

WIND POWER PROJECT BY PATNAIK MINERALS PVT. LTD

Monitoring Period: 2009-09-01 to 2011-05-27
(incl. both days)

Report No: 8108775734 - 12/116

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Summary:

The scope of this verification covers the determination of voluntary greenhouse gas emission reductions generated by the above mentioned project. The verification is based on the approved VCS PD^{/PD/}, Final VCS validation report^{/FVR/}, Monitoring report^{/MR1//MR2/}, supporting emission reduction calculation sheet^{/XLS1/} and other supporting documents made available to the verifiers by the project proponent.

As a result of the verification, the verifier confirms that:

- All operations of the project are implemented and installed as planned and described in the project document^{/ISO/, /CAL/, /CS/}. The installed equipment essential for generating emission reductions runs reliable.
- The monitoring plan is in accordance with the applied approved CDM methodology ACM0002 version 09
- The installed equipment essential for measuring parameters required for calculating emission reductions are calibrated.
- The monitoring system is in place and functional. The project has generated GHG emission reduction and the emission reduction from the project activity is real, credible and long term for the whole crediting period^{/JMR/}
- GHG emission reductions are calculated without any material misstatements in a conservative and appropriate manner.

Also, all the documents checked during on-site visit and verification process will be kept confidential and will not be disclosed at any time other than the project proponent consent or as required by VCSA.

Reporting period: 2009-09-01 to 2011-05-27

Verified GHG emission reductions or removals in the above reporting period:

GHG Emission Reductions or Removals	t CO2 equivalent
Year 2009:	12,418
Year 2010:	50,514
Year 2011:	23,660
Total Emission reductions	86,592

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1 INTRODUCTION

1.1 Objective

The purpose of this verification, by independent checking of objective evidence, is as follows:

- to verify that the project is implemented as described in the validated project description (PD);
- to assess the implementation of the monitoring plan (MP) content as mentioned in the validated VCS-PD;
- to assess the project's compliance with other relevant rules, including the host country (India) legislation;
- to confirm that the monitoring system is implemented and fully functional to generate voluntary emission reductions (VERs / VCUs) without any double counting; and
- to establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation.

1.2 Scope and Criteria

The verification of this project is based on the validated project description ^{/PD/}, validation report ^{/FVR/}, the monitoring report of the first monitoring period ^{/MR/} monitoring report of this monitoring period ^{/MR1//MR2/}, emission reduction calculation spread sheet ^{/XLS1/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

The TÜV NORD JI/CDM CP has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The verification is carried out on the basis of the following requirements, applicable for this project activity:

- VCS Version 03 requirements
- other relevant rules, including the host country legislation,
- CDM Validation and Verification Manual ^{/VVM/},
- monitoring plan as given in the validated VCS PD ^{/PD/},
- Approved CDM Methodology ACM0002 Ver. 9 (Consolidated baseline methodology for grid-connected electricity generation from renewable sources).

1.3 Level of assurance

The verification has been planned and organized to achieve a

- ☒ Reasonable level of assurance
- ☐ Limited level of assurance.

1.4 Summary Description of the Project

1.4.1 Project Characteristics

Essential data of the project is presented in the following Table 1.4.1.

Table 1.4.1: Project Characteristics

Item	Data
Project title	Wind power project by Patnaik Minerals Pvt. Ltd
Project owner	Patnaik Minerals Private Limited
Any specific project categories	☐ Mega project ($> 10^6$ t CO _{2eq} / a) ☒ Project (> 5000 t CO _{2eq} / a $< 10^6$ t CO _{2eq} / a) ☐ Micro project (< 5000 t CO _{2eq} / a) ☐ AFOLU project ☐ Grouped project ☐ No specific project category
VCS MR dated	Draft: 2012-02-20 Final: 2012-04-19
Applied Methodology	ACM0002 Ver. 9 (Consolidated baseline methodology for grid-connected electricity generation from renewable sources)
Project starting date	2007-03-21
Crediting period	☒ Renewable Crediting Period (10 y) ☐ Fixed Crediting Period (10 y)
Start of crediting period	2007-03-21

1.4.2 Project Location

The details of the project location are given in table 1.4.2:

Table 1.4.2: Project Location

No.	Project Location
Host Country	India
Region:	Jamnagar and Rajkot, Gujarat
Project location address:	Kalavad taluka of Jamnagar district and Upleta taluka of Rajkot District in Gujarat

No.	Project Location					
Latitude and Longitude:	Location No.	Latitude	Longitude			
	81	22°05'54"	70°16'22"			
	82	22°05'48"	70°16'24"			
	83	22°05'41"	70°16'26"			
	84	22°05'35"	70°16'29"			
	85	22°05'28"	70°16'34"			
	86	22°05'20"	70°16'27"			
	87	22°05'15"	70°16'27"			
	88	22°05'09"	70°16'31"			
	89	22°05'03"	70°16'32"			
	90	22°04'56"	70°16'31"			
	91	22°04'58"	70°16'11"			
	92	22°05'05"	70°16'11"			
	93	22°05'11"	70°16'11"			
	94	22°05'18"	70°16'05"			
	96	22°05'31"	70°16'04"			
	97	22°05'38"	70°16'03"			
	98	22°05'44"	70°16'03"			
	99	22°05'38"	70°15'29"			
	100	22°05'32"	70°15'31"			
	101	22°05'26"	70°15'31"			
	102	22°05'19"	70°15'34"			
	103	22°05'12"	70°15'33"			
	104	22°05'05"	70°15'37"			
	105	22°04'33"	70°16'05"			
	106	22°04'26"	70°16'09"			
	107	22°04'20"	70°16'13"			
	108	22°04'13"	70°16'15"			
	109	22°04'05"	70°16'18"			
	110	22°03'59"	70°16'21"			
	111	22°03'34"	70°16'03"			
	112	22°03'28"	70°16'06"			
	113	22°03'21"	70°16'10"			
	114	22°03'16"	70°16'13"			
	501	21°57'46"	70°16'16"			
	502	21°57'53"	70°16'16"			
	503	21°57'60"	70°16'11"			
	504	21°58'03"	70°16'02"			
	507	21°58'26"	70°15'43"			
	508	21°58'31"	70°15'41"			
	510	21°58'46"	70°15'59"			
	511	21°58'50"	70°15'59"			
	512	21°58'55"	70°16'00"			
	513	21°59'01"	70°16'03"			
	514	21°59'05"	70°16'04"			

1.5 Summary Description of the Project

Wind power project by Patnaik Minerals Pvt. Ltd. is converting, kinetic energy of wind into mechanical energy of the WEG blades and subsequently into electrical energy.

Wind has considerable amount of kinetic energy when blowing at high speeds. This kinetic energy when passed through the blades of the wind turbines is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity. The technology is a clean technology since there are no GHG emissions associated with the electricity generation. The project installs Enercon make E-48 WEGs of individual capacity 800 kW.

The key parameters of the project are given in table 1-3:

Table 1-5a: Technical data of the project

Parameter	Unit	Value
Rated capacity	kW	800
Rotor diameter	m	48
Hub height	m	56
Number of blades		3
Swept area	m ²	1,810
Rotor speed	rpm	16 - 31.5
Tip speed	m/s	41 - 78
Cut-in Wind Speed	m/s	3
Rated Wind Speed	m/s	12

Table 1-5b: Parameters confirmed during verification

Parameter	Name	Unit	Value
EG _y	Net Electricity Supplied to Grid	MWh	95,664.55

2 VALIDATION PROCESS, FINDINGS AND CONCLUSION

2.1 Validation Process

Validation process is not applicable as this is a verification report.

2.2 Validation Findings

2.2.1 Gap Validation

NA

2.2.2 Methodology Deviations

NA

2.2.3 New Project Activity Instances

NA

2.3 Validation Conclusion

The project was validated with a positive validation opinion by DOE TUV NORD Cert GmbH (Report number: 532 19708 – 08/473).

3 VERIFICATION PROCESS

3.1 Method and Criteria

The verification of the project consisted of the following steps:

- Contract review
- Appointment of team members and technical reviewers
- Publication of the monitoring report
- Desk review of the Monitoring Report^{MR1/} submitted by the client and additional supporting documents.
- Verification planning,
- On-Site assessment,
- Background investigation and follow-up interviews with personnel of the project developer and its contractors,
- Draft verification reporting
- Resolution of corrective actions
- Final verification reporting
- Technical review
- Final approval of the verification.

Verification is based on the criteria laid down by VCS version 03.

The sequence of the verification is given in the table 3.1 below:

Table 3.1: Verification sequence

Topic	Time
Assignment of verification	2012-02-13
On-site visit	2012-03-01
Draft reporting finalised	2012-03-01
Technical review on draft reporting finalised	-
Final reporting finalised	2012-04-19

Technical review on final reporting finalised	2012-04-19
Final corrections	-

The main verification steps are described below.

3.2 Appointment of team members and technical reviewer

On the basis of a competence analysis and individual availabilities a verification team was appointed. Furthermore also the personnel for the technical review and the final approval were determined.

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 3.2-1 below.

Table 3.2-1: Involved Personnel

	Name	Company	Function ¹⁾	Qualification Status ²⁾	Scheme competence ³⁾	Technical competence ⁴⁾	Verification competence ⁵⁾	Host country Competence	On-site visit
☒ Mr. ☐ Ms.	Abhishek Kumar Srivastava	TUV India Private Limited	TL	LA	☒	1.2	☒	☒	☒
☒ Mr. ☐ Ms.	Lokesh Chandra Dube	TUV India Private Limited	TM ^{A)}	A	☒	1.2	☒	☒	☐
☐ Mr. ☒ Ms.	Arshi Vimal	TUV India Private Limited	TM ^{A)}	A	☒	1.2	☒	☒	☒
☐ Mr. ☒ Ms.	Kiran Nayak	TUV India Private Limited	OT	T	☐	-	☐	☒	☐
☒ Mr. ☐ Ms.	Lin Yi	TUV NORD CERT GmbH	OR ^{B)}	LA	☒	1.2	☒	☒	-
☒ Mr. ☐ Ms.	Stefan Winter	TUV NORD CERT GmbH	TR ^{B)}	SA	☒	1.2	☒	☒	-
☒ Mr. ☐ Ms.	Rainer Winter	TUV NORD CERT GmbH	FA ^{B)}	SA	☒	1.2	☒	☒	-

¹⁾ TL: Team Leader; TM: Team Member, TR: Technical review; OT: Observer-Team, OR: Observer-TR; FA: Final approval

²⁾ GHG Auditor Status: A: Assessor; LA: Lead Assessor; SA: Senior Assessor; T: Trainee; TE: Technical Expert

³⁾ GHG auditor status (at least Assessor)

⁴⁾ As per S01-MU03 or S01-VA070-A2 (such as 1.1, 1.2, ...)

⁵⁾ In case of verification projects

- A) Team Member: GHG auditor (at least Assessor status), Technical Expert (incl. Host Country Expert or Verification Expert), not ETE
- B) No team member

3.3 Document Review

The validated VCS PD^{/PD/}, VCS MR^{/MR1//MR2/} emission reduction calculation spreadsheet^{/XLS1/} and supporting background documents^{/LOG//CAL//TRG/} related to the project implementation, project design, monitoring and baseline were reviewed. The project proponent furnished performance records of the project in form of training records^{/TRG/} and calibration certificates^{/CAL/} etc. VER calculation sheet^{/XLS1/} was checked thoroughly by the verification team for correctness of calculation approach. Data input values were also checked from the records maintained by the project proponents. Result of calculations reported in the monitoring report^{/MR1//MR2/} was checked against data values as available from the project proponent in VER calculation sheet^{/XLS1/}. These data values and other information related to project performance including calibrations details are available in the form of data logs and records duly archived and maintained as per the quality assurance/quality control procedure specified as a part of monitoring plan given in the validated PD^{/PD/}. Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The references used in the course of this verification are summarized in Annex 2.

3.4 Interviews

The verification team has carried out interviews during the site visit in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

During verification site visit the verification team has confirmed the selected information by interviewing the plant personnel and to resolve issues identified in the document review. The main topics of the interviews are summarized in Table 3.4-1.

Table 3.4-1: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives ^{/IM01/} Project consultant ^{/IM02/}	- General aspects of the project - Technical equipment and operation - Changes since validation - Monitoring and measurement equipment - Remaining issues from validation / previous verifications - Calibration procedures - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - GHG calculation - Procedural aspects of the verification - Maintenance - Environmental aspects - Editorial issues of the Monitoring Report

A comprehensive list of all interviewed persons is part of annex 2 'Table 5-4'.

3.5 Site Inspections

During the site visit records of calibration, Joint meter reading, Commissioning certificate, QA-QC procedures, NOC (No objection certificate) from State electricity board, Land lease and Power purchase documents were reviewed. All the procedures and records were found authenticated and properly maintained as per the requirement of the project.

Collection of Measurements

During the onsite visit it was found that the metering arrangement of generated electricity is as per the section 3.2 of the MR and section 3.2 of the validated PD. JMR^{/JMR/} is taken at the substation in the presence of GETCO personal and the project proponent representatives every month. To ensure the quality of monitoring there are both main and check meters installed near each WEG, which are capable of recording both export and import of the electricity and ultimately provides net electricity supplied to the grid. This net value is then used to calculate the GHG emission reductions by the project activity. The accuracy class of each meter is 0.2s as verified during onsite observation by verification team^{/IM01//IM02/}

Observation of established practices and testing of the accuracy of monitoring equipment

Accuracy of monitoring equipment in the project is maintained by means of periodic testing/calibration^{/CAL/} of the energy meters installed at each WTGs calibrated/tested^{/CAL/} once in a year as specified in the QA/QC procedures, as per the approved monitoring plan of validated VCS PD. The meters i.e., Main meter and Check meter calibration / test reports for the above mentioned dates were checked by the verification team which is conservative and acceptable hence found to be ok. The established practices and testing of accuracy of the monitoring equipment was checked at the site by means of calibration/test certificates furnished by the project proponent^{/CAL/} on site and were found appropriate. No calibration has been performed for the year 2011. However, calibration for the year 2012 has been conducted and the meters are found to be functioning properly. Hence, for the non-calibrating period of the current monitoring period i.e. 2011-01-22 to 2011-05-27, a correction factor (0.2%) in accordance with EB 52, Annex 60 has been applied. The same has been cross checked by the verification team and found appropriate.

Determination of the reductions in GHG emissions

Emission reductions have been transparently calculated as per the approach approved in the validated VCS PD^{/PD/}. The PP has used monitored data and ex-ante fixed data including default values as mandated/permitted by the applied methodology. The values used for calculation of GHG emission reductions have been thoroughly checked by the verification team and was found appropriate and correct. The spread sheet submitted by the PP clearly and transparently mentions value of the data parameter used for calculation of emission reductions. The calculations are traceable and follow logical steps. The input values have been verified from the reliable and authentic sources including monitoring records^{/JMR/}, approved VCS PD^{/PD/}, validation report^{/FVR/} and applied methodology.

However 02 CARs and 01 CL were raised under section 4.2 of this report on calculation of GHG emission reductions and successfully closed out.

Review of additional data from other sources if appropriate

Additional data from other sources were checked to cross verify the reliability of monitored data e.g. Central Electricity Authority (CEA) version 04. This is done through reviewing data source.

Review of monitoring results and verification of the correct application of monitoring methodologies

The verification team has checked the meter reading records and the log book readings of the project activity during the site visit. The monitoring plan mentioned in the validated PD is as per the methodology ACM0002 version 09 applied in the project activity and same is followed by project proponent as checked/verified during verification. The QA/QC measures mentioned in the MR and validated PD are being followed by project proponent. The calibration/testing of the meters are carried out yearly as mentioned in the MR and validated PD. No calibration has been performed for the year 2011. However, calibration for the year 2012 has been conducted and the meters are found to be functioning properly. Hence, for the non-calibrating period of the current monitoring period i.e. 2011-01-22 to 2011-05-27, a correction factor (0.2%) in accordance with EB 52, Annex 60 has been applied. The same has been verified and found conservative. The documents submitted were found to be satisfactory and in compliance with the VCS 2007.1 and VCS version 3 requirements.

The verification team has carried out interviews in order to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the VCS.

3.6 Resolution of Any Material Discrepancy

Material discrepancies identified in the course of the verification are addressed either as CARs, CLs or FARs.

A **Corrective Action Request (CAR)** is established where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence the project results,
- the requirements deemed relevant for verification of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered or that emission reductions would not be able to be verified and certified.

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the first verification.

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in the next section 4 of this report.

In this section the assessments and findings from the desk review of the VCS PD^{/PD/}, site visit, interviews and supporting documents as well as the final assessments are summarised. Table 3.6-1 includes an overview of all raised CARs, CLs and FARs.

Table 3.6-1: Overview of CARs, CLs and FARs issued

No.	Topic / Chapter	CAR	CL	FAR
4.1	Project implementation and Completeness of monitoring	04	-	-
4.2	Accuracy of emission reduction calculations	02	01	-
4.3	Quality of evidence to determine emission reductions	01	-	-
4.4	Management and operational system	02	-	-
-	SUM	09	01	

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

Description

The project was found to be in line with the Validated project description^{/PD/}, Monitoring Report^{/MR/} of first monitoring period and the final monitoring report for second monitoring period^{/MR2/}. During the desk review and site visit it was observed that the start date of the second (present) monitoring period is 2009-09-01 which is in continuation of last monitoring period ending on 2009-08-31. The project has installed 44 WEGs of 800 kW in the state of Gujarat, India. The specifications of the installed WEGs were checked from the purchase orders^{/PT/} and physically verified during the site visit. The name of WEGs, latitude and longitudes were verified from the validated PD and validation report. The project has been implemented as described in the validated VCS Project Description^{/PD/}.

As per the onsite assessment, observations, interviews^{/IM01//IM02/} and collected evidences, it is concluded that the project has been implemented as per the project description provided in the validated PD^{/PD/}.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	4.1-1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Details of outages or the events which may impact the GHG emission reductions, as per section 2.1 of the VCS Monitoring Report template has not been provided in the VCS monitoring report ^{/MR1/} .		

Finding:	4.1-1
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	PP would like to clarify that there have been no outages during the monitoring period and same has been included in the MR as well
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	As evident by the electricity generation records made available with the PP including generation records at the WTGs, recorded by Enercon as available on site during assessment, there were no outages during the current monitoring period. The same is found stated in the revised MR.. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☐ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	4.1-2
Classification	☒ CAR ☐ CL ☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	GPS coordinates of the WEGs written in the submitted monitoring report ^{/MR1/} are not in line with the validated PD ^{/PD/} .
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The GPS coordinates have been corrected now. The certificate of coordinates provided by the technology provider has now been submitted to DOE as Annexure 1
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	GPS coordinates provided in the revised MR are found matching with the validated PD. The PP has submitted list of geographical coordinates of WEG locations certified by the technology supplier (Enercon) dated 2010-01-29, which is acceptable. The latitude and longitudes were also checked on random basis on site using GPS application available in mobile phones. There was no significant variation observed. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The project is implemented as described in validated VCS PD^{/PD/}. There is no deviation from the validated PD. The implementation of project is correctly and transparently described in the monitoring report^{/MR2/} after making minor corrections during the course of verification.

4.1.1 Implementation status of the monitoring plan and the completeness of monitoring

The project activity monitoring procedures are in compliance with the monitoring plan of validated VCS PD^{/PD/}.

Description:

The monitoring report^{/MR1//MR2/} has outlined the monitoring procedure of the project over the period (2009-09-01 to 2011-05-27). The submitted monitoring report^{/MR1//MR2/} which forms the basis of the verification, was prepared by summarizing consolidated data over the whole monitoring period in accordance with the monitoring plan of the validated VCS PD^{/PD/}. The monitoring report is in line with the requirements of the monitoring plan of the validated VCS PD^{/PD/} as well as with the applied methodology ACM0002 version 09^{/ACM2/}. The JMRs provided by GEDA mentions export, import and net electricity supplied to the grid. This was checked by verification team during the desk review and also cross checked by interviewing the PP^{/IM01/}. The calibration / testing of the meters for the period i.e. from 2009-09-01 to 2011-01-21 was carried out and the copy for the same was obtained by the verification team. No calibration has been performed for the year 2011. However, calibration for the year 2012 has been conducted and the meters are found to be functioning properly. Hence, a correction factor for the non calibrated period i.e. 2011-01-22 to 2011-05-27 has been appropriately applied for the period January, 2011 to May, 2011 conservatively in accordance with EB 52, Annex 60. The data is recorded by Enercon for the daily generation. The JMR is taken by GEDA and PP personnel This is done on monthly basis. All records related to the project are systematically archived and will be kept for crediting period +2 years.

The reporting procedures reflect the requirements of the monitoring plan of the validated PD^{/PD/}. The monitoring parameter is recorded as per the monitoring plan and methodology. No deviation is taken in the monitoring plan for this monitoring period.

Following metering and measurement was verified during onsite visit:

- Transformer yard meter at the WTG site
- main and check meters installed at the GETCO substation

The calibration records^{/CAL/} were made available to the verification team. None of the meters have been changed or reset during the reported monitoring vintage.

Related Findings

☐ No CARs, CLs or FARs have been identified in this context

☒ The following finding(s) have been addressed:

Finding:	4.1.1-1
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Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Latest VCS monitoring report template i.e. version 3.1 available on the VCS website ¹ is not used to prepare the monitoring report of the project.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The template has been revised and the latest version 3.1 is now used to prepare the monitoring report.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The monitoring report is found revised on the latest applicable version of MR template as available on VCS website i.e. MR template of version 3.1. The MR is found filled in as per the requirements of the template. CAR is thus closed out.		
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☐ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Finding:	4.1.1-2		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Monitoring period as specified in the submitted monitoring report is from 2009-09-01 to 2011-08-07 which is not correct as the project got registered under CDM on 28-May-2011. Please refer to the FAR D3 of validation report regarding double counting of ERs.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	PP would like to clarify that the dates mentioned was a typographical error. The correct dates of the monitoring period being : 01 Sep 2009 to 27 May 2011 has been included in the MR.		

¹ <http://www.v-c-s.org/program-documents>

DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	As per the corrective action proposed on FAR D3 during validation, double counting of ERs shall be avoided. Compliance to the same was to be checked in subsequent verifications. VT checked that the present monitoring period is till 2011-05-27 which does not overlap with the crediting period in CDM and hence is accepted. CAR is closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The submitted monitoring report^{/MR1/} has been cross checked by the verification team by the three means those are desk review, site visit and interaction with project participants.

In the section, Completeness of Monitoring, the verification team has checked the applied monitoring methodology ACM0002 version 09 and other related issues like monitoring of parameters, Calibration/testing of meters, etc are carried out as per validated PD or not. These were checked during the course of verification. The verification team has checked the monitoring of electricity generation at metering point and found that the monitoring and recording is done monthly which is as per validated PD. The joint meter readings^{/JMR/} were also checked and found acceptable. The meters i.e., Main meter and Check meter calibration / test reports for the the period 2009-09-01 to 2011-01-21 were checked by the verification team and found to be acceptable. However, no calibration has been carried out for the year 2011. Hence, a correction factor for the non calibrated period i.e. 2011-01-22 to 2011-05-27 has been appropriately applied for the period January, 2011 to May, 2011 conservatively in accordance with EB 52, Annex 60

Two (02) CARs were raised on the completeness of monitoring and closed successfully, hence the section is inline with the validated PD^{/PD/}. The section completeness of monitoring fulfils the requirements of monitoring methodology ACM0002 Version 09 and also complies with the requirements of VCS 2007.1 and VCS version 3. Furthermore, there are no open issues from the previous verification^{/VCS_VER/}.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

Description

The monitoring report^{/MR1/} is found to be in line with the validated PD^{/PD/}, and also uses the same parameters for ensuring the accuracy of the emission reductions.

The calculated emission reductions of 86,592 tCO₂e for the current monitoring period viz. 2009-09-01 to 2011-05-27 has been verified and found to be true, real and accountable. The formulas and factors used in the calculations of emission reductions are in accordance to the approved baseline

methodology ACM0002 Version 09 after minor corrections. Furthermore, there are no indirect GHG emissions associated to the project activity. All the emission reductions calculations are presented in a transparent manner and in line with the applied methodologies and tool to calculate emission factor for an electricity system. The formulas of EG_y and ERs are shown below as:-

As per the validated PD and methodology ACM0002 (Version 09), the emission reductions (ER_y) are calculated as:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

BE_y = Baseline emissions in year y; kWh = $EF_y * EG_y$

EF_{CO_2} = Emission Factor in year y; tCO₂e/MWh 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_y = Net electricity supplied to GUVNL facility in year y MWh

PE_y = Project Emissions

LE_y = Leakage

Emissions Factor (EF_{CO_2}):

The emission factor for the NEWNE grid has been calculated ex ante as **0.9058** tCO₂e/MWh and does not require monitoring.

Net electricity supplied to the grid (EG_y):

Net electricity supplied to the grid (EG_y) during the second monitoring period is **95,664.55** MWh. However, taking into consideration the delay in the calibration for the period 2011-01-21 to 2011-05-27, a correction factor (0.2%) has been applied in accordance with EB 52, Annex 60 for the entire period of January, 2011 to May, 2011. The corrected value therefore comes out to 95,612.19 MWh.

The corrected value of the parameter EG_y when used for the computation of Emission Reductions results in the emission reductions of 86,605 t CO₂e. However, due to month-wise calculation of ERs and rounding down of each monthly value of ERs, Emission reductions from the monitoring period come out to be **86,592 t CO₂e**. The same is found to be conservative and hence acceptable to the verification team.

One CAR and one CL are raised on the same.

Related Findings

- ☐ No CARs, CLs or FARs have been identified in this context
- ☒ The following finding have been addressed:

Finding:	4.2-1
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Classification	☐ CAR	☒ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Emission reduction calculation spread sheet showing a complete and traceable calculation of emission reductions is not submitted by PP.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Emission reduction calculation sheet has now been provided to DOE as Annexure 2.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	A clear, traceable and complete ER calculation sheet has been submitted by the PP that includes calculation of emission reductions from generated electricity. Input values of net electricity supplied to the grid are found sourced from the JMR sheets, which is as per the requirement of validated PD. Also, the emission factor is taken as fixed <i>ex ante</i> . Due to month-wise calculation of ERs and rounding down of each monthly value of ERs, Emission reductions from the monitoring period come out to be 86,592 t CO ₂ e. Calculation approach is conservative; calculation is correct; emission reduction values are rounded down, hence acceptable. CL is closed.		
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Finding:	4.2-2		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Ex-ante values of operating margin emission factor, build margin emission factor and combined margin emission factor provided under section 3.1 of the VCS MR are not in line with the approved validation report.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The values of combined margin emission factor has been corrected and the ex ante monitoring parameters in the monitoring report are now in line with the validated PD/first verification report.		

DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	Emission factor values are found corrected and found made in line with validation report and previous verification report. Validation report gives value of Combined margin as 0.90589 t CO₂/MWh. However, a value of 0.90580 t CO₂/MWh was applied in calculations conservatively during validation and last (first) verification. The same value has been applied in this verification and hence is acceptable. CAR is closed out successfully.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Finding:	4.2-3		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Please clarify what PP meant by PMPL Phase-I and PMPL Phase-II under table 'VER Calculation' of section 5 of the submitted monitoring report.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The terminology PMPL Phase-I and PMPL Phase-II is used by the GETCO for providing the monthly generation figures in the JMR. However, there is no differentiation between PMPL phase I and phase II from the VCS perspective as both are part of the same project activity. The emission reduction calculation has been done based on the summation of net electricity exported by the project activity represented by PMPL – I, PMPL-II, BIL in the JMR.		
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	WTGs were commissioned phase-wise. DOE has assessed the justification given by the PP and same has been incorporated in the revised version of the MR. This was also checked by checking the meters and interviewing the personals taking the JMR's. CAR is closed successfully.		
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Final Assessment

The calculation of emission reduction was cross checked from the revised spreadsheet^{/XLS1/}, JMRs^{/JMR/} provided by PP. The ER calculation was found to be correct and conservative. The conservativeness was checked by checking the rounding down of the total emission reductions. The calculated emission reductions of **86,592 tCO₂e** for the period from 2009-09-01 to 2011-05-27 is verified and found to be true, real and accountable. Hence project complies with the requirements.

One CAR and one CL were raised on the section Accuracy of emission reduction calculations and closed successfully as mentioned above.

The verification team has ensured that there is no double counting of emission reductions in the monitoring period as the project got registered under CDM on 2011-05-28 which is after the specified monitoring period, also project is not claiming the ERs under any other standard. This is in compliance with VCS 2007.1 & VCS version 3.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

Description

The emission reductions are calculated on the basis of the monthly joint meter readings at the substation. The JMRs^{/JMR/} provided by GEDA were checked and found to be matching with the data provided through the spreadsheet^{/XLS1/} by the project proponent. The meter readings are taken jointly by GETCO and PP representative. As the meter readings are taken these are signed by both the parties and accepted as final readings. So QA/QC procedures are in place for the calculation of net energy supplied to the NEWNE grid. Also, the electrical meters used for measurements are locked and sealed and thus are tamper free. Other than this, several documents^{/JMR/CAL} were submitted by the project participant as evidence to determine emission reductions and to cross check the values. These values were cross checked and the verification team is satisfied with the quality of the evidence used to determine emission reductions.

Related Findings

- ☒ No CARs, CLs or FARs have been identified in this context
☐ The following finding(s) have been addressed:

Finding:	4.3-1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	Accuracy class of meters installed at metering yard as mentioned under section 3.2 of the submitted monitoring report is ranging between 0.2s/0.5s, kindly clarify the same as in the other parts i.e. page no. 9 of MR the accuracy class of the meters are mentioned is 0.2s.		
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	PP would like to clarify that the accuracy class of the meters in 0.2s, and same has been corrected in the MR. The calibration certificates of the meters are now been provided to the DOE.		

DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	As confirmed from the meter specification provided in the calibration certificates all meters installed during the monitoring period are of accuracy class 0.2s which is as per the requirements laid by approved monitoring plan contained in validated PD. The VT checked accuracy class of energy meters on site and found the same acceptable. CAR is closed successfully.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

The emission reductions are calculated on the basis of the monthly Joint Meter Readings^{/JMR/} at the substation. The electrical meters used for the emission reduction calculations were locked and sealed as checked by the verification team during the site visit and thus are tamper free. The project proponent also submitted other documents^{/JMR/CAL/} for the verification of emission reductions are found to be satisfactory, hence the section Quality of evidence to determine emission reductions of the revised monitoring report^{/MR2/} is in line with the validated PD^{/PD/} and hence complies with the requirements.

4.4 Management and Operational System

Description

The suitability of the monitoring system was assessed first during the desk review of MR^{/MR1/}, followed by site visit and the interviews of PP and operational staff. The management and operation of the project has been found to be sufficient as per the monitoring plan of the validated VCS PD^{/PD/}. The system in place on site is found to be satisfactory as it ensures that the quality of the emission reductions achieved by the project is maintained. Also the recording of data for JMR is carried out by GEDA and PP representative. The roles and responsibilities mentioned in PD were also checked and found to be appropriate in the revised MR^{/MR2/}.

Two (02) CARs were raised on the management and operational system during course of verification and successfully closed.

Related Findings

- ☐ No CARs, CLs or FARs have been identified in this context
- ☒ The following finding(s) have been addressed:

Finding:	4.4-1		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding Describe the finding in unambiguous style; address the context (e.g. section)	Section 3.3 of the submitted VCS MR is not inline with the VCS monitoring report template, as following departures were found from the template: 1. A clear organisational structure, responsibilities and competencies are missing. 2. Procedure for handling internal auditing and non conformities are missing.		
Corrective Action #1 This section shall be filled by the PP. It shall address the corrective action taken in details.	1. The organisational structure along with responsibilities and competencies is now included in the MR 2. PP would like to clarify that there is no requirement of auditing in the project activity as the electricity export readings come directly from electricity board via calibrated meters. Same is included in the MR		
DOE Assessment #1 The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.	A clear organisational structure, responsibilities and competencies are found provided in section 3.3 of the revised MR. It is also found clarified in the MR that there is no requirement of internal auditing. The validated PD and approved VCS validation report do not stipulate any such requirements. Section 3.3 of the submitted VCS MR is now in-line with the VCS monitoring report template, hence is accepted. CAR was successfully closed.		
Conclusion Tick the appropriate checkbox	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements		

Finding:	4.4-2		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding Describe the finding in unambiguous style; address the context (e.g. section)	The roles and responsibilities with reference to the project activity have not been provided in section 1.3 of the MR. Furthermore, the contact information also needs to be clearly defined.		

Finding:	4.4-2
Corrective Action #1 <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The roles and responsibilities as well as contact information has now been included in the revised MR.
DOE Assessment #1 <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The description of roles and responsibilities as well as contact information has now been clearly defined in the revised MR. The submitted VCS MR is now in-line with the VCS monitoring report template, hence is accepted. CAR was successfully closed.
Conclusion <i>Tick the appropriate checkbox</i>	☐ To be checked during the first periodic verification ☒ Appropriate action was taken ☒ Project documentation was corrected correspondingly ☐ Additional action should be taken ☒ The project complies with the requirements

Final Assessment

Management and operation system for data collection, compilation and archiving of the monitored data of generated emission reductions is observed during site visit, interview with PP and O&M personnel. By means of this, verification team conclude that monitoring information provided in section 3.3 of MR^{MR2/} is in accordance with the validated PD and hence complies with the requirements.

Moreover 02 CARs were raised on the management and operation system and closed successfully during the course of verification.

5 VERIFICATION CONCLUSION

The conclusions can be summarised as follows:

- All operations of the project are implemented and installed as planned and described in the validated project description^{/PD/} and project activity confirms with the verification criteria for project and their GHG emission reductions or removals set out in the VCS rules i.e. VCS 2007.1 and VCS version 03.
- The monitoring plan is in accordance with the applied approved methodology, i.e. ACM0002, version 09 and monitoring plan as sought out in section 3.3 and 3.4 of validated project description^{/PD/}.
- The installed equipments essential for measuring parameters (quality and quantity of energy meters) required for calculating emission reductions are calibrated appropriately.
- The monitoring system is in place and functional. The project has generated verifiable GHG emission reductions.

As the result of the 2nd periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM

CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows.

Reporting period: 2009-09-01 to 2011-05-27

GHG Emission Reductions or Removals	tCO ₂ e
Baseline Emissions	86,592
Project Emissions	0
Leakage	0
Net GHG emission reductions or removals	86,592

Annex 1

VERIFICATION STATEMENT

The verification statement will be provided as part of the final verification report.

M/s Patnaik Minerals Private Limited has commissioned the TÜV NORD JI / CDM Certification Program to carry out the verification of the Project "*Wind power project by Patnaik Minerals Pvt. Ltd*" in Jamnagar and Rajkot districts of Gujarat, India with regard to the requirements of VCS 2007.1 Standard.

The project activity involves conversion of the kinetic energy into electrical energy. In this process there occurs no greenhouse gas emissions or burning of any fossil fuels. Thus electricity is generated through sustainable means without causing any negative effect on the environment.

Reporting period: From 2009-09-01 to 2011-05-27

In the course of the verification nine (09) Corrective Action Requests (CARs), one (01) Clarification Request (CL) were successfully closed.

The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the validated PD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to the TÜV NORD JI/CDM CP by the project participant.

In detail the conclusions can be summarised as follows:

- all operations of the project are implemented and installed as planned and described in the validated project description.
- the monitoring plan is in accordance with the applied approved methodology ,i.e, ACM0002 Version 09
- the installed equipment essential for measuring parameters required for calculating emission reductions is calibrated appropriately.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

As the result of the 1st periodic verification, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. TÜV NORD JI/CDM CP herewith confirms that the project has achieved emission reductions in the above mentioned reporting period as follows:

Total Emission reductions 86,592 t CO2 equivalents

Year 2009: 12,418 t CO2 equivalent

Year 2010: 50,514 t CO2 equivalent

Year 2011: 23,660 t CO2 equivalent



TÜV NORD JI/CDM Certification Program
Abhishek Kumar Srivastava
Verification Team Leader
New Delhi, 2012-04-19



TÜV NORD JI/CDM Certification Program
Rainer Winter
Final approval
Essen, 2012-04-19

Annex 2

Table 5-1: Documents provided by the project participant

Reference	Document
/CAL/	Calibration records for the key instruments and measuring devices: ▪ Calibration certificates of associated with PMPL meter no. GJU-04176 dated 2009-03-03, 2010-01-22 and 2012-01-17 ▪ Calibration certificates of associated with PMPL meter no. GJU-04175 dated 2009-03-03, 2010-01-22 and 2012-01-17 ▪ Calibration certificates of check meter associated with PMPL meter no GJB 01470 dated 2009-03-03, 2010-01-22 and 2012-01-17
/CON/	The signed contract between TUV-NORD and Patnaik Minerals Private Limited to carry out the verification job
/ORG/	Organization Chart for operation and monitoring for the proposed project activity.
/JMR/	Joint Meter readings
/CN/	Monthly Credit Notes for each WTG covering whole the monitoring period.
/PHOTO/	Photograph of the WEGs installed at project site.
/LOG/	Log book records for the current monitoring period i.2. 2009-09-01 to 2011-05-27
/MR1/	Draft MR version 1.0 submitted initially by the PP
/MR2/	Final MR version 3 which forms the basis for verification.
/PT/	Evidence of proof of title /ownership (Cp section 8.1 of the VCS-PD template) ▪ Purchase orders of wind turbine generators. ▪ Agreement between PMPL and Enercon.
/QA-QC/	The QA-QC procedure on data acquisition and storage.
/TRG/	Training and maintenance record of the plant personal to operate.
/XLS/	Supporting Excel sheet for calculation of emission reduction related to /MR1/
/XLS1/	Supporting Excel sheet for calculation of emission reduction related to /MR2/

Table 5-2: Background investigation and assessment documents

Reference	Document
/ACM2/	ACM0002/Version 09: "Consolidated baseline methodology for grid connected electricity generation from renewable sources".
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/FVR/	Final Validation report issued by TUV NORD Cert GmbH (Report number: 532 19708 – 08/473), dated 2009-11-16
/IPPC/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/MR/	Final Monitoring Report for the 1st monitoring period (2007-05-01 to 2009-08-31) of the VCS project activity "Wind power project by Patnaik Minerals Pvt. Ltd", Version 3, dated 2010-07-16
/PD/	Registered VCS PD for the project activity "Wind power project by Patnaik Minerals Pvt. Ltd", Version 2, dated 2009-11-09
/VCS_VER/	Verification report issued by TUV NORD Cert GmbH for the 1st Monitoring period (2007-05-01 to 2009-08-31), dated 2010-08-10
VCS	Verified Carbon Standard VCS version 3
/VCS-MR-T/	VCS MR template
/VDS-PD-T/	VCS PD Template
/VVM/	Validation and Verification Manual

Table 5-3: Websites used

Reference	Link	Organisation
/cd4cdm/	www.cd4cdm.org	UNEP Riso Centre
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/pmpl/	http://patnaikminerals.com/	Patnaik Minerals Private Limited

Reference	Link	Organisation
/vcs/	www.v-c-s.org	VCSA
/unfccc/	http://cdm.unfccc.int	UNFCCC

Table 5-4: List of interviewed persons

Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	Sanjit Panda	Assistant General Manager (Projects), Patnaik Minerals Private Limited.
/IM01/	☒ Mr. ☐ Ms.	Kantilal	Engineer, Enercon
/IM02/	☒ Mr. ☐ Ms.	Atin Prakash	Senior Consultant E&Y
/IM02/	☒ Mr. ☐ Ms.	Vishal Goel	Consultant E&Y

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)