

**MONITORING REPORT FORM (F-CDM-MR)**
Version 02.0**MONITORING REPORT**

Title of the project activity	Wind power project by Patnaik Minerals Pvt. Ltd.
Reference number of the project activity	4072
Version number of the monitoring report	1
Completion date of the monitoring report	16/11/2012
Registration date of the project activity	28/05/2011
Monitoring period number and duration of this monitoring period	1 st , the monitoring period is from 28/05/2011 – 30/06/2012 (First and last day included)
Project participant(s)	Patnaik Minerals Private Limited
Host Party(ies)	India
Sectoral scope(s) and applied methodology(ies)	1 and ACM 0002 Ver. 12.1.0
Estimated amount of GHG emission reductions or net anthropogenic GHG removals by sinks for this monitoring period in the registered PDD	70691 tCO ₂ e (estimated for 400 days as per current monitoring period)
Actual GHG emission reductions or net anthropogenic GHG removals by sinks achieved in this monitoring period	50822 tCO ₂ e

SECTION A. Description of project activity**A.1. Purpose and general description of project activity**

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Patnaik Minerals Pvt. Ltd. (PMPL) is the flagship company of R N Patnaik group. The main line of activities are mining of Iron & Manganese Ore. Starting as a Proprietorship Firm, over the last 44 years (since 1961) it has evolved to be the most reputed mining company in Joda - Barbil region (Dist. Keonjhar, Orissa), which is considered as the hub of Iron Ore mining in India.

The project activity involves 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. The project activity is in line with the sustainable development priorities of the country. The electricity generated from the wind farm will be 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 Gujarat.

Purpose

The project activity is an initiative by Patnaik Minerals Private Limited (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

Enercon India Limited has supplied the wind energy technology to PMPL. WEG is ingeniously devised to convert kinetic energy from “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 WEGs with synchronous generator, pitch regulation, low cut-in speed and aerodynamic braking system. The specification for the WEGs is provided below.

TECHNICAL CONCEPT & SPECIFICATION OF**E-48 WEG**

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.

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 activity is also registered under VCS and Voluntary emission reductions were claimed for the period 01st May 2007 to 27th May 2011 (before the CDM registration date).

This is the first monitoring report under CDM and the CERs are being claimed for the monitoring period of 28 May 2011 to 30 June 2012 (both days included)

A.2. Location of project activity

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The project activity is located in the Kalavad taluka of Jamnagar district and Upleta taluka of Rajkot District in Gujarat. The nearest airport and railway station is at Jamnagar city, which is located at a distance of approximately 60 kms from the project activity site.

District: Jamnagar, Rajkot

Taluk: Kalavad, Upleta

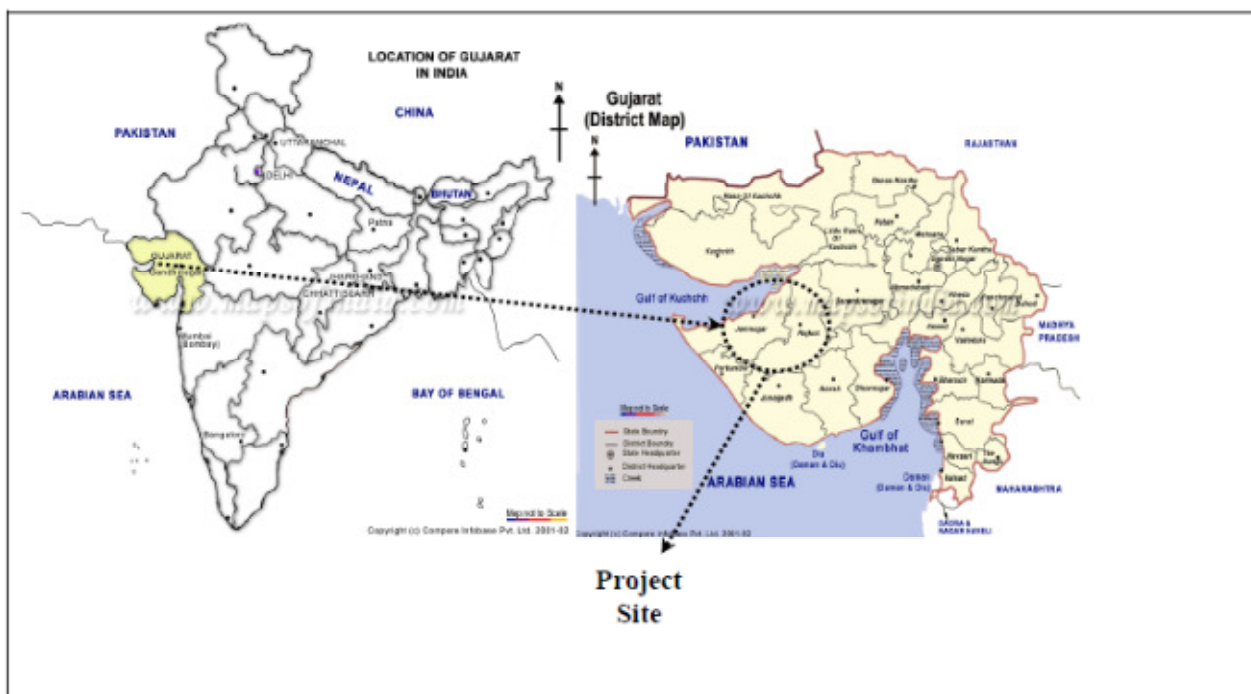
Site: Samana

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

The specific GPS coordinates for all the WEGs under the project activity has been provided below:

Serial No.	Location No.	Latitude	Longitude
1	81	22°05'54"	70°16'22"
2	82	22°05'48"	70°16'24"
3	83	22°05'41"	70°16'26"
4	84	22°05'35"	70°16'29"
5	85	22°05'28"	70°16'34"
6	86	22°05'20"	70°16'27"
7	87	22°05'15"	70°16'29"
8	88	22°05'09"	70°16'31"
9	89	22°05'03"	70°16'32"
10	90	22°04'56"	70°16'31"
11	91	22°04'58"	70°16'11"
12	92	22°05'05"	70°16'11"
13	93	22°05'11"	70°16'11"
14	94	22°05'18"	70°16'05"
15	96	22°05'31"	70°16'04"
16	97	22°05'38"	70°16'03"
17	98	22°05'44"	70°16'03"
18	99	22°05'38"	70°15'29"
19	100	22°05'32"	70°15'31"
20	101	22°05'26"	70°15'31"

21	102	22°05'19"	70°15'34"
22	103	22°05'12"	70°15'33"
23	104	22°05'05"	70°15'37"
24	105	22°04'33"	70°16'05"
25	106	22°04'26"	70°16'09"
26	107	22°04'20"	70°16'13"
27	108	22°04'13"	70°16'15"
28	109	22°04'05"	70°16'18"
29	110	22°03'59"	70°16'21"
30	111	22°03'34"	70°16'03"
31	112	22°03'28"	70°16'06"
32	113	22°03'21"	70°16'10"
33	114	22°03'16"	70°16'13"
34	501	21°57'46"	70°16'16"
35	502	21°57'53"	70°16'16"
36	503	21°57'60"	70°16'11"
37	504	21°58'03"	70°16'02"
38	507	21°58'26"	70°15'43"
39	508	21°58'31"	70°15'41"
40	510	21°58'46"	70°15'59"
41	511	21°58'50"	70°15'59"
42	512	21°58'55"	70°16'00"
43	513	21°59'01"	70°16'03"
44	514	21°59'05"	70°16'04"



A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Patnaik Minerals Private Limited	No

A.4. Reference of applied methodology

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Title of the baseline methodology: “*Consolidated Baseline Methodology for grid connected electricity generation from renewable sources*”.

Reference: ACM0002, Version 12.1.0 (EB 58), Sectoral scope: 01.

It has been referred from the list of approved methodologies for CDM project activities in the UNFCCC CDM website (<http://cdm.unfccc.int/methodologies/PAMethodologies/approved.html>).

The approved methodology also draws upon:

1. Version 5.2 of the “Tool for demonstration and assessment of additionality”;
2. Version 1.1 of the “Tool to calculate the emission factor for an electricity system;”
3. Version 02.2. of the “Combined tool to identify the baseline scenario and demonstrate additionality;”
4. Version 02 of the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion.”

A.5. Crediting period of project activity

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A fixed crediting period of 10 years had been chosen and the crediting period is from 28/05/2011 to 27/05/2021.

SECTION B. Implementation of project activity**B.1. Description of implemented registered project activity**

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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 activity is also registered under VCS and Voluntary emission reductions were claimed for the period 01st May 2007 to 27th May 2011 (before the CDM registration date).

This is the first monitoring report under CDM and the CERs are being claimed for the monitoring period of 28 May 2011 to 30 June 2012 (both days included)

No events or situations took place during the monitoring period which would have impacted the applicability of the methodology used in the project activity.

B.2. Post registration changes**B.2.1. Temporary deviations from registered monitoring plan or applied methodology**

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Nil

B.2.2. Corrections

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Nil



B.2.3. Permanent changes from registered monitoring plan or applied methodology

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Nil

B.2.4. Changes to project design of registered project activity

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Nil

B.2.5. Changes to start date of crediting period

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Nil

B.2.6. Types of changes specific to afforestation or reforestation project activity

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Not applicable

SECTION C. Description of monitoring system

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Description of monitoring plan

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.

The electricity export readings come directly from electricity board via calibrated meters, thus there is no requirement of auditing in the project activity.

It is to be noted that no meter has been replaced in the current monitoring period.

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:

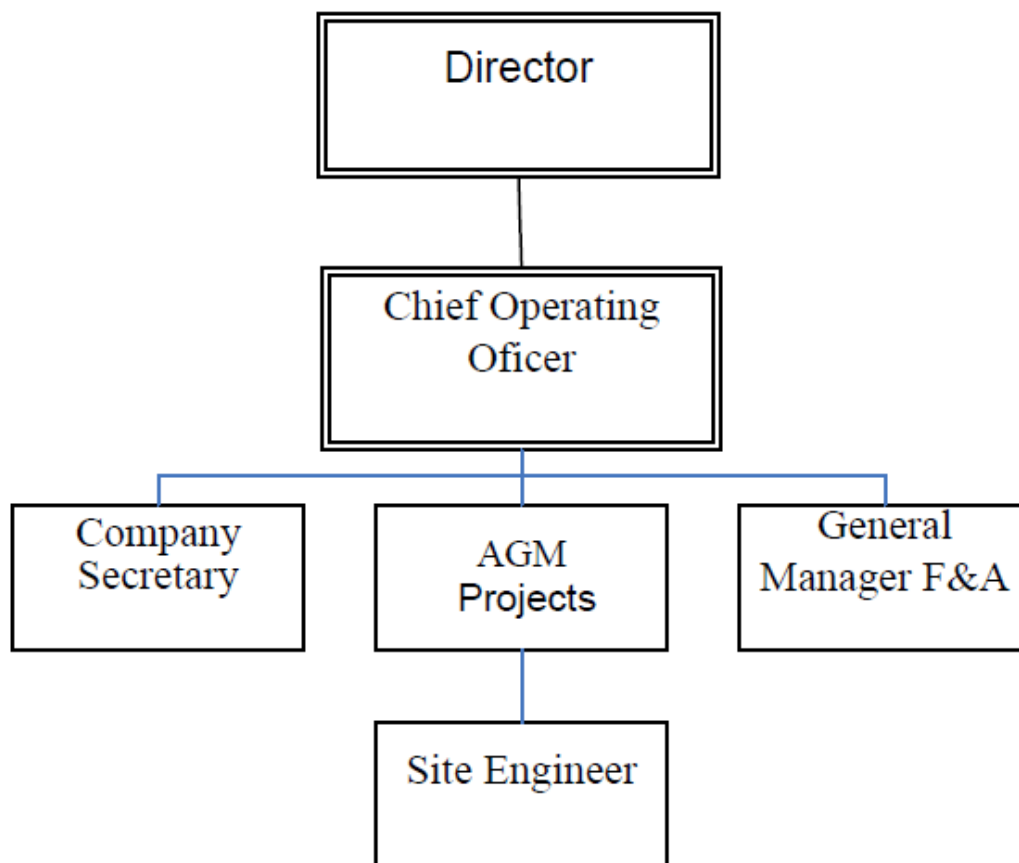


Figure: Organization Structure

The hierarchy shows the reporting structure for the project activity.

The director and COO would be responsible for Overall Supervision of the project activity.

Company secretary, AGM and GM along with site engineer would be responsible for taking care of the proper functioning of the whole site, invoicing and CDM related activities.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data/Parameter	$EF_{OM,y}$
Unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor for western regional grid which is now part of NEWNE grid
Source of data	Referred from CO ₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority, Version 3.0
Value(s) applied	1.0032
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO ₂ /MWh
Description:	Build Margin Emission factor for western regional grid which is now part of NEWNE grid
Source of data used:	CEA: 'The CO ₂ Baseline Database for the Indian Power Sector'. Version 03, Source: Central Electricity Authority; www.cea.nic.in ,
Value applied:	0.5938
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	EF_y
Unit	tCO ₂ /MWh
Description	Combined Margin emission factor for western grid which is part of NEWNE grid
Source of data	Estimated figure based on 75% of OM and 25% of BM values. Referred from CO ₂ Baseline Database for the Indian Power Sector prepared by Central Electricity Authority Version 3.0
Value(s) applied	0.9008
Purpose of data	Calculation of baseline emissions
Additional comment	-

D.2. Data and parameters monitored

Data/Parameter	EG _{facility,y}					
Unit	MWh/yr					
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y					
Measured/Calculated /Default	Calculated					
Source of data	Monthly Share Certificate					
Value(s) of monitored parameter	56419.38 (After correction from calibration delay)					
Monitoring equipment	The WEGs of a single customer (PMPL and BIL individually in this case) in a particular location are connected to a Vacuum Circuit Breaker metering yard (VCB) 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. Net electricity generated by PMPL/BIL wind farm is 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 VCB metering yard.					
		Meter Serial No.	Accuracy Class	Date of Calibration		Error observed during Calibration
				From	Till	
	Main Meter	GJU04175	0.2s	22/01/2010	21/01/2011	Error within permissible limit
				17/01/2012	16/01/2013	
		GJU04176	0.2s	22/01/2010	21/01/2011	Error within permissible limit
				17/01/2012	16/01/2013	
		GJB01470	0.2s	22/01/2010	21/01/2011	Error within permissible limit
				17/01/2012	16/01/2013	
Measuring/Reading/Recording frequency	Measure daily, Reported Monthly					
Calculation method (if applicable)	There is a delay in the calibration of the meters in 2011, hence as per EB 52, Annex 60 the maximum correction factor is applied to electricity exported for whole of months from May 2011 to January 2012. The next calibration after the monitoring period is also checked where the error is within the permissible limit.					
QA/QC procedures	Annual calibration of all the meters is undertaken at required intervals. There was no replacement of meters in the current monitoring period. The meters are of accuracy class 0.2.					
Purpose of data	Calculation of emission reductions					
Additional comment	-					

D.3. Implementation of sampling plan

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Not Applicable

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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As per the registered PDD, the project activity uses the approved methodology ACM 0002 (Version 12.1.0) for the emission reduction calculations

Baseline emissions

According to the methodology, ACM 0002 baseline emissions for the project activity are the kWh produced by the renewable generating unit multiplied by an emission coefficient.

$$BE_y = EF_{Grid,CM,y} \times EG_{PJ,y}$$

where

BE_y Baseline emission for year y, t CO₂ /year

$EF_{Grid,CM,y}$ Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the version 01.1 of the “Tool to calculate the emission factor for an electricity system”

$EG_{PJ,y}$ Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

Grid emission factor was calculated ex ante. Hence,

$EF_{Grid,CM,y}$: **0.9008 tCO₂/MWh**

The monthly Share certificates are issued for the entire month.

Time Period	Net Electricity exported by the Project activity (EG _y) MWh	Grid emission factor (tCO ₂ /MWh)	Emission reductions (tCO ₂)
28 May 2011 - 31st May 2011*	1187.38	0.9008	1069.59
Jun-11*	6991.36	0.9008	6297.82
Jul-11*	5316.08	0.9008	4788.73
Aug-11*	4915.05	0.9008	4427.47
Sep-11*	2399.82	0.9008	2161.76
Oct-11*	2317.15	0.9008	2087.29
Nov-11*	2494.80	0.9008	2247.32
Dec-11*	4534.22	0.9008	4084.42
Jan-12*	4419.75	0.9008	3981.31
Feb-12	5150.00	0.9008	4639.12
Mar-12	4696.73	0.9008	4230.81
Apr-12	5131.02	0.9008	4622.03

May-12	6866.03	0.9008	6184.92
Jun-12	8794.33	0.9008	7921.94
Total	56419.38	0.9008	50822.00

*Calibration delay correction factor is applied

E.2. Calculation of project emissions or actual net GHG removals by sinks

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Project emissions as per section B.6.3 of the registered PDD are zero (0)

E.3. Calculation of leakage

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Leakage emissions as per section B.6.3 of the registered PDD are zero (0)

E.4. Summary of calculation of emission reductions or net anthropogenic GHG removals by sinks

Time Period	Baseline emissions or baseline net GHG removals by sinks (tCO ₂ e)	Project emissions or actual net GHG removals by sinks (tCO ₂ e)	Leakage (tCO ₂ e)	Emission reductions or net anthropogenic GHG removals by sinks (tCO ₂ e)
Total	50,822	0	0	50,822

E.5. Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex-ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (tCO₂e)	70,691 (calculated for 400 days)	50,822

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

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Emission reductions have decreased by 28% as compared to ex-ante calculations provided in the PDD. In the registered PDD the net export of electricity was envisaged to be 78476 MWh (calculated for 400 days, for 365 days it was envisaged to be 71610 MWh), however during the monitoring period only 56419 MWh of net electricity was exported to the grid. The difference in the total CERs is due to lower than estimated wind availability/speed leading to lower net electricity generation.



History of the document

Version	Date	Nature of revision
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	EB 54, Annex 34 28 May 2010	Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Issuance		