Factor	Emission Reductions
	kWh	kWh	kWh	MWh	tCO ₂ e/MWh	tCO ₂ e
May-07	3,119,541	-	1,032,126	4,152	0.9058	3753
June-07	2,598,738	81,311	934,385	3,614	0.9058	3267
July-07	2,903,681	996,809	972,637	4,175	0.9058	4405
August-07	3,224,384	2,708,002	886,577	6,819	0.9058	6164
September-07	1,059,863	1,046,776	415,117	2,522	0.9058	2280
October-07	813,685	820,025	287,936	1,922	0.9058	1737
November-07	1,006,433	1,078,790	343,268	2,428	0.9058	2195
December-07	2,282,078	2,455,081	879,053	5,616	0.9058	5077
January-08	2,179,405	2,409,789	1,009,940	5,599	0.9058	5062
February-08	2,147,780	2,280,638	782,116	5,211	0.9058	4710
March-08	2,576,876	2,420,457	803,904	5,801	0.9058	5244
April-08	1,576,274	1,801,343	537,443	3,915	0.9058	3539
May-08	4,119,490	4,116,650	1,192,191	9,428	0.9058	8523
June-08	4,314,247	4,354,087	1,307,092	9,975	0.9058	9018
July-08	2,567,339	2,707,027	946,661	6,221	0.9058	5624
August-08	2,928,239	2,826,745	951,963	6,707	0.9058	6063
September-08	1,951,650	1,999,798	620,628	4,572	0.9058	4133

October-08	606,920	619,846	205,452	1,432	0.9058	1295
November-08	1,501,759	1,608,708	540,551	3,651	0.9058	3300
December-08	1,861,659	1,931,805	674,115	4,468	0.9058	4039
January-09	1,976,128	2,139,025	758,195	4,873	0.9058	4405
February-09	1,862,451	1,906,542	775,928	4,545	0.9058	4109
March-09	2,150,950	2,138,948	663,492	4,953	0.9058	4,487
April-09	2,019,011	1,966,549	630,799	4,616	0.9058	4,181
May-09	2,761,049	2,541,129	870,909	6,173	0.9058	5,592
June-09	3,583,728	2,799,531	1,103,663	7,487	0.9058	6,782
July-09	2,062,991	1,871,447	624,859	4,559	0.9058	4,130
August-09	3,372,236	3,241,835	998,360	7,612	0.9058	6,895
Total	45,340,041	37,565,361	15,323,155	143,747		130,009

Baseline Emissions:

CO₂ Emission Factor as per the baseline adopted (tCO₂/MWh) = 0.9058

Net Electricity exported (MWh) = 143,747

Baseline emissions (tonnes CO₂) = 130,009

Project Emissions: 0 tCO₂

Leakage: 0 tCO₂

Emission Reductions:

Baseline emissions – Project emissions

= 130,009 tCO₂ – 0 tCO₂

= **130,009 tCO₂**

Measures to Ensure the Results/Uncertainty Analysis

The uncertainty level associated with the monitored data used for calculating emission reductions is low as the following additional parameters are being monitored for cross checking purposes:

- The electricity generation data for each WEG has been recorded in daily generation reports provided by Enercon India Limited.
- The electricity generation at each metering yard has been recorded in daily generation reports provided by Enercon India Limited.

The calibration of all main meters at the substation is being carried out annually.

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

GETCO Main Meters Details

	Meter Serial No.	Meter Type	Meter Make	Accuracy Class	Date of Calibration		Error observed during Calibration
					From	Till	
Main Meter	GJU04175	E3MO21	Secure	0.2s	13/03/2007	03/03/2009	Error within permissible limit
	GJU04176	E3MO21	Secure	0.2s	27/06/2007	03/03/2009	Error within permissible limit
	GJB01470	E3MO21	Secure	0.2s	10/04/2008	03/03/2009	Error within permissible limit

Roles and Responsibilities

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

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

