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# VERIFICATION / CERTIFICATION REPORT

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## BUNDLED WIND ENERGY POWER PROJECTS (2004 POLICY) IN RAJASTHAN

(UNFCCC Registration Ref. No.1166)

Monitoring Period:  
30 October 2008 to 30 November 2009

REPORT NO. 2010-9233

REVISION No. 02

DET NORSKE VERITAS



## VERIFICATION / CERTIFICATION REPORT

Date of first issue: 19 December 2009	Project No.: PRJC-196927-2009-CCS-IND	
Recommended for approval Chandrashekara Kumaraswamy	Approved by Michael Lehmann	Organisational unit: Climate Change and Environmental Services
Client: Enercon (India) Limited		Client ref.: Mr.Yogesh Mehra

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### Summary:

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions reported for the “Bundled wind energy power projects (2004 policy) in Rajasthan” (UNFCCC Registration Ref.No.1166) for the period 30 October 2008 to 30 November 2009.

In our opinion, the GHG emission reductions reported for the project in the monitoring report (version 03) of 04 January 2011 are fairly stated.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 (version 06) and the revised monitoring plan approved by the executive board of UNFCCC on 2 August 2010.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the “Bundled wind energy power projects (2004 policy) in Rajasthan” during the period 30 October 2008 to 30 November 2009 amount to 33 322 tonnes of CO<sub>2</sub> equivalent.

Report No.: 2010-9233		Subject Group: Environment	
Report title: Bundled wind energy power projects (2004 policy) in Rajasthan			
Work carried out by: Nikesh R S, Murali G, Kannan Parthasarathy,Sharmistha shome.			
Work verified by: Tang Zhiang			
Date of this revision: 14 January 2011	Rev. No.: 02	Number of pages: 12	

<b>Indexing terms</b>	
Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification
	Market Sector
	Energy Industry
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***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CH <sub>4</sub>	Methane
CL	Clarification request
CMS	Central Monitoring Station
CO <sub>2</sub>	Carbon dioxide
CO <sub>2e</sub>	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EIL	Enercon (India) Limited
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
JMR	Joint Meter Readings
LCS	Local Control System
MP	Monitoring Plan
N <sub>2</sub> O	Nitrous oxide
PDD	Project Design Document
RRVVPN	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
RPPC	Rajasthan Power Procurement center
UNFCCC	United Nations Framework Convention on Climate Change
WEG	Wind Electricity Generators



## 1 INTRODUCTION

Enercon (India) Limited has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification and certification of emission reductions reported for the “Bundled wind energy power projects (2004 policy) in Rajasthan” (the project) in the period 30 October 2008 to 30 November 2009. This report contains the findings from the verification and a certification statement for the certified emission reductions. The verification report has been revised pursuant to the completeness check by the CDM Secretariat to include all the monitoring parameters in the spread sheet submitted for issuance request.

### 1.1 Objective

Verification is the periodic independent review and ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registered CDM project activity during a defined monitoring period.

Certification is the written assurance by a DOE that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification was to verify and certify emission reductions reported for the “Bundled wind energy power projects (2004 policy) in Rajasthan” for the period 30 October 2008 to 30 November 2009.

### 1.2 Scope

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified.

### 1.3 Description of the Project Activity

Project Parties:	India and Japan
Title of project activity:	Bundled wind energy power projects (2004 policy) in Rajasthan
UNFCCC registration No:	UNFCCC registration No.1166
Baseline and monitoring methodology	ACM0002 (version 06)
Project Entity:	Enercon (India) Limited and Japan Carbon Finance



Location of the project activity: The Project is located at Kita and Bhu village, in Jaisalmer district of Rajasthan that forms part of the northern regional electricity grid of India. The project area extends between latitude 26° 41' & 26° 46.5' north and longitude 70° 57.5' & 71° 4' east.

Project's crediting period: 30 October 2008 to 29 October 2018.  
The length of the crediting period of the project activity as per registered PDD is 10 years (fixed) starting from 30 October 2008 to 29 October 2018.

Period verified in this verification: 30 October 2008 to 30 November 2009.

Joint Meter Reading (JMR) is carried out on the first day of every month. The project proponent wishes to forego the generation for 2 days i.e., from 30 October 2008 to 31 October 2008 for the purpose of simplicity in the calculation of emission reductions during this verification. Therefore the generation from 1 November 2008 has been considered for the first monitoring period and is considered conservative.

The project activity harnesses wind energy in the Jaisalmer region of Rajasthan for generation of electricity and export to the grid. The project activity has an aggregated installed capacity of 24.8 MW comprising of 31 Enercon make wind electricity generators (WEGs) each having a capacity of 0.8 MW. All the WEGs are connected to the Rajasthan state electricity grid. The energy generated in the project is measured by individual LCS meters and energy meters installed at the substation after stepping up to 33 kV. The operation and maintenance of the machines are carried out by Enercon (India) Limited (EIL), who is also the supplier of the machines.

#### 1.4 Methodology for Determining Emission Reductions

The emission reductions from the project for the monitoring period starting from 30 October 2008 to 30 November 2009 as reported in the monitoring report version 03 dated 4 January 2011 and actually verified at site equals to 33 322 tCO<sub>2</sub>e. The monitoring of the parameters were not in line with the monitoring plan of the registered PDD /3/. A revision of the monitoring plan incorporating the actual monitoring practice was submitted to UNFCCC during June 2010 and the same was approved by UNFCCC on 02 August 2010 /13/. The emission reductions from the project activity is calculated as a product of net electricity supplied to the grid from the project activity and the emission factor of the northern grid of India which has been fixed ex-ante for the crediting period. DNV confirms that the monitoring plan and emission reduction calculations are in line with approved methodology ACM0002 version 06 /6/.

## 2 METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:



- i) Net electricity supplied to the grid by the project activity which is recorded monthly;
- ii) Electricity exported, as recorded by the main meter at the EB substation
- iii) Electricity imported, as recorded by the main meter at the EB substation
- iv) Electricity exported by a WEG, as measured at the controller (LCS)
- v) Electricity exported by a WEG to the grid
- vi) Electricity imported by a WEG from the grid
- vii) Summation of electricity exported to the grid by all the WEGs included in the project activity.
- viii) Summation of electricity imported from the grid by all the WEGs included in the project activity.
- ix) Emission factor of the grid, fixed ex-ante as 873.87 tCO<sub>2</sub>e/GWh.

### Verification team

<b>Role</b>	<b>Last Name</b>	<b>First Name</b>	<b>Country</b>	<b>Type of involvement</b>						
				Administrative	Desk review	Site visit	Reporting	Supervision of work	Technical review	Sectoral competence
Project manager / CDM verifier	Ravandur Satish	Nikesh	India	✓	✓	✓	✓			✓
Technical team leader (CDM verifier)	Govindarajulu	Murali	India		✓		✓	✓		✓
GHG Auditor	Shome	Sharmistha	India			✓				
Sector expert	Parthasarathy	Kannan	India		✓		✓			✓
Technical reviewer	Tang	Zhiang	China						✓	✓

### Duration of verification

Preparations: From 14 December 2009 to 16 December 2009

On-site verification: From 17 December 2009 to 18 December 2009

Reporting, calculation checks and QA/QC: From 24 August 2010 to 14 January 2011

## 2.1 Review of Documentation

The monitoring reports (version 01 and 2) /1/ and the emission reduction calculations, in the form of spreadsheet /2/ submitted by Enercon (India) Limited was assessed as a part of the verification. The copies of the generation certificates for all months within the verification period /7/ which forms the basis of the emission reduction calculation were verified.



In addition to the monitoring documentation provided by the project participants, DNV has reviewed:

- a) The registered PDD /3/, the monitoring plan contained in the PDD as well as the validation report /4/, revised monitoring plan approved by UNFCCC /13/;
- b) The applied monitoring methodology ACM0002 version 06 /6/;
- c) Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board;
- d) Other operational documents referenced as /7/- /16/ were also assessed as evidence during the site visit.

## 2.2 Site Visits

Detailed verification of all data contained in the monitoring report was performed during the site visit at the wind farm of Enercon (India) Limited on 17 & 18 December 2009. The site visit was carried out by Nikesh R S and Sharmistha Shome of DNV and covered all the WEGs installed as part of this project activity. The on-site assessment involved:

- (i) Assessment of the implementation and operation of the project activity as per the registered PDD;
- (ii) Review of information flows for generating, aggregating and reporting the monitoring parameters; i.e. evidences for the reported net generation of electricity were verified /7/-/16/.
- (iii) Cross-check between information provided in the monitoring report i.e., the electricity supplied to the grid minus the electricity consumption of the project (electricity imported from the grid) as per the monthly statements have been cross checked /7/-/11/.
- (iv) Check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology /3/ /12/.
- (v) Review of calculations and assumptions made in determining the GHG data and emission reductions /2/;
- (vi) Identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters /11/.
- (vii) Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved revision of monitoring plan.

During the site visit, the following personnel were interviewed or assisted the verification team:

### Person's interviewed

### Agenda



**Enercon (India) Limited**

Mr. Himanshu Bhatnagar – Manager

Mr. Ravinder – Site Incharge

- Detailed check of monitoring report and ER spread sheet against monthly statements and invoices.
- Check of installation of WEGs and metering provision for electricity exported to grid.
- Check of calibration record of meters.
- Check of procedures and implementation of O&M schedules.

**2.3 Reporting of Findings**

A corrective action request (CAR) is issued, where:

- i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- ii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- iii. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

A clarification request (CL) shall be raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

Three CARs and two CLs were identified during this verification and have been provided as Appendix A of this report.



### 3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “Bundled wind energy power projects (2004 policy) in Rajasthan” for the period 30 October 2008 to 30 November 2009.

#### 3.1 Remaining Issues, CARs, FARs from Previous Validation or Verification

According to the validation report /4/, no CAR or CL's were required to be closed out during verification. There are no FARs to be addressed during the subsequent verification.

#### 3.2 Project Implementation

As part of the site visit DNV was able to confirm that the project implementation is in accordance with the project description contained in registered PDD of 23 October 2008. The 24.80 MW wind project comprises of 31 WEGs of 0.80 MW each commissioned between March 2006 and May 2006. The commissioning certificates for the wind turbines were verified against the commissioning capacity details and found to be correct /10/.

#### 3.3 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the revised monitoring plan approved on 2 August 2010 is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 (version 06).

#### 3.4 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the revised monitoring plan approved on 2 August 2010. As per the revised monitoring plan /13/, the parameter net electricity supplied to the grid EGy is calculated as the difference of the electricity exported and the electricity imported from the grid. It also indicates that (a) the electricity is measured with the help of electronic meters at the wind farm substation, (b) the data is measured continuously and recorded monthly (c) 100% of the data is monitored and (d) data will be archived electronically. The monitoring plan and the applied methodology have been properly implemented, all parameters stated in the monitoring plan, the applied methodology have been sufficiently monitored and updated.

The 31 WEG machines of the project activity form a small cluster in the large wind farm and are hence, not connected to a dedicated uploading meter in the wind farm sub-station. The revised monitoring plan, approved by UNFCCC, has been properly implemented and elaborates on the monitoring of gross electricity exported to the grid (EGy) and the apportioning plan practiced by Enercon (India) Limited to arrive at the net electricity exported to grid from the project activity:

- a) The gross electricity fed to the state utility grid ( $E_{JMR, Export}$ ) and electricity imported from the grid ( $E_{JMR, Import}$ ) for the wind farm is monitored through the meters available at the substation /7/. The net electricity exported to the grid is difference between the gross export and import.



- b) The joint meter readings will be carried out at the above meters once in a month in presence of both parties (the developer's representative and officials of the state power utility) /7/.
- c) The electricity generated from by the individual WEGs in the entire wind farm is measured through the local energy meters (local control system (LCS) meters,  $E_{\text{Controller, Export}}$ ) which are connected to the central monitoring station (CMS) /9/.
- d) The export multiplication factor and import multiplication factor is arrived as per the working provided in the monitoring plan and DNV has confirmed that the electricity export and electricity import as stated under (a) above is used in working the multiplication factors and  $E_{\text{WEG, Import}}$ ,  $E_{\text{WEG, Export}}$  is calculated based on the multiplication factors and the  $E_{\text{Controller, Export}}$  as indicated under (c) above.
- e) The net electricity exported to the grid from the project activity is arrived based on the  $E_{\text{WEG, Import}}$ ,  $E_{\text{WEG, Export}}$  data for the individual WEGs connected to this project activity as indicated under equation 5 of the revised monitoring plan /7/.

In line with the details provided in the section B.7.2 of the revised monitoring plan, the state electricity distribution company provides a monthly statement to individual party/owner which forms the basis for the emission reduction calculations. The generation details have also been cross checked with invoices /8/ and payment details /15/ issued by RPPC to individual owners. All the records, as signed by both the parties, have been verified by DNV. All the backup data are also being archived. The accuracy of equipment used for monitoring has been controlled and calibrated in accordance with the monitoring plan. All necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the registered PDD /11/. Knowledge of personnel associated with the project activity was also found to be satisfactory.

### 3.5 Assessment of data and calculation of Emission Reductions

The parameters of electricity supplied to the grid, imported from the grid and net electricity supplied to the grid (as per the approved revision of monitoring plan section B.7.1) is being monitored and archived. The monthly joint meter readings are carried out by the EIL and Rajasthan State Electricity Distribution Company Limited officials. The net electricity exported to the grid from the individual WEGs is apportioned based on the electricity metered at the local energy meters (local control system (LCS) meters). A statement (indicating the import, export and the net electricity) showing the monthly net electricity generated by all the WEGs in the wind farm is issued by RRVVN/ Jodhpur discom to project proponent. The project participant translates this statement (indicating the net electricity exported to the grid from the WEG) into an invoice and is forwarded to Jodhpur Discom. The monthly statement forms the basis for calculations of the emission reductions and is in line with the approved revision of monitoring plan /7/.

The meter at the grid interconnection point of the substation is jointly inspected and sealed on behalf of the parties and is not tampered with by either party except in the presence of the other party or its accredited representatives. The general conditions set out for metering, recording, meter readings, meter inspections, test & checking and communication are as per the PPA (power purchase agreement) with Ajmer Vidyut Vitran Nigam Limited /16/. As part of the overall transaction cycle mentioned in the earlier paragraphs, DNV has verified the electricity generation from individual turbines through the log sheets, monthly statements issued by Rajasthan State Electricity Board to the individual owners of WEGs and the same



has been double checked with the sale invoices and the cheque details of RPPC, Jaipur /8/9/11/15/.

The net electricity supplied from the project activity for the period 30 October 2008 to 30 November 2009 is 38.132 GWh and the emission reductions from the project for the same period as reported in the monitoring report version 03 dated 4 January 2011 and actually verified at site equals to 33 322 tCO<sub>2</sub>e. The reported emission reductions of 33 322 tCO<sub>2</sub>e is less by 26.35% than the estimated emission reduction of 45 247 tCO<sub>2</sub>e (estimated for the same period as per the registered PDD of 23 October 2008 ).

The line 2 check/back up energy meter was replaced on 15 February 2008 due to display problem (old electricity meter S/N TNU00951 replaced by calibrated meter S/N ABB00691). DNV confirms both meters are of 0.2S accuracy class. The details of the monitoring systems (instruments type, recording frequency, calibration frequency etc) have been explained in the Appendix B of this report. DNV also confirms that the JMR readings for the complete monitoring period were taken from the main meters (line 1 and line 2) and emission reductions are based on main meter readings, back up/check meter reading (line 1 and line 2) will be taken only when main meters are defective.

It has been confirmed by DNV that the maximum output capacity has not been exceeded on any given month during the monitoring period and considering uncertainty of wind pattern the emission reductions for the period of 30 October 2008 to 30 November 2009 are found to be reasonable.

Emission factor of the grid, fixed ex-ante as 873.87 tCO<sub>2</sub>e/GWh based on the data available from the CO<sub>2</sub> Baseline data for Indian Power Sector published in the CEA website /19/. The central electricity authority, Ministry of Power, Government of India has published a database of carbon dioxide emission factors from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database provides information about the OM and BM factors of all the regional electricity grids in India. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM baselines. The value has been fixed *ex-ante* for the crediting period /3/.

### 3.6 Quality of Evidence to Determine Emission Reductions

The data presented in the revised monitoring report version 03 dated 4 January 2011 was assessed by reviewing project documentation, collection of monitored data, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. Sufficient evidence was presented for the reported net emission reductions.

### 3.7 Management System and Quality Assurance

The project participant has established management procedures and implemented effectively to ensure that the process is consistent. The procedures cover management responsibilities, data monitoring procedures, training procedures, periodical internal audits, management reviews and corrective actions in case of any deviations. Calibration of the monitoring equipments has been followed as per defined procedures and carried out annually /12/ and all



the meters and the details of the calibration of the meters have been provided under Appendix B of this report.

Necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the PDD. Knowledge of personnel associated with the project activity was also found to be satisfactory.



#### 4 CERTIFICATION STATEMENT

Det Norske Veritas Certification AS (DNV) has performed the verification of the emission reductions that have been reported for the “Bundled wind energy power projects (2004 policy) in Rajasthan” ” (UNFCCC Registration Ref.No.1166) for the period 30 October 2008 to 30 November 2009.

The project participants are responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project. DNV does not express any opinion on the selected baseline scenario or on the validated and registered PDD.

DNV conducted the verification on the basis of the monitoring methodology ACM0002 (version 06), the monitoring plan contained in the registered Project Design Document of /3/ and the revised monitoring report (version 03) dated 4 January 2011 approved by UNFCCC /13/. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

DNV’s verification approach draws on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. DNV planned and performed the verification by obtaining evidence and other information and explanations that DNV considers necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

In our opinion the GHG emissions reductions of the “Bundled wind energy power projects (2004 policy) in Rajasthan” ” (UNFCCC Registration Ref.No.1166) for the period 30 October 2008 to 30 November 2009 are fairly stated in the monitoring report (version 03) dated 4 January 2011.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002 (version 06) and the monitoring plan contained in the registered PDD of /3/ /13/.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the “Bundled wind energy power projects (2004 policy) in Rajasthan” during the period 30 October 2008 to 30 November 2009 amount to 33 322 tonnes of CO<sub>2</sub> equivalent.

Chennai and Oslo, 14 January 2011

G.Murali  
CDM Verifier  
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Michael Lehmann  
Director of Services and Technologies  
Det Norske Veritas Certification AS



## 5 REFERENCES

*Documents provided by the Project Participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the periodic verification conclusions, and are usually further checked through interviews with key personnel.*

- /1/ EIL: Monitoring Report of “Bundled wind energy power projects (2004 policy) in Rajasthan in India” for the period 30 Oct 2008 to 30 Nov 2009, version 2 dated 25 Aug 2010 and version 3 dated 4 January 2011.
- /2/ EIL: Monthly data archiving & project monitoring excel sheet, “Emission reduction and generation calculation” also having the CER calculations dated 25 Aug 2010.
- /3/ EIL: CDM PDD for the “Bundled wind energy power projects (2004 policy) in Rajasthan”, version 06 dated 23 October 2008.
- /4/ SGS: Validation report for the “Bundled wind energy power projects (2004 policy) in Rajasthan” in India Report No: CDM.VAL0800 dated 27 October 2008.

*Background documents related to the design and/or methodologies employed in the design or other reference documents.*

- /5/ CDM Executive Board: Validation and Verification Manual. Version 1.2.
- /6/ CDM Executive Board: ACM0002 – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 6.
- /7/ RRVPN/Jodhpur Discom: Record of JMR monthly statements for the energy generated through wind mills covering the entire monitoring period.
- /8/ EIL: Record of invoices issued by EIL for electricity sales covering this entire monitoring period.
- /9/ EIL: Record of monthly power generation details from the individual WEGs covering this entire monitoring period.
- /10/ RRVPN/Jodhpur Discom: Commissioning certificates of all the 31 WEGs dated between 25 March 2006 and 13 May 2006.
- /11/ EIL: Records of daily and monthly generation details in CMS, Maintenance records and Internal audit reports covering this entire monitoring period.
- /12/ RRVPN/Jodhpur Discom: Calibration Records from the Executive Engineer Testing Division, RRVPN/Jodhpur Discom, Jodhpur region, for the main meter and the Check meter installed at the substation dated 15 February 2008, 29 January 2009 and 30 January 2009.
- /13/ UNFCCC: Approved revision of monitoring plan <http://cdm.unfccc.int/Projects/DB/SGS-UKL1181723770.26/view>
- /14/ EIL: Instantaneous monitoring of the electricity generation from the individual WEGs and the location numbers checked during the site visit.
- /15/ RPPC: Monthly Cheque details indicating the transaction for the purchase of wind electricity covering this entire monitoring period.
- /16/ Ajmer Vidyuth Vitharan Nigam Limited: Power purchase agreements of all the 31 WEGs with individual WEGs owners and EIL dated March 2006
- /17/ UNFCCC: Template for Monitoring Report, version 1.EB 54 Annex 34.



- /18/ UNFCCC; Guidance on completeness check of request for Issuance, EB 48 Annex 68.
- /19/ CEA: Baseline Carbon Dioxide Emissions from Power Sector,  
<http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>.

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## **APPENDIX A**

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### **CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS**

**Corrective action requests**

<b>CAR ID</b>	<b>Corrective action request</b>	<b>Response by Project Participants</b>	<b>DNV's assessment of response by Project Participants</b>
CAR 1	<p>It needs to be clarified on how the monitoring of the Parameter <math>EG_y</math> is conforming with the Monitoring Plan of the registered PDD and the ACM 0002 version 6 methodology adopted for the project activity.</p> <p>It is mentioned in the monitoring report version 1, that the net electricity supplied by individual wind turbines is determined by allocating the total electricity (recorded at the main meters M1 and M2) to the individual turbines in proportion of the electricity generation recorded by the LCS meters at the individual wind turbines by Enercon India Ltd.</p>	<p>The PP has requested the revision to monitoring plan which was approved by EB on 2 Aug 2010. The project activity is located in Bhu and is connected to Amarsagar substation. In addition to the project activity, the wind farms located at Temdarai, Sodabandhan, Korwan, Asloi and other wind turbines at Bhu are also connected to the Amarsagar substation. Electricity delivered by all these wind farms are metered at a common metering point. The common metering point comprises two main meters i.e. Main meter 1 and Main meter 2 that are installed at 132 kV metering point at the Amarsagar substation. Consequently, the main meter readings reflect the aggregate electricity supplied by all these wind farms, including the project activity. The net electricity supplied by individual wind turbines is determined by a process of allocating the total electricity (recorded at the main meters M1 and M2) to the individual turbines in proportion of the electricity generation recorded by the LCS meters at the individual wind turbines.</p> <p>All the parameters that are used for purpose of allocation are directly monitored and hence the monitoring plan is in line with the requirements of the ACM0002, version 6.</p>	<p>The revised monitoring plan has been approved by UNFCCC and the revised monitoring report has been verified.</p> <p>Accepted OK</p> <p><b>CAR 1 is closed.</b></p>

<b>CAR ID</b>	<b>Corrective action request</b>	<b>Response by Project Participants</b>	<b>DNV's assessment of response by Project Participants</b>
CAR 2	The monitoring report need to be revised as per the latest template requirement of CDM EB 54 annex 34 /17/.	The revised monitoring plan as per the latest template requirement of CDM EB 54 annex 34 has been provided to the DoE.	<p>The revised MR version 2 /1/ is inline with the CDM EB 54 annex 34 requirement.</p> <p>Accepted OK</p> <p><b>CAR 2 is closed.</b></p>
CAR 3	The monitoring report need to be revised considering the guidelines for completeness check as per CDM EB 48 annex 68 /18/	The monitoring report is revised and all the documents that are mentioned in Annex 68 of EB 48 have been provided to the DoE.	<p>Revised monitoring report has been evidenced and accepted.</p> <p>Accepted OK</p> <p><b>CAR 3 is closed.</b></p>

**Clarification requests**

<b>CAR ID</b>	<b>Corrective action request</b>	<b>Response by Project Participants</b>	<b>DNV's assessment of response by Project Participants</b>
CL 1	<p>The power is transmitted to the sub station at 220/132/33KV Amarsagar substation.</p> <p>As per the PDD, power supplied to the grid is metered through two trivector meters (main and check meters) which are calibrated and sealed by the State Electricity Board (SEB). However, it has been observed during the site visit that there are Main meter 1 and Main meter 2 at the Amarsagar substation and two numbers of meters at Temdari which is in the premises of SEB. The PP is requested to clarify which meter is acting as check meter.</p>	<p>As per revised monitoring plan, the electricity supplied is recorded at the main meters M1 and M2 at Amarsagar and backup metering system at Temderai. Backup metering system located at Temderai acts as check meters. Both the meter readings are taken jointly by the representatives of Enercon and the state utility. Also all the main and backup meters are checked for accuracy annually once each year.</p>	<p>The revised monitoring report version 2 addresses this clarification on the meters.</p> <p>The calibration certificates for all the meters have been checked and there is no gap between calibration frequency.</p> <p>Accepted OK</p> <p><b>CL 1 is closed.</b></p>
CL 2	<p>Clarification is requested on the transmission loss calculations between Temdarai and Amarsagar substation.</p> <p>Further clarification is requested on the distribution of losses to each WTG.</p>	<p>The distribution of losses for each WTG is done based on the LCS meter readings that are monitored continuously for each WTG. The detailed procedure for allocation is provided in section B.7.2 of the revised monitoring plan.</p>	<p>The revised monitoring plan clearly addressed this allocation plan and UNFCCC has accepted the same.</p> <p>Accepted OK</p> <p><b>CL 2 is closed</b></p>

**Forward action requests from previous verification**

<b>FAR ID</b>	<b>Forward action request</b>	<b>Summary of how FAR has been addressed in this reporting period</b>	<b>Assessment of how FAR has been addressed</b>
FAR 1	This is first verification and not applicable.		

## **APPENDIX B**

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### **DETAILS OF MONITORING PARAMETERS**

	Assessment/ Observation	Assessment/ Observation
Data / Parameter: (as in monitoring plan of PDD): Instrument Tag number	EGy kWh Electricity supplied to regional electricity grid. WEGs connected to grid through main meters with serial number: TNU00946 ( Line 1) TNU00945 ( Line 2 )	EGy kWh Electricity supplied to regional electricity grid. WEGs connected to grid through check /back up meters with serial number: RJB00052 ( Line 1) TNU00951 ( Line 2) ABB00691 ( Line 2) Line 2 meter was replaced on 15 Feb 2008 due to display problem
Measuring frequency:	Continuous (online )	Continuous (online )
Reporting frequency:	Once in a month	Once in a month
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes	Yes
Type of monitoring equipment:	Electronic trivector meter of class 0.2	Electronic trivector meter of class 0.2
Is accuracy of the monitoring equipment as stated in the PDD? If the PDD does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	No the accuracy of the monitoring equipment is not stated in the PDD. The monitoring equipment represent good monitoring practise	No the accuracy of the monitoring equipment is not stated in the PDD. The monitoring equipment represent good monitoring practise
Calibration frequency /interval:	Annual	Annual
Is the calibration interval in line with the monitoring plan of the PDD? If the PDD does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	The PDD does specify calibration interval as yearly once as per PPA. Also, The selected frequency of annual meter testing by the RRVPN authorities does represent good monitoring practice followed in the region.	The PDD does specify calibration interval as yearly once as per PPA. Also, The selected frequency of annual meter testing by the RRVPN authorities does represent good monitoring practice followed in the region.

DET NORSKE VERITAS

Company performing the calibration:	RRVPN/Jodhpur Discom	RRVPN/Jodhpur Discom
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes, RRVPN/Jodhpur Discom certificates dated 15 Feb. 2008, 29 Jan. 2009.	Yes, RRVPN/Jodhpur Discom certificates 15 Feb. 2008, 29 Jan. 2009 and 30 Jan. 2009.
Is (are) calibration(s) valid for the whole reporting period?	Yes. Validity of the calibration of the meters has checked for the entire period.	Yes. Validity of the calibration of the meters has checked for the entire period.
If applicable, has the reported data been cross-checked with other available data?	Cross-checked with individual PP invoice and RPPC cheque details.	Cross-checked with individual PP invoice and RPPC cheque details.
How were the values in the monitoring report verified?	Against joint meter readings.	Against joint meter readings.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes.	Yes.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the registered monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not applicable.	Not applicable.



## **APPENDIX C**

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### **CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS**

### Murali Govindarajulu

Holds a Bachelor's Degree in Chemical Engineering and has done a Short term diploma course in Management. Having an overall experience of around eleven years. Prior to joining DNV having around seven years experience in Chemical process industry covering production, energy efficiency improvement and equipment design erection and commissioning. His experience also covers the fields of environmental management and resource conservation including identification of alternative fuels. He has also been actively involved in implementation of Management Systems such as ISO 140001 and OHSAS 18001 standards in chemical process industry for more than three years.

He has experience of around 4 years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable sources.

### Nikesh.R.S

Holds a Bachelor's Degree in Environmental Engineering, possesses experience of design, erection, commissioning, operation & maintenance of wastewater treatment plant as part of working in wastewater design & equipment supply in India for 4 years. Also, he was involved in the design, erection and commissioning, operation and maintenance of biomass based boilers for captive power plants for 2 years in the various manufacturing and Process industries in India & have been extensively trained in CDM Validation & Verification activities & has experience of more than 2 years in validation and verification of numerous CDM projects in both in India & abroad.

### Sharmistha Shome

Worked as Strategic System manager in Asia Consulting Group Pvt. Ltd, Gurgaon from 1/06/07 to 20/08/07. Joined DNV Climate change as GHG Auditor trainee from 03/09/07. She has acquired over two years of experience in validation of numerous CDM projects while working in DNV.

### Kannan Parthasarathy:

Handled Various projects on Wind Turbine requirements since 1993 onwards as on date in DNV. This includes the following:

- Wind Turbine Generator - various inspection and projects Covering WTG capacity 250KW to 1.5MW and various manufacturer (Various services provided to different manufacturer - Vestas RRB/AWT/NEG Micon/Vestas/Pioneer Wincon/Pioneer Asia/Gamesa/Suzlan/GE/Siva Electric/Wind Win etc)
- Vendor inspection of various items and component assessments. Castings Hub & Extender/ Tower/ Nacelle/ Gear box/Generator/Forging-Shaft/Yawing system etc
- safety Testing of Over speed machine and Breaking system
- Installation Commissioning of Machines and Power curve at specific site studies. Analysis of Plant Load factor (PLF) - actual Vs plant capacity
- Design services and Co-ordination with DNV Principle Denmark Office.

- CWET Centre for Wind Energy Testing - providing technical support in establishing the system & procedures. Also Wind Monitoring Mast installation and assessments at CWET Testing Location.
- Wind Turbine Array arrangement and studies; Conducted Micro-siting studies (Wind) and arrive at power curve (Theoretical) requirements.
- Type testing of 1 MW Gear Box and Generator and manufacturing assessments.
- Management System Certificate audits  
(Experience of above also performed during the work at NEPC-Micon)

### Tang Zhiang

Mr. Tang Zhiang, Walter holds a Bachelor Degree in Thermodynamic Engineering and a Master Degree in Business Administration. Having an overall experience of around twelve years. Prior to joining DNV, having around 5 years in the field of power industry covering of consulting and engineering for thermal power, wind power, hydropower and solar energy projects. His experience also covers the field of space industry for thermal design, the energy analysis and thermal control for about 4 years.

He has gained the relevant financial and investment knowledge through his courses in MBA. He has applied his financial and investment knowledge in his consulting work for the power industry, such as investment risk analysis, financial accounting, investment parameters assessment, etc.

He has experience of more than 3 years in validation and verification of numerous CDM, VCS and GS projects in DNV both in China and abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in “Energy Generation from Renewable Energy Sources”.