

VCS 2007.1 Verification Report of the VCS project entitled " 44 MW Bundled Wind Power Project in Maharashtra managed by Enercon India Limited."



Voluntary Carbon Standard Version 2007.1 Final Verification Report

27th May 2010

Project No: 53153808/08-08/486

Name of Verification company:	Date of the issue:
TÜV NORD CERT GmbH	2010/05/27
Report Title:	Approved by:
44 MW Bundled Wind Power Project in Maharashtra managed by Enercon (India) Limited.	Eric Krupp
Client:	Project Title:
Enercon (India) limited	44 MW Bundled Wind Power Project in Maharashtra managed by Enercon India Limited.
Summary:	

VCS 2007.1 Verification Report of the VCS project entitled " 44 MW Bundled Wind Power Project in Maharashtra managed by Enercon India Limited."

Enercon (India) limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project - "44 MW Bundled Wind Power Project in Maharashtra managed by Enercon (India) Limited." with regard to the relevant requirements of VCS 2007.1 Standard.

The purpose of this project activity is to generate electricity using renewable sources (wind) and export it to the connected state grid i.e. MSEDCL (Maharashtra state electricity Board) which is a part of NEWNE grid of India^{/CEA/}, thereby displacing the grid that would have been generated predominantly from fossil fuel based power generation.

As per the VCS PD, control panel meters installed at wind turbines have to be calibrated annually. However, the same was not furnished by the PP due to the fact that meters are self calibrated and equipped with intelligent software control system which does not require calibration. The panel meter needs no calibration as it is software based integrated system which has been specially designed for control of wind turbine where control functions, data collection and storage, real time grid monitoring and storage function are integrated. Thus, verification team assessed that there is no significant impact on the project activity due to this deviation. Hence, deviation is also in line with the stipulations of VCS 2007.1 section 5.3 and acceptable to the verification team.

A risk based approach has been followed to perform this verification. In the course of the verification (09) corrective Action Requests (CAR) and (01) clarification request (CL) were raised and successfully closed out.

The verification is based on Validated VCS-PD under version 2007.1, Final Validation Report, monitoring report, emission reduction calculation sheet and other supporting documents made available to the verifiers by project proponent.

Based on the VCSPD, Final Validation Report, and subsequent verification, the verifiers confirm that:

The GHG emission reduction in the reported monitoring period 01/04/2006 to 31/05/2009 (inclusive both the days) is: 122,200 tCO₂e.

VCS 2007.1 Verification Report of the VCS project entitled " 44 MW Bundled Wind Power Project in Maharashtra managed by Enercon India Limited."

Work carried out by:	Number of pages:
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VCS 2007.1 Verification Report of the VCS project entitled " 44 MW Bundled Wind Power Project in Maharashtra managed by Enercon India Limited."

Table of Contents

1. Introduction	05
1.1. Objective	05
1.2. Scope and Criteria	05
1.3. VCS Project Description	05
1.4. Level of Assurance	11
2. Methodology	12
3. Verification Findings	12
3.1. Remaining issues, including any material discrepancy, from previous validation	12
3.2. Project Implementation	16
3.3. Completeness of Monitoring	17
3.4. Accuracy of Emission Reduction Calculations	23
3.5. Quality of Evidence to Determine Emission reductions	28
3.6. Management and Operation System	29
4. Verification conclusion	30
Annex -1	34
Annex-2	35

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 Project Document;
- to confirm that the monitoring system is implemented and fully functional to generate Voluntary Emission Reductions (VERs/VCUs¹) 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 VCS project is based on the monitoring report^{/MR1/, /MR2/}, Final Validation report^{/FVR/}, VCS PD^{/VCS-PD/} and other supporting documents made available to the verifier and information collected through performing interviews 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.

1.3 VCS project Description

The project under consideration is set up to produce clean power from the wind electric converters. The Project leads to reduce greenhouse gas (GHG) emissions because it displaces electricity from fossil fuel based electricity generation plants. The Project activity is located across Satara, Sangli, Nasik, and Ahmednagar District in the state of Maharashtra in India. The project is helping in bridging the demand supply gap by using wind as a source of generating electrical energy.

¹ As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after successful registration in an approved VCU Registry

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

The project activity consists of the 55 machines of Enercon make of 800 KW each, aggregating to the capacity of 44 MW. The Project considered harnessed renewable resources in the region, thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development. Enercon (India) Ltd (“Enercon” or “EIL”) is the equipment supplier and the operations and maintenance contractor for the Project.

The following table gives the detail description of the location of the WECs and respective latitude and longitude:

S. No.	Customer's Name	Machine Capacity (MW)	Site	Taluka	District	Latitude	Longitude
1	G. B. Rubber Products	1.6	Kadvekhurd	Patan	Satara	17°33'15" to 17°33'56"	73°55'28" to 73°56'51"
2	Atlas Tours & Travels Pvt. Ltd	0.8	Kadvekhurd	Patan	Satara	17°33'15" to 17°33'56"	73°55'28" to 73°56'51"
3	Shah Lulla Estate Developers	0.8	Kadvekhurd	Patan	Satara	17°33'15" to 17°33'56"	73°55'28" to 73°56'51"
4	Liberty Oil Mills Ltd.	2.4	Kadvekhurd	Patan	Satara	17°33'15" to 17°33'56"	73°55'28" to 73°56'51"
4	Liberty Oil Mills Ltd.	1.6	Varekarwadi	Patan	Satara	17°11'47.6" to 17°11'51.	73°59'12.7" to 73°59'13.

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

S. No.	Customer's Name	Machine Capacity (MW)	Site	Taluka	District	Latitude	Longitude
						2''	5''
5	Paceman Sales Promotion P. Ltd.	0.8	Bhambawadi	Shirala	Sangli	17°8'36.5 ''	73°55'14.3''
6	Delta Enterprises	2.4	Bhambawadi	Shirala	Sangli	17°7'11.3 '' 17°8'35.6 '' 17°8'28.5 ''	73°56'5.7 '' 73°55'2.8 '' 73°55'21.7''
7	Shreem Capacitors Pvt. Ltd.	3.2	Bhambawadi	Shirala	Sangli	17°8'52.1 '' 17°8'58.2 '' 17°9'2.8'' 17°9'34.8 ''	73°55'10.1'' 73°55'6'' 73°55'5.4 '' 73°55'6.1 ''
8	Kishor Food Products P. Ltd	0.8	Bhambawadi	Shirala	Sangli	17°8'53.2 ''	73°54'57.7''
9	Mahanagar Developers	7.2	Bhambawadi	Shirala	Sangli	17°9'7.6'' 17°9'14.7 '' 17°9'19.1 ''	73°55'5.8 '' 73°55'2.5 '' 73°55'3.6

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

S. N o.	Customer s Name	Machin e Capacit y (MW)	Site	Taluk a	District	Latitude	Longitud e
						17°9'24.6 ” 17°9'28.2 ” 17°9'14.5 ” 17°9'10.8 ” 17°9'10.9 ” 17°8'10.9 ”	” 73°55'6” 73°55'6.7 ” 73°55'18. 1” 73°55'36. 6” 73°55'3.5 ” 73°56'0.5 ”
9	Mahanaga r Developer s	0.8	Panchpa tta	Sinnar	Nasik	19°39'12. 8”	73°48'41. 4”
10	Mr. J. P. Patel	0.8	Panchpa tta	Sinnar	Nasik	19°45'53. 4”	73°50'32. 8”
11	Mr. C. P. Patel	0.8	Panchpa tta	Sinnar	Nasik	19°45'17. 1”	73°50'31. 4”
12	Mr. V. V. Patel	0.8	Panchpa tta	Sinnar	Nasik	19°44'58”	73°50'13. 1”
13	Mr. J. V. Patel	0.8	Panchpa tta	Sinnar	Nasik	19°45'12. 7”	73°50'29. 2”
14	Mr. S. V. Patel	0.8	Panchpa tta	Sinnar	Nasik	19°45'46. 9”	73°50'34. 1”
15	Mr. V. L.	0.8	Panchpa	Sinnar	Nasik	19°44'33.	73°50'29.

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

S. No.	Customer's Name	Machine Capacity (MW)	Site	Taluka	District	Latitude	Longitude
	Patel		tta			5"	2"
16	Laxmi Narayan Best Chiwda	0.8	Panchpatta	Sinnar	Nasik	19°45'2.9" "	73°50'12.6"
17	Om Shanti Wind Farms P. Ltd	0.8	Aundhe wadi	Sinnar	Nasik	19°45'7.7" "	73°50'12.8"
18	New Sahyadri Industries Ltd.	1.6	Panchpatta	Akole	Ahmednagar	19°44'24.3" 19°44'28.2"	73°50'40.8" 73°50'35.7"
19	Mr. P. L. Patel	0.8	Panchpatta	Akole	Ahmednagar	19°41'7.2" "	73°48'48.2"
20	Elpro International	0.8	Panchpatta	Akole	Ahmednagar	19°41'41.8"	73°48'53.3"
21	Prachar Energy	1.6	Panchpatta	Akole	Ahmednagar	19°39'17.8" 19°39'22.7"	73°48'42.7" 73°48'47.5"
22	Panama Wind Energy Pvt. Ltd.	1.6	Panchpatta	Akole	Ahmednagar	19°41'16.6" 19°41'20.6"	73°48'53" 73°48'55.6"
23	International Conveyors	0.8	Panchpatta	Akole	Ahmednagar	19°41'37"	73°48'54.3"

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

S. No.	Customer's Name	Machine Capacity (MW)	Site	Taluka	District	Latitude	Longitude
	Ltd.						
24	Metalfab Hightech Private Limited	0.8	Panchpatta	Akole	Ahmednagar	19°41'11.9"	73°48'51.6"
25	Gargi Construction Co. Pvt. Ltd.	1.6	Panchpatta	Akole	Ahmednagar	19°41'26.1" 19°41'31.1"	73°48'55.1" 73°48'54.5"
26	Mohite & Mohite	2.4	Panchpatta	Akole	Ahmednagar	19°42'15.6" 19°42'20.5" 19°42'25.6"	73°49'6.4" 73°49'15.9" 73°49'15.3"
27	Indiana Engineering Works (Bombay) P. Ltd.	1.6	Panchpatta	Akole	Ahmednagar	19°39'27.5" 19°39'32.4"	73°48'49" 73°48'49.8"
28	Welpack Industries Ltd.	0.8	Panchpatta	Akole	Ahmednagar	19°39'7.9" "	73°48'37"
29	Sunilkumar Ramanlal Shah	0.8	Panchpatta	Akole	Ahmednagar	19°44'38.6"	73°50'22.5"

The emission reduction for the reported monitoring period is based on net electricity of 134,895,879 kWh Supplied to NEWNE grid (after considering

VCS 2007.1 Verification Report for the project entitled:
"44 MW Bundled Wind Power Project in Maharashtra managed
by Enercon India Limited"

conservative approach of apportioning) and the validated ex-ante grid emission factor (0.90589tCO₂/MWh)/cea/ of NEWNE grid is in accordance with meth ACM0002 version: 10 /ACM0002/. The net electricity Supplied from project activity was calculated as the difference between electricity exported to the grid and the electricity imported from the grid which are derived from the continuously measured export and import electricity meters respectively.

Procedure for apportioning of electricity:

The net electricity supplied to the grid is calculated from the difference between Break up Exported and imported values of each customer for every month, the Break up imported and exported values are calculated as per the formulas described below.

Net Electricity supplied= (Break up Exported electricity)
- (Break up Imported electricity)

Break up Exported electricity = (Exported EB meter reading X Panel generation)/ total Panel generation of all WECs connected on same feeder

Break up Imported electricity = (Imported EB meter reading X Panel generation)/ total Panel generation of all WECs connected on same feeder

The Net electricity supplied to the grid is recorded by taking a Joint Meter Reading (JMR) in the presence of officials from MSEDCL and Enercon as O&M contractor, on behalf of project sponsor. None of the meters have been changed/CAL/ during the reported monitoring vintage period which was verified on-site and was found to be deemed correct.

1.4 Level of assurance

The verification report is based on VCS-PD^{/VCS-PD/}, Monitoring report^{/MR1/, /MR2/} and Final Validation report^{/FVR/}, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. The verification opinion is assured provided the credibility of all above.

VCS 2007.1 Verification Report for the project entitled:
"44 MW Bundled Wind Power Project in Maharashtra managed
by Enercon India Limited"

2 Methodology

The onsite visit for the project was carried out in December 2009 and the assessment of verification is carried out from December 2009 to May 2010.

Preparations:	2009-12-14 to 2010-02-04
On-site verification :	2009-12-17 to 2009-12-18
(Draft) Reporting :	2010-01-05
(Final) Reporting :	2010-05-27

The verification consists of the following steps:

- A desk review of the VCS-PD /VCS-PD/ and supporting documents with the use of the relevant sections of a customised protocol according to the VCS 2007.1 guidelines;
- A desk review of the Monitoring Report /MR1/, /MR2/ and additional supporting documents which were submitted by the client. The relevant sections of the above mentioned customised protocol according to the VCS 2007.1 were used;
- Verification audit planning;
- On-Site assessment;
- Background investigation
- follow-up interviews with personnel of the project developer and
- Verification reporting (Draft Verification Report and Final Verification Report).

The criteria of this verification include the relevant rules and steps as set out in the VCS 2007.1.

3 Verification Findings

3.1 Remaining issues, including any material discrepancy, from previous validation

The raised CARs were successfully closed during the validation of the project design. There are no remaining issues. The verification has been carried out based on the validated VCS PD and Final Validation Report.

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

However, during validation a forward action request was raised which is successfully closed out for this 1st periodic verification.

Consideration of FAR B1^{VAL} raised during the validation process

FAR_{VAL}B1	References	Summary of project owner response	Revised sections (as applicable)	Conclusion
If the PLF of the project activity exceeds the range sensitivity analysis the additionality of the project will be re-assessed during every crediting period, The VERs will be issued if the project is additional.” (Refer Annex 11,66,67 of EB48)	Final Validation Report /FVR/	PLF for all the customers is below the higher range of sensitivity analysis in additionality demonstration i.e. 22% (at 20% base PLF), furthermore for 3 customers the PLF values were marginally high as and when compared with 22% of PLF. The region for higher PLF was good wind availability. These higher PLF values were cross checked in the IRR sheet and IRR arrived were found to be below the benchmark value. The values of PLF for those three customers are It clearly shows that the	MR2, XLS2	The computation of PLF work sheet provided by the PP has been cross checked and found that the PLF of the 3 customers is slightly higher (in decimal place) than the 22% which is higher range of sensitivity analysis which is 22.082% for Shah Lulla Estate

VCS 2007.1 Verification Report for the project entitled:
 "44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited"

FAR _{VAL} B1	Reference s	Summary of project owner response	Revised sections (as applicab le)	Conclusion
		project is additional for all the customers in the bundle. For some of the customers the PLF is below the lower range of sensitivity analysis in additionality demonstration i.e. 18% (at 20% base PLF), but the lower PLF will affect the additionality consideration positively. It is clear from here that project activity is additional for the monitoring period of 1 April 2006 to 31 May 2009.		Developers, 22.048 % for Liberty Oil Mills Ltd. and 22.063% for Sunilkumar Ramanlal Shah, however these higher PLF values were cross checked in the IRR sheet and IRR arrived were found to be below the benchmark value. Hence the FAR is closed for this monitoring period. However, the

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

FAR_{VAL}B1	Reference s	Summary of project owner response	Revised sections (as applicab le)	Conclusion
				compliance of addtionality should be checked during every subseque nt verifica tion

3.2 Project Implementation

The project activity consists of the 55 machines of Enercon make of 800 KW each, totalling to the capacity of 44 MW. The Project considered harnessed renewable resources in the region, thereby displacing non-renewable natural resources thereby ultimately leading to sustainable economic and environmental development.

During the monitoring period, the net electricity Supplied to the grid by the project activity is 134,895,879KWh (after considering conservative approach of apportioning) and thus the total baseline emission for this monitoring period is computed to 122,200 tCO₂e.

The Commissioning certificate issued by the MSEDCL has been cross-checked as well as purchase orders to confirm the implementation of the project, the WEC owner and the substation to which each WEG is connected. Also the monthly JMR sheet and invoice copies mention the name of the WEC owner thus it was confirmed during the course of this verification that the actual project activity was implemented in accordance with the VCS PD.

Nevertheless following CARs raised the course of verification and was closed successfully.

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

Project Implementation	CAR 3.2.1
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	PP is requested to incorporate the date of commissioning of all WECs and the specified number of the respective WECs in section B of MR.
Corrective Action	The date of commissioning has been incorporated in section B of the MR.
DOE Assessment	Date of commissioning and the location no of each WECs has been incorporated in the revised MR. Hence the CAR is closed.
Conclusion	☐ To be checked during the next periodic verification ☒ MR was corrected correspondingly ☐ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

Project Implementation	CAR 3.2.2
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	PP needs to detail out all the major break down and maintenance records for the entire monitoring period in section C of the MR.
Corrective Action	All the major break down and maintenance records have been added in section C of the MR. Subsequently a separate excel sheet is also provided for detail out the break down and maintenance records.
DOE Assessment	Local villagers blocked the way to site for the period in between July 2007 and January 2008, consequently the WECs were not able to generate electricity. That reason for the Major breakdown and maintenance records for the monitoring records has been incorporated in the revised MR, also incorporated in the excel sheet attached with MR. Hence the CAR is closed.
Conclusion	☐ To be checked during the next periodic verification ☒ MR was corrected correspondingly ☒ Spread sheets were corrected

Project Implementation	CAR 3.2.2
	correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

3.3 Completeness of Monitoring

The reporting /MR2/ /XLS2/ is in line with the requirements of the validated monitoring plan as well as with the applied methodology ACM0002 version 10/ACM0002/.

The reporting procedures reflect the requirements of the monitoring plan /VCS-PD/. The monitoring parameters are recorded as per the monitoring plan. During site visit the verification team checked through interviews /IM01, IM02/ and confirmed that the monthly JMR (Joint Meter Reading) provides the net export and import and net electricity supplied to the grid (=Net export-Import) of each individual and grouped WECs. This data then forms the basis of emission reduction calculation.

Each meter is of two way tri-vector export-import meter installed by State electricity board (MSEDCL) the generated power from the WECs will be measured at 33 KV bays.

Metering system for the project activity consists of one main and one check meter. Both the meters are two-way trivector meters capable of recording import and export of electricity and provide output in the form of net electricity supplied to the grid. The metering equipment is maintained in accordance with electricity standards prevalent in Maharashtra.

The electricity exported and imported values are recorded by taking a Joint Meter Reading (JMR) in the presence of officials from MSEDCL and Enercon as O&M contractor, on behalf of project sponsor.

None of the meters have been changed during the reported monitoring vintage. No abnormality was found in the metering system/cal/.

Moreover, as mentioned in the VCS PD, control panel meters installed at wind turbines have to be calibrated annually. However, the same was not furnished by the PP due to the fact that meters are self calibrated and

VCS 2007.1 Verification Report for the project entitled:
 "44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited"

equipped with intelligent software control system which does not require calibration. The panel meter needs no calibration as it is software based integrated system which has been specially designed for control of wind turbine where control functions, data collection and storage, real time grid monitoring and storage function are integrated. The verification team has cross checked the same from the technological supplier manual annex 2, page number 64/CAL1/. Moreover As per the section 5.3 of VCS Standard 2007.1, the deviations are acceptable where they don't impact negatively of the conservativeness of the VCS program approved methodology's criteria . Thus, verification team assessed that there is no significant impact on the project activity due to this deviation. Hence, it is in line and acceptable to the verification team.

The following CARs were raised during the course of verification and was closed based on the revised MR.

Monitoring	CAR 3.3.1
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	As per the registered VCS PD, EG Gross,y, EG Export, y, EG import, y has to be monitored. However, monitoring report does not describe the same. Correction required for the same.
Corrective Action	Corrections have been made, all the parameters are added in sections F of the MR.
DOE Assessment	All the monitoring parameters have been incorporated in the revised monitoring plan as per the registered VCS PD, also incorporated in excel sheet attached with the MR Hence the CAR is closed.
Conclusion	☐ To be checked during the next periodic verification ☒ MR was corrected correspondingly ☒ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

VCS 2007.1 Verification Report for the project entitled:
 "44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited"

Monitoring	CAR 3.3.2
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	PP is requested to incorporate description of the all the metering system, meter serial nos. commissioning history of meters, calibration dates and due date of calibration in section F of the MR (preferably in tabular form)
Corrective Action	All the details regarding meter serial no's, commissioning history of meters and calibration details have been added in section F of MR.
DOE Assessment	Correction has been made in the revised MR and found to be OK. Hence CAR is closed.
Conclusion	☐ To be checked during the next periodic verification ☒ MR was corrected correspondingly ☐ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

Monitoring	CAR 3.3.3
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	Annual calibration reports of export and import meters have to be furnished from the starting of the monitoring period i.e. 2006, 2007, 2008 and 2009. Moreover, the same information has to be described in MR.
Corrective Action	Calibration reports are available for verification, the details of calibration are also described in the section F of MR.
DOE Assessment	Calibration details have been incorporated in the revised monitoring Report All the calibration Dates mentioned in the MR has been cross checked with the Calibration report. Hence the CAR is closed.
Conclusion	☐ To be checked during the next periodic verification ☒ MR was corrected correspondingly ☐ Spread sheets were corrected correspondingly

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

Monitoring	CAR 3.3.3
	☐ Appropriate action was not taken ☒ The project complies with the requirements

Monitoring	CAR 3.3.4
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	As per the registered VCS PD, the calibration of online panel meter has to be carried out annually (Refer EG _{Gross,y}).PP is requested to furnish the same and the details of the same is described in MR.
Corrective Action	The panel meter is auto calibrated meter which does not require any calibration, the proof for same is available for verification. (Enercon machine manual).
DOE Assessment	As per the registered VCS PD the online panel meter is calibrated annually. However, The panel meter needs no calibration as it is software based integrated system which has been specially designed for control of wind turbine where control functions, data collection and storage, real time grid monitoring and storage function are integrated. The verification team has cross checked the same from the technological supplier manual annex 2, page number 64/CAL1/. Moreover As per the section 5.3 of VCS Standard 2007.1, the deviations are acceptable where they don't impact negatively of the conservativeness of the VCS program approved methodology's criteria . Thus, verification team assessed that there is no significant impact on the project activity due to this deviation. Hence, it is in line and acceptable to the verification team.
Conclusion	☐ To be checked during the next periodic verification ☐ MR was corrected correspondingly ☐ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☒ The project complies with the requirements

3.4 Accuracy of Emission Reduction Calculations

The value of the emission reductions depends on the net electricity Supplied by the project activity.

GHG emission reduction is calculated as baseline emission minus project emission and leakage.

The baseline emissions reductions are based on the net electricity Supplied to the grid by the WECs. The project emissions are zero as there is no auxiliary firing taking place. Also, as per the methodology the leakage emission need not be calculated for this project activity. Therefore the baseline emission equals the Emission Reductions.

Thus, $ER_y = BE_y$

Baseline Emissions:

The baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor (EF_y in tCO_2/MWh) times the electricity exported by the project activity to the grid (EG_y in MWh)

$$BE_y = EF_y * EG_y$$

Net electricity Supplied to the grid is done based on apportioning method as described below

Procedure for apportioning of electricity:

The project activity is connected to the total five number of metering points as mentioned below in the tabular form. It was checked during the site visit and the found correct.

Metering Points	Number of Machine
Bhambarwadi	18
Varekarwadi	2
Kadvekhurd	7
Panchpatta	27
Aundhewadi	1
Total	55

VCS 2007.1 Verification Report for the project entitled:
 "44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited"

Procedure for apportioning:

The net electricity supplied to the grid is calculated from the difference between Break up Exported and imported values of each customer for every month, the Break up imported and exported values are calculated as per the formulas described below.

Net Electricity supplied= (Break up Exported electricity)
 - (Break up Imported electricity)

Break up Exported electricity = (Exported EB meter reading X Panel generation)/ total Panel generation of all WECs connected on same feeder

Break up Imported electricity = (Imported EB meter reading X Panel generation)/ total Panel generation of all WECs connected on same feeder

In the starting of the project activity the metering has been done on the site and the substation was Panumbre which is around 20 kms from the Bhambarwadi site, after the charging of Bhambarwadi substation on 23/12/2006 the substation has been changed from Panumbre to **Bhambarwadi** . However those machines were shifted on the Bhambarwadi sub station in June 2007 but the metering system was not changed. The complete set of meters were relocated at Bhambarwadi site. 8 out of 9 WECs of Mahanagar Developer were connetted to Feeder no. 3 while the rest 1 WEC of Mahanagar Developer was connected to feeder no. 1.

Apportioning for all the machine included in the project activity being done as per the registered VCS-PD, also described in the revised MR and the calculation incorporated in the excel sheet attached with MR.

One sample apportioning procedure for the month of May 09 for feeder no 3 of at Kadvekhurd for 8 Machine is described below

Name of customers attached at Feeder 3	Number of WEGs	Panel Generation (Ai)	EB Reading		Break Up		
			Export (B)	Import (C)	Export (Di)=Ai*B/Σ Ai	Import (Ei)=Ai*C/Σ Ai	Net Export (Fi)= (Di)-(Ei)
M/s Liberty	1	125913	1031542	298.35	105770.17	30.59	105739.58

VCS 2007.1 Verification Report for the project entitled:
 "44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited"

			EB Reading		Break Up		
Oil Mill							
M/s Liberty Oil Mill	1	128767	1031542	298.35	108167.60	31.28	108136.32
M/s Liberty Oil Mill	1	109927	1031542	298.35	92341.52	26.71	92314.81
M/s G.B.Rubber	1	195944	1031542	298.35	164598.01	47.61	164550.41
M/s G.B.Rubber	1	181149	1031542	298.35	152169.83	44.01	152125.82
M/s Atlas Tours & travels	1	139005	1031542	298.35	116767.78	33.77	116734.01
M/s Shahlulla	1	181406	1031542	298.35	152385.72	44.07	152341.64
M/s Fashion suiting	1	165878	1031542	298.35	139341.80	40.30	139301.50
	Total	1227989					

The total net electricity supplied by WECs during the monitoring period is 134,895,879KWh which is the conservative value after considering apportioning for the vintage Apr-06 to Dec-06 and Jan-07 to Dec-07. The Value as per the credit note is 135,734,846.71; PP hereby chooses to use the conservative value of net electricity supplied to grid between apportioned value and value from the credit note. A minor difference has been observed as per apportioned value and value in the credit note this is due to time difference of the time of meter reading. For the vintages Apr-06 to Dec-06 and Jan-07 to Dec-07, PP has considered apportioned values of electricity supplied to grid and for vintage Jan-08 to Dec-08 and Jan-09 to May-09 PP has considered the values of electricity supplied to grid from credit notes as they were conservative figure. The baseline emission factor has been fixed ex-ante as 0.9059 tCO₂/MWh based on the CEA data for Southern Regional Grid/CEA/.

Based on the net electricity supplied and the emission factor the baseline emissions for the present monitoring period are computed to be 122,200tCO₂e. All the figures as per the monitoring plan were cross-checked by the verification team against basic monitored data ^{/XLS2/} and the calculations were found to be correct"

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

Nevertheless the following CARs were raised during the
 course of verification and was closed based on the
 revised MR.

Emission reduction calculation	CAR 3.4.1
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	The electricity export and electricity import values are calculated based on the <u>apportioning method</u> as mentioned in the registered PD. However, ER calculation sheet does not provide the formula (algorithm) for the same and the respective values are sourced from JMR sheet (Credit notes) which is not in line with the registered PD. Corrections required for the same. Moreover, one sample calculation of electricity export and electricity import should be described in MR.
Corrective Action	Sample calculation for apportioning has been shown in different excel sheets for each site, the sample calculation for Feeder 3 at site Kadvekhurd is also shown in the MR.
DOE Assessment	The apportioning method to calculate net electricity Supplied to the grid from the project activity is incorporated in the MR and VCU calculation sheet. The emission reduction sheet is also checked for consistency and found correct. The data for the net electricity supplied to the grid is based on the WEC panel meter readings as well as the monthly readings from the JMR sheet. The value of net electricity supplied to the grid is also cross-checked with the invoice copies raised to MSEDCL. Hence, CAR is closed.
Conclusion	☐ To be checked during the next periodic verification ☒ MR was corrected correspondingly ☒ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

Emission reduction calculation	CAR 3.4.2
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	Monitoring report and ER sheets have not described the import and export value of the electricity for few of the months (which are highlighted in yellow in VER calculation sheet) in 2006, 2007, 2008 and 2009. Correction is required for the same.
Corrective Action	Corrections have been made, the electricity import and export values have been filled for all customers.
DOE Assessment	Corrections have been made in Revised MR and ER sheet. Hence the CAR is closed.
Conclusion	☐ To be checked during the next periodic verification ☒ MR was corrected correspondingly ☒ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

Emission reduction calculation	CAR 3.4.3
Classification	☒ CAR ☐ FAR ☐ CL ☐ None
Findings	Discrepancies are found with JMR sheets (Credit notes) for Net electricity exported to the grid for few months (which are highlighted in yellow in VER calculation sheet) of 2006, 2007, 2008 and 2009. Correction is required in the corresponding emission reduction calculation sheet and the MR.
Corrective Action	Corrections have been made in the ER sheet for all the highlighted months.
DOE Assessment	Revised ER sheet has been crosschecked with the Credit notes, it is now found to be correct. Hence the CAR is closed.

Emission reduction calculation	CAR 3.4.3
Conclusion	☐ To be checked during the next periodic verification ☐ MR was corrected correspondingly ☒ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☐ The project complies with the requirements

3.5 Quality of Evidence to Determine Emission Reductions

Proper data management inclusive of data acquisition and aggregation, data management system is being followed for the project activity.

All records needed for monitoring are archived in line with the requirements of the registered monitoring planⁿ /VCS-PD/. No significant, lack of evidence and missing data were detected during on-site verification.

It is evident from the monitoring data that the monitoring system ensures for continuous (except some routine breakdowns or outage) operation.

All internal data are subjected to QA/QC measures. Enercon (India) Limited (EIL) is ISO 9001:2000/ISO/ certified and has proper procedures for data handling which is cross checked by the verification team to ensure that the QA/QC procedure is followed as per the ISO standard.

The monitoring personnel at site are well trained and follow reproducible routines. The training records^{/TRA/} of the plant personals have been cross checked and found OK. Thus, they are competent to carry out the relevant tasks with sufficient accuracy. All necessary monitored and measured raw data were checked during on-site verification (Ref Annex-2 of this report). The electricity exported to the grid and imported from the grid are the basic monitoring parameters. The net electricity supplied to the grid is the difference between the export and import values which is cross checked by the verification team with JMR sheets and the commercial invoices, found OK.

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

Quality of Evidence to Determine Emission Reductions	CL 3.3.5
Classification	☐ CAR ☐ FAR ☒ CL ☐ None
Findings	During the site visit it is found that, the start date of the project activity is 7 th February 2006 and the sub station charged on that location is later, PP is requested to justify that how the monitoring was done on that period.
Corrective Action	In the starting of the project activity the metering has been done on the site and the substation was Panumbre which is around 20 km from the Bhambarwadi site, after the charging of Bhambarwadi substation on 23/12/2006 the substation has been changed from Panumbre to Bhambarwadi. There is no change in metering system only substation was changed. The proof for same is available for verification.
DOE Assessment	Metering system for the WECs earlier was located at the Panumbre and later all those machines shifted at Bhambarwadi Substation; furthermore the metering system has not changed, verified from the credit notes issued by the (MSEDCL). Hence the CL is closed
Conclusion	☐ To be checked during the next periodic verification ☐ MR was corrected correspondingly ☐ Spread sheets were corrected correspondingly ☐ Appropriate action was not taken ☒ The project complies with the requirements

3.6 Management and Operational System

The allocation of responsibilities is documented in a written form and is followed as described in the VCS-PD. EIL being an ISO 9001: 2001 certified/ISO/ has proper

VCS 2007.1 Verification Report for the project entitled:
"44 MW Bundled Wind Power Project in Maharashtra managed
by Enercon India Limited"

procedures for allocation of roles and responsibilities as well as internal audits. Routines for the archiving of data are defined and documented. Calculations laid down in the monitoring report are in line with VCS-PD.

The overall authority of the project site belongs to EPC contractor EIL. The Joint meter readings are noted in presence of officials from plant personnel and the MSEDCCL officials.

The data archiving of gross generation is directly measured from SCADA system. The monthly export and import values are maintained in monthly JMR sheets, which are signed by both the parties and documented which are subject to QA/QC measures. All monitored data are archived in Physical and Electronic form. The data will be kept for the whole crediting period and additional 2 years as given in the PD.

4 Verification conclusion

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 registered VCS PD, Final validation report, monitoring report, supporting emission reduction calculation sheet and other supporting documents made available to the verifiers by the project proponent.

As mentioned in the VCS PD, control panel meters installed at wind turbines have to be calibrated annually. However, the same was not furnished by the PP due to the fact that meters are self calibrated and equipped with intelligent software control system which does not require calibration. The panel meter needs no calibration as it is software based integrated system which has been specially designed for control of wind turbine where control functions, data collection and storage, real time grid monitoring and storage function are integrated. The verification team has cross checked the same from the technological supplier manual annex 2, page number 64^{/CAL1/}

Hence the deviation is accepted to the verification team.

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 design.

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

- The monitoring system is in place and in line with the approved methodology ACM 0002 version 10.
- The installed equipment essential for recording generation accounting the emission reductions runs reliably and is calibrated appropriately.
- GHG emission reductions are calculated without any material misstatements in a conservative and appropriate manner.

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.

Monitoring period: 01/04/2006 to 31/05/2009 (inclusive both days).

Verified emission reductions generated in the above mentioned monitoring period:

Emission reductions	CO2 [tCO2]	CH4 [t CH4]	N2O [t N2O]	HFCs [t HFC]	PFCs [t PFC]	SF6 [t SF6]	Sum [tCO2e]
01/04/2006 to 31/05/2009	122,200	–	–	–	–	–	122,200
TOTAL:	122,200						122,200

Project emissions	00	t CO2 equivalents
Leakage emissions	00	t CO2 equivalents
Baseline emissions	122,200	t CO2 equivalents
Emission reductions	122, 200	t CO2 equivalents

The Break-up of emission reduction for the present monitoring period is as follows:

VCS 2007.1 Verification Report for the project entitled:
 "44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited"

Year	Net Electricity supplied to the grid (kWh)	Emission Factor (tCO ₂ /MWh)	VCU generated
01 April 2006 to 31 December 2006	13391411	0.90589	12131
01 January 2007 to 31 December 2007	33346587	0.90589	30208
01 January 2008 to 31 December 2008	68381520	0.90589	61946
01 January to 2009 to 31 may 2009	19776360	0.90589	17915
Total VCU's for the monitoring period	134,895,879	0.90589	122200



Monojkumar Borekar
 Verification Team Leader
 Mumbai, 2010-05-20



Eric Krupp
 Final approval
 Essen, 2010-05-27

Annexure 1:

Abbreviations

CAR	Corrective Action Request
CEA	Central Electricity Authority
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CTPT	Current Transformer and Potential Transformer
CL	Clarification Request
ER	Emission Reduction
FAR	Forward Action request
GHG	Greenhouse gas(es)
ISO	International Standardisation Organisation
kWh	Kilowatt hour
MR	Monitoring Report
MP	Monitoring Plan
MW	Megawatt
MWh	Megawatt Hours
PP	Project Participant
QA/QC	Quality Assurance / Quality Control
MSEDCL	Maharashtra State Electricity Distribution Comp. Lited.
VCS-PD	VCS PD validated under VCS 2007.1
FVR	Final Validation report based on VCS PD 2007.1 Version.
VCU	Voluntary Carbon Units
VER	Voluntary Emission Reduction

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

Annexure 2:

Table 1: Documents referred during the course of verification:

Reference	Documents
/BR/	Breakdown / Annual maintenance records during the monitoring period
/CAL/	Calibration certificates for the following parameters during the monitoring period: a. Main meter located at the substation b. Online panel meter located at the wind mill
/CR/	Commissioning certificates of all the WECs located onsite.
/GHG/	Certificate furnishing the details about non rejection of the project under other GHG programs.
/FVR/	Final Validation Report dated 13.11.2009
/ISO/	Copy of ISO Certificate confirming the ISO Standard.
/INV/	Invoices raised to the state electricity board (SEB) for the project activity.
/JMR/	Copy of the JMR sheets covering the monitoring period.
/MR1/	Draft monitoring report-Version 1 on the basis of which the verification is carried out.
/MR2/	Final verification report-Version 02 which forms the basis of TUV-NORD certification report
/PPA/	Power purchase agreement between the client and the SEB
/RD/	Declarations by the project proponents stating no intention of creating and trading of another from of environmental credits out of VERs would be created from this given project.
/O&M/	Operation and maintenance contract evidence

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

Reference	Documents
/SLD/	Single line diagram describing all the metering points for all the WECs related to the project activity.
/TS/	1. Technical specification of the Online meter along with the serial numbers 2. Technical specifications of the WECs on site.
/TRA/	Training records of the personal working onsite.

Table 2: Background investigation and assessment documents

Reference	Document
/ACM002/	ACM 0002 Version 10: “Approved Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/VCS-PD/	Final Project Document validated under VCS V1.
/VCS/	Voluntary Carbon Standard 2007.1
/VVM/	CDM Validation and Verification Manual
/CEA/	Notification on the instillation and operation of meters published by Central Electricity Authority.
/VAL-XLS/	Validated Excel Calculation sheets for baseline determination linked with the registered PDD.

Table 3: Websites used

Reference	Link	Organisation
/CEA/	www.cea.nic.in	Central Electricity Authority

VCS 2007.1 Verification Report for the project entitled:
 “44 MW Bundled Wind Power Project in Maharashtra managed
 by Enercon India Limited”

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

Table 4: Interviewed Persons

Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	Rohit Joshi	EIL-officer
/IM01/	☐ Mr. ☒ Ms.	Anushree Mishra	EIL-Asst. officer
/IM01/	☒ Mr. ☐ Ms.	Sharad Dubey	Asst. Manager -EIL
/IM01/	☒ Mr. ☐ Ms.	Rajesh Kadam	Deputy Manager-EIL