



VERIFICATION / CERTIFICATION REPORT

ENERCON WIND FARMS IN KARNATAKA BUNDLED PROJECT-30.4 MW IN INDIA

(UNFCCC Registration Ref. No.1291)

Monitoring Period:
1 September 2010 to 31 August 2011

REPORT No. 2011-0729

REVISION No. 02

DET NORSKE VERITAS



VERIFICATION / CERTIFICATION REPORT

Date of first issue: 04 April 2011	Project No.: PRJC-346758-2011-CCS-IND
Approved by: Edwin Aalders	Organisational unit: DNV Climate Change and Environmental Services
Client: Enercon (India) Limited (EIL)	Client ref.: Mr. Yogesh Mehra

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Summary:

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions reported for the “Enercon Wind farms in Karnataka Bundled Project-30.4 MW” (UNFCCC Registration Ref. No. 1291) for the period 1 September 2010 to 31 August 2011. In our opinion, the GHG emission reductions reported for the project in the monitoring report (Version 04) of 9 May 2012 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 on 21 July 2011 and formulae contained in the validated and registered Project Design Document of revised PDD version 6 incorporating notification of changes of 16 April 2011.

DNV Climate Change Services AS is able to certify that the emission reductions from the “Enercon Wind farms in Karnataka Bundled Project-30.4 MW” during the period 1 September 2010 to 31 August 2011 amount to 52 254 tCO_{2e}.

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Work carried out by: Murali Govindarajulu, Preeti Jolad			
Work verified by: S.Ranganathan			
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***Abbreviations***

BESCOM	Bangalore Electricity Supply Company Ltd.
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CMP	CDM Modalities and Practices
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	DNV Climate Change Services AS
DNA	Designated National Authority
EIL	Enercon (India) Limited
FAR	Forward Action Request
GHG	Greenhouse gas(es)
HESCOM	Hubli Electricity Supply Company Ltd.
IPCC	Intergovernmental Panel on Climate Change
JMR	Joint Meter Reading
KPTCL	Karnataka Power Transmission Corporation Limited
LCS	Local Control System
MP	Monitoring Plan
MR	Monitoring Report
PDD	Project Design Document
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention on Climate Change
VVM	Validation and verification manual
WEG	Wind Electricity Generators



1 INTRODUCTION

Enercon (India) Limited has commissioned DNV Climate Change Services AS (DNV) to carry out the verification and certification of emission reductions reported for the Enercon Wind farms in Karnataka Bundled Project-30.4 MW (UNFCCC Registration Ref. No. 1291) for the period 1 September 2010 to 31 August 2011. This report contains the findings from the verification and a certification statement for the certified emission reductions. This version of the report has been prepared to address the finding issued as part of incomplete message of the request for issuance.

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 verification 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 “Enercon Wind farms in Karnataka Bundled Project-30.4 MW” for the period 1 September 2010 to 31 August 2011.

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. The verification was based on the recommendations in the Validation and Verification Manual /14/.

1.3 Description of the Project Activity

Project Parties	<i>India, Japan</i>
Title of project activity:	<i>Enercon Wind farms in Karnataka Bundled Project-30.4 MW</i>
UNFCCC registration No:	<i>1291.</i>
Baseline and monitoring methodology	<i>ACM 0002 Version 6</i>
Project Participants:	<i>Enercon (India) Limited and Japan Carbon Finance, Ltd</i>



Location of the project activity: *The Project is located at Gadag and Chitradurga districts in the State of Karnataka that forms part of the Southern regional electricity grid of India.*

Project's crediting period: 18 March 2010 to 17 March 2020

Period verified in this verification: 1 September 2010 to 31 August 2011.

The bundled project consists of 38 WEGs of 800 kW Enercon make machines, involving 18 investors, with a combined capacity of 30.4 MW. The owners of the sub projects have entrusted Enercon (India) Limited as the focal point for the CDM related activities. The details of owners, unique identification numbers and geo-coordinates of the WEGs are listed in section A.3. of the Monitoring Report /1/. Ownership of one of the WEGs has been changed (from R.K Marbles to Power Link System Private Ltd.) the same has been verified by DNV during the site visit and was found to be in order /7/. The approval from Government of Karnataka to transfer the ownership of the 800 kW WEG from R.K. Marbles to Power Link Systems Private limited, dated 15 February 2008 /7/. DNV is able to verify that the monthly Form B (Joint meter reading) has been raised by BESCO for the WEG is in the name of the new entity Power Link Systems Private limited during the verification period /6/. The change in ownership of the WEG was also notified to UNFCCC vide a "Notification of changes in PDD", which was approved on 16 June 2011 /18/. The monthly invoices for the WEG are also raised by Power Link Systems Private limited for the verification period /5/.

1.4 Methodology for Determining Emission Reductions

According to the applied methodology ACM 0002 Version 6 /15/, the emission reductions from the project activity are determined as the difference between the baseline emissions, project emissions and leakage:

$$ER_y = BE_y - PE_y - L_y$$

PE_y and L_y are considered as to be zero as stated in the registered PDD and/18/ validation report /20/. Therefore, the emission reductions are accounted as:

$$ER_y = BE_y = EG_y \times EF_y$$

where,

EF_y is the emission factor of the grid to which the project is connected, and was determined and validated *ex-ante* as 0.93204 tCO₂/MWh and will not be updated during the first crediting period. This was verified by DNV from the registered PDD /16/ and validation report /20/.

EG_y is the net electricity generation delivered to the grid, which is determined by the electricity exported to the grid minus the electricity imported from the grid

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) Review of project documentation;
- ii) The net electricity supplied by the project to the grid which is multiplied with a fixed grid baseline combined emission factor of 0.93204 tCO₂e/MWh /21/;
- iii) The actual installed capacity of the wind farm is 30.4 MW, consisting of 38 WEGs of 800 kW each, is in conformance with the descriptions in the registered PDD /16/.

**Verification team**

Role	Last Name	First Name	Country	Type of involvement					
				Desk review	Site visit	Reporting	Supervision of work	Technical review	TA 1.2 competence
Team leader (Verifier)	Govindarajulu	Murali	India	✓	✓	✓	✓		✓
AUT	Jolad	Preeti	India	✓	✓	✓			
Technical reviewer	Seshan	Ranganathan	India					✓	✓

Duration of verification

Monitoring report publication:

2 November 2011

On-site verification:

From 22 November 2011 to 23 November 2011

Reporting, calculation checks and QA/QC: From 23 November to 22 May 2012

2.1 Review of Documentation

The monitoring report, version 01 dated 11 October 2011 /1/ has been made publicly available on the CDM website. In addition to the web hosted and revised monitoring report version 4 dated 9 May 2012; the verification has been performed based on the review of the following documentation:

- The registered PDD including the notification of changes /18/, the monitoring plan, the revised monitoring plan approved by UNFCCC on 21 July 2011 /19/, the corresponding validation report and the first verification report /22/
- The approved baseline and monitoring methodology ACM0002 version 6 applied by the project /15/.
- The Notification Changes in PDD, approved by UNFCCC on 16 June 2011 /18/. Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /14/.
- Other information and references relevant to the project activity's resulting emission reductions /2/-/8/, /10//11/.
- The copies of the generation certificates for all months within the verification period, which forms the basis of the emission reduction calculation /9/.

During the desk review, DNV has applied standard auditing techniques to assess the quality of information provided. The following activities were performed:



- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures; and
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

2.2 Site Visits

During 22 and 23 November 2011, DNV visited Chitradurga and Gadag in Karnataka state where the WEG's are installed and performed interviews with the project participants. The key personnel /25/-/27/ of the project were interviewed or assisted the verification team.

During the on-site assessment, DNV has applied standard auditing techniques to assess the quality of information provided. The following aspects of the CDM project activity have been verified:

- The implementation and operation of the CDM project activity as per the registered PDD;
- The information flow for generating, aggregating and reporting of the monitoring parameters; and
- The operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD.

Further, the following activities were performed:

- A cross-check between information provided in the monitoring report /1/ and data from other sources /2/-/11/;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD /16//14/ and the selected methodology /15/;
- A review of calculations and assumptions made in determining the GHG data and emission reductions /2/; and
- An identification that quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

The data presented in the monitoring report was assessed by review of the detailed project documentation and production records, as well as by interviews with personnel of Enercon (India) Limited and observation of collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results; to verify the correct application of the approved monitoring methodology and the determination of the emission reductions.

In addition, all parameters required by the monitoring methodology ACM0002 Version 6 /15/, and the management system were assessed during the site visit.



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 verification period.

3 CARs and 3 CLs were raised and have been adequately addressed by the project participants. One FAR was raised during the first verification; the same has been adequately addressed by the project participants and is closed.



3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the Enercon Wind farms in Karnataka Bundled Project-30.4 MW for the period 1 September 2010 to 31 August 2011

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

There are no remaining issues from the validation report /20/. However there has been a FAR issued in the first verification /22/. The FAR is “Procedures to address the reporting and other communication details in case of change in the investors involved in the project activity from time to time need to be implemented.” The FAR has been adequately addressed by project participant and the relevant procedures have been verified by DNV /12/. The first verification report submitted is awaiting issuance.

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 notification of changes approved by UNFCCC on 16 June 2011 /18/. The verification team confirmed through visual inspection and document review /3/ that all physical features of the proposed CDM project activity including data collection systems and storage systems have been implemented in accordance with the registered PDD. DNV confirmed during the on-site visit that the CDM project is completely operational. The Notification Changes in PDD submitted by PP was approved by UNFCCC on 16 June 2011 /18/ and a request for revision of monitoring plan was approved by UNFCCC on 21 July 2011 /19/. The changes have been detailed under section 3.3 of the report.

The project is a wind power generation facility with 27 WEG located at Chitradurga and 11 WEG at Gadag districts of Karnataka, India, each with a capacity of 800 kW.. All the WEGs have been supplied by Enercon (India) Limited. The first machine of the bundle was commissioned on 29 March 2006 and the last machine commissioned on 29 December 2006 /3/.

The installed capacity of the project activity is 30.4 MW consisting of 38 WEGs of 800 kW turbines of Enercon make. The details of the WEGs with respect to installation and capacity have been verified to be consistent with description indicated in the PDD /16/. The actual implementation of the project during this verification period was verified in terms of name plate capacities of WEGs, monitoring equipment and their accuracy levels.

The electricity generated from the project activity is supplied to the Karnataka grid, which is part of southern grid of India, under the Power Purchase Agreement (PPA) /10/. The WEGs are provided with a main electricity meter and check meter. The details of the meters are described in section 3.5.1 of the report. All meters are bidirectional with 0.2s accuracy, all of which are used for both measuring the electricity exported to and that imported from the grid. The electricity meters are sealed by the state utility to guarantee the integrity of the instruments. This is in line with the monitoring plan. Further, each of the WEG has in built control panel meter to monitor generation from the central monitoring stations.



3.3 Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD

Apart from the changes notified through Notification of changes in PDD /18/ and the Request for revision of monitoring plan /19/, other information (data and variables) stated in MR are consistent with PDD.

The Notification of changes in PDD was made with respect to the following:

- a) To indicate the village in which each of the Wind Energy Generator (WEG) is located, in accordance with the commissioning certificates.
- b) To indicate the actual geo-coordinate of the individual WEGs as per the actual site measurements done by Enercon.
- c) Transfer of ownership with respect to one of the WEGs of 0.8 MW capacity.

The revision of monitoring plan was with respect to the following:

- a) Inclusion of "Electricity Export, EG_{export} "
- b) Inclusion of "Electricity Export, EG_{import} "
- c) Inclusion of "Transmission Losses, TE "
- d) The formula for calculation of "Net Electricity supplied to the grid" EG_y is corrected to: $EG_y = EG_{\text{export}} - 115\% * EG_{\text{import}} - \text{Transmission Loss } (TE)$
- e) The procedure adopted by the state utility for calculation of transmission loss as given in the PPA is presented as:

$$Z = \frac{(X1+X2+X3...+Xn)-Y}{(X1+X2+X3...+Xn)} \times 100$$

3.4 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the revised monitoring plan approved by UNFCCC on 21 July 2011 /19/ is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 Version 6 /15/.

3.5 Compliance of monitoring with the monitoring plan

The project activity envisages the harnessing of wind potential for generation of electricity at Gadag and Chitradurga regions of Karnataka, India. The project activity has an aggregated installed capacity of 30.4 MW comprising 38 WEGs supplied by Enercon (India) Limited, each having a capacity of 800 kW each. All the WEGs are connected to the Karnataka state electricity grid, which is part of the southern regional grid of India. The monitoring of the parameters is in accordance with the revised monitoring plan approved on 21 July 2011 /19/ and the final validation report /20/. The monitoring plan and the records are sufficient to enable verification of the emission reductions. The monitoring report is complete as per guidance provided by the CDM Executive Board. As per the revised monitoring plan, the following parameters need to be monitored:

- a) Net electricity supplied to the grid by the project activity **EG_y** ,
- b) Electricity export recorded at meters (**EG_{export}**) of the individual investors (as stated under section 3.5.1 of the verification report and section C of the MR /1/.
- c) Electricity import recorded at meters (**EG_{import}**) of the individual investors (as stated under section 3.5.1 of the verification report and section C of the MR /1/.
- d) Transmission loss (**TE**) for export between the metering location at 33 kV metering point and the high voltage side of the substation to which the subproject is



connected. This is calculated by state utility and reported in JMR (as stated under section 3.5.1 of the verification report and section C of the MR /1/.

The joint measurement will be carried out at the meters of the individual sub projects once in a month in presence of both parties (the developer's representative and officials of the state power utility). Both parties will sign the recorded reading. Each WEG is also equipped with an integrated electronic meter which is connected to the central monitoring station (CMS) of the entire wind farm and maintained by Enercon. The transmission loss is apportioned by the state utility among the various project developers based on the electricity metered at the metering stations and the reading of meters located at the respective sub stations. The transmission loss for one of the customers Enercon Wind Farms (Chitradurga) Pvt. Ltd is recorded to be zero as there is a dedicated substation which is directly connected to the grid and net electricity is directly recorded at the bulk meter in the substation in Aimangala and so there is no transmission loss to be accounted. This has been verified by DNV during the site visit. The procedure adopted by the state utility for calculation of transmission loss is stated in section B.7.2 of the revised monitoring plan /19/ and section C of the MR /1/. The transmission loss is calculated by state utility which is reflected in the JMR (Form B) /6/ for each sub project recorded at 33kV metering point. Net electricity supplied to the grid is calculated after subtracting the transmission loss and 115% of the power imported from grid, to the meter readings taken at 33 kV metering location for all the sub projects included in the project activity.

All the joint meter reading records /6/ signed by both the parties and invoices /5/ have been verified by DNV. All the documents serving as the source for the emission reduction calculations are being archived. Necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the PDD. During the site visit interactions, the knowledge of personnel associated with the project activity was also found to be satisfactory.

All parameters stated in the revised monitoring plan are monitored and reported appropriately. The monitoring report lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, aggregation, to recording, calculation and reporting) for these parameters is provided in the monitoring report. The information flow for the each parameter is further verified in the following sections. DNV confirms that neither a revision nor a deviation to the monitoring plan has been requested to CDM Executive Board.

3.5.1 Monitoring parameters

According to the revised monitoring plan approved by UNFCCC /19/, there are 4 parameters to be monitored:

- a) Net electricity supplied to the grid by the project activity **EG_y**,
- b) Electricity export recorded at meters (**EG_{export}**) of the individual investors (as stated under section 3.7 of the verification report and section C of the MR /1/.
- c) Electricity import recorded at meters (**EG_{import}**) of the individual investors (as stated under section 3.7 of the verification report and section C of the MR /1/.
- d) Transmission loss for export between the metering location at 33 kV metering point and the high voltage side of the substation to which the subproject is connected **TE**.



The following tables are related to the parameters in the monitoring plan / methodology:

Data / Parameter:	Net electricity supplied to the grid EG_y
Measuring frequency:	Calculated from the sum of the net electricity supplied by the WEGs connected to this project activity. $EG_y \text{ (Sub project)} = EG_{\text{export}} - 115\% * EG_{\text{import}} - \text{Transmission Loss (TE)}$
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Calculated.
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?	Not applicable
Calibration frequency /interval:	Not applicable
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?	Not applicable
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	Not applicable
If applicable, has the reported data been cross-checked with other available data?	The values of net electricity exported were verified from the JMR /6/ and electricity sales invoices /5/.
How were the values in the monitoring report verified?	The values of net electricity exported were verified from the JMR /6/ and electricity sales invoices /5/.
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?	The net electricity supplied to the grid has been used in the emission reduction calculation.
In case only partial data are available	Not applicable



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?	
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Data / Parameter:	Electricity export (EG_{export}) and Electricity import (EG_{import}) recorded at meters
Measuring frequency:	Continuous
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	EG_{Import} and EG_{Export} to the grid have been monitored by the energy meters installed at the grid interconnection points.
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?	Yes. The meters have an accuracy class 0.2s. which is in line with the PDD and it represents good monitoring practise.
Calibration frequency /interval:	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 calibration interval is in line with the monitoring plan of the PDD except for main energy meters with serial numbers 543610, 5389981, 5436122, 5389904 connected to Elpro International, Panama Infrastructure, Sameer Ladkat and M.K Agrotech Ltd respectively. The selected annual calibration of meters represents good monitoring practice
Company performing the calibration:	HESCOM and BESCOM
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes
Is(are) calibration(s) valid for the whole reporting period?	Yes, the calibrations are valid for the entire reporting period of 1 September 2010 to 31 August 2011 except for main energy meters with serial numbers 543610, 5389981, 5436122, 5389904 connected to Elpro International, Panama Infrastructure, Sameer Ladkat and M.K Agrotech Ltd respectively with a respective gap of 25 days, 28 days, 29 days and 24 days, The subsequent calibration of the meters indicates that the meters are working well within the limits. Thus as per "Guidance of assessing the compliance of calibration frequency requirements" of EB 52 Annex 60, the maximum inaccuracy of the meters has been applied on the measured values



	for the entire month of September 2010. The CER calculation sheet indicates the details of the calibration and the application of the maximum inaccuracy on the measured values related to the above mentioned meters /2/.
If applicable, has the reported data been cross-checked with other available data?	Not applicable
How were the values in the monitoring report verified?	The values EG_{export} and EG_{import} are required for calculation of net electricity exported were verified from the JMR /6/ and electricity sales invoices /5/.
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?	The values EG_{export} and EG_{import} are required for calculation of net electricity exported to the grid.
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

Data / Parameter:	Transmission loss for export between the metering location at 33 kV metering point and the high voltage side of the substation to which the subproject is connected, T_E
Measuring frequency:	Calculated by the state utility as % difference between the electricity exported recorded by the meters at sub-station and the total of net generation recorded by the meters of sub projects connected to it. The transmission losses are reported in joint meter reading /6/.
Reporting frequency:	Monthly
Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes
Type of monitoring equipment:	Calculated.
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	The Transmission losses are calculated as the difference between the measurements at the 33 kV yard and the 66 kV yard. All the meters involved for the calculation of



represent good monitoring practise?	the Transmission losses are of accuracy 0.2s. This has been mentioned under the revised monitoring plan approved by UNFCCC on 21 July 2011 /19/
Calibration frequency /interval:	The calibration frequency is once a year (annually) in accordance with the approved revised monitoring plan
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 calibration of measuring equipment is carried out annually and this is in accordance with the revised monitoring plan approved by UNFCCC on 21 July 2011 /19/.
Company performing the calibration:	Not applicable
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Not applicable
Is(are) calibration(s) valid for the whole reporting period?	<p>Yes, the calibrations of the main meters are valid for the entire reporting period of 1 September 2010 to 31 August 2011 except for main energy meters with serial numbers 543610, 5389981, 5436122, 5389904 connected to Elpro International, Panama Infrastructure, Sameer Ladkat and M.K Agrotech Ltd respectively with a respective gap of 25 days, 28 days, 29 days and 24 days. The subsequent calibration of the meters indicates that the meters are working well within the limits. Thus as per "Guidance of assessing the compliance of calibration frequency requirements" of EB 52 Annex 60, the maximum inaccuracy of the meters has been applied on the measured values for the entire month of September 2010. The CER calculation sheet indicates the details of the calibration and the application of the maximum inaccuracy on the measured values related to the above mentioned meters /2/.</p> <p>There was a gap in the validity of calibration for the meters in the Bannikoppa substation for the meters numbered 06607369, 06605135, 06606801 & 06607373. The subsequent calibration confirmed that the error of these meters to be within the specified limit and so as conservative approach, as per guidelines for assessing compliance with the calibration frequency requirements /17/, the maximum permissible error</p>



	+0.2% has been applied for calculating the transmission losses covering the set of readings for the months May, June and July 2011. The calibration certificates have been checked and the details provided in the ER sheet are in order.
If applicable, has the reported data been cross-checked with other available data?	The values of transmission losses were verified from the Invoices /6/.
How were the values in the monitoring report verified?	The values of net electricity exported were verified from the Invoices /6/.
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?	The transmission losses are used for calculation of net electricity supplied to the grid.
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

The calibration records of the electricity meters of the sub projects /4/ and the bulk meters located at the sub stations /17/ have been provided to DNV for verification.

During the monitoring period two wind farm meters have been changed and the details of the same have been provided below. These meters were calibrated on 24 August 2010 /24/

Name of the Investor	RR No.	Old Meter	Replaced Meter No.	Meter Classification	Date of Meter replacement
Panama Business Centre	ELP 33	5390229	8001400	Main	15 Dec 2010
Panama Infrastructure	ELP 23	5389986	5271055	Check	22 Aug 2011

3.6 Assessment of data and calculation of emission reductions

DNV confirms that appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed, and the assumptions, emission factors and default values that are applied in the calculation have been justified.

As stated in the section 1.4, the emission reductions ER_y by the project activity during the



monitoring period is the difference between the baseline emission, project emissions or leakage.

$$ER_y = BE_y - PE_y - L_y$$

3.6.1 Baseline emissions

Baseline emissions (BE_y in tCO_2) are the product of the baseline emission factor (EF_y in tCO_2/MWh) times the net electricity supplied by the project activity to the grid (EG_y in MWh).

EF_y is emission factor of the grid, which was calculated *ex-ante* and will not be updated during the first crediting period. EF_y of the proposed project in the registered PDD is $0.93204 tCO_2/MWh$, which has been verified to be correct based on the CEA data /21/.

EG_y is the net electricity generation supplied to the grid, which is determined by the electricity supplied to the grid minus the 115% of the imported electricity from the grid and transmission loss as described under Section 3.5.1. The net electricity supplied by the sub projects to the grid was verified by DNV from the monthly JMR report /6/, the electricity sales invoice /5/.

$$EG_y (\text{Sub project}) = EG_{\text{export}} - 115\% * EG_{\text{import}} - \text{Transmission Loss (TE)}.$$

$$= 56769.094 \text{ MWh} - 80.176 \text{ MWh} - 621.950 \text{ MWh}$$

$$= 56066.968 \text{ MWh}$$

Hence,

$$BE_y = EF_y * EG_y = 52\,254 \text{ tCO}_2\text{e}$$

The total net electricity exported during the verification period was 56066.968 MWh after applying the correction factor on the measured values covering the period of gap in calibration.

3.6.2 Project emissions

The project emissions are regarded as zero as the energy generated is from wind energy as detailed in the PDD and in line with the methodology ACM0002 Version 6.

3.6.3 Leakage

There are no leakages that need to be considered in applying the methodology ACM0002 Version 6.

3.6.4 Emission reductions

Therefore, the emission reductions in this monitoring period are:

$$ER_y = BE_y - PE_y - L_y = 52\,254 - 0 - 0 = 52\,254 \text{ tCO}_2\text{e}.$$

The emissions reductions reported in this monitoring period are 52 254 $tCO_2\text{e}$ for the period from 1 September 2010 to 31 August 2011. The yearly expected emission reductions in the registered PDD are 65 774 $tCO_2\text{e}$, the emission reductions accounted for the current verification period are 52 254 $tCO_2\text{e}$. The reported emission reductions are 20.55% lower than the expected. The variation is deemed to be a result of decreased PLF.

It has been confirmed by DNV that maximum output capacity has not been exceeded the design capacity on any given month during the verification period.



As outlined above, the input data for calculating the emission reductions, the calculating process and the result are complete and transparent. Therefore, DNV is able to confirm the accuracy of the emission reductions.

3.7 Quality of evidence to determine emission reductions

DNV confirms that a complete set of data for this monitoring period was available to be verified and was in accordance with the registered PDD.

All necessary documentation were collected, referenced and aggregated and were easily accessible in hard-copy and electronic format. Measurements are performed by calibrated equipment, and the key data were cross-checked against the invoices issued by for electricity sales invoices /5/. No assumptions are used that have any material influence on reported emission reductions.

3.8 Management system and quality assurance

The owners of the sub projects have entered into a maintenance and services agreement with Enercon (India) Limited /23/, which was verified during the site visit. The performance of the WEGs, safety in operation and scheduled / breakdown maintenance thereof are organized and monitored by EIL. EIL maintains records, in both electronic and well as printed (paper) form, of generation data of individual WTGs from the controllers of each WEG. EIL, the focal point for the project activity cross-checks the calculation of CERs based on monitoring data made available through JMR, break up energy reports and LCS readings, on behalf of the owners of the sub projects.

The management system for the project has been verified to be in place on site by DNV. The organization structure with the responsibilities, personnel competencies, monitoring procedure and monitoring management have been properly identified and put into operation.

DNV confirms that the responsibilities and authorities in the management and operational system for monitoring and reporting are in accordance with the responsibilities and authorities stated in the registered PDD and monitoring plan.



4 CERTIFICATION STATEMENT

DNV Climate Change Services AS (DNV) has performed the second periodic verification of the emission reductions reported for the Enercon Wind farms in Karnataka Bundled Project-30.4 MW (UNFCCC Registration Reference No. 1291) for the period 1 September 2010 to 31 August 2011.

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 conducted the verification on the basis of the monitoring methodology ACM0002(version 06), revised monitoring plan approved on 21 July 2011 and. 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 emission reductions reported for the Enercon Wind farms in Karnataka Bundled Project-30.4 MW (UNFCCC Registration Ref. No. 1291) for the period 1 September 2010 to 31 August 2011 are fairly stated in the monitoring report version 4 dated 9 May 2012.

The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002 (version 06), approved PDD version 6, dated 16 April 2011 and the revised monitoring plan approved on 21 July 2011.

DNV Climate Change Services AS is able to certify that the emission reductions from the Enercon Wind farms in Karnataka Bundled Project-30.4 MW during the period 1 September 2010 to 31 August 2011 amount to 52 254 tCO_{2e} equivalent.

Bangalore and Oslo, 22 May 2012

Murali Govindarajulu
CDM Verifier
DNV India.

Edwin Aalders
Approver
DNV Climate Change Services 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 version 1, dated 11 October 2011(webhosted) and version 4 dated 9 May 2012*
- /2/ EIL: Spread sheet for Emission reduction Calculations, version 1*
- /3/ EIL: Commissioning certificates of WEGs dated 29 March 2006, 31 March 2006, 6 May 2006 and 29 December 2006*
- /4/ HESCOM : Calibration certificates of the electricity meters covering the period of 1 September 2010 to 31 August 2011*
- /5/ EIL: Records of invoices raised by the project participant for the sale of power for the period of 1 September 2010 to 31 August 2011.*
- /6/ EIL: Records of Joint meter readings at the wind farm site for the period of 1 September 2010 to 31 August 2011*
- /7/ EIL: Approval from Government of Karnataka to transfer the ownership of the 0.8 kW WEG from R.K. Marbles to Power Link Systems Private limited, dated 15 February 2008*
- /8/ EIL: Records of monthly generation details in CMS and maintenance records for the period of 1 September 2010 to 31 August 2011.*
- /9/ HESCOM :The generation certificates for the verification period 1 September 2010 to 31 August 2011*
- /10/ EIL & other project proponents: Power Purchase agreements signed by the investors with the state utility*
- /11/ HESCOM :The calibration certificates electricity meters located at the sub stations, for the period of 1 September 2010 to 31 August 2011*
- /12/ EIL: Procedures for the intimating the change in investors circulated by the Enercon India dated 6 February 2012.*
- /13/ EIL: Calibration Certificates for the customers Sameer Ladkat, Elpro, Panama Infrastructure and M.K Agrotech dated 24.07.2009, 21.07.2009, 24.07.2009 and 21.07.2009 respectively.*

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

- /14/ CDM Executive Board: Validation and Verification Manual. Version 01.2*
- /15/ CDM Executive Board: ACM0002 version 06, Consolidated baseline methodology for grid connected electricity generation from renewable energy sources.*
- /16/ Registered PDD version 6, dated 16 April 2011*
- /17/ CDM Executive Board: Guidelines for assessing compliance with the calibration frequency requirements Annex 60 of EB 52 dated 12 February 2010.*
- /18/ CDM Executive Board: Notification of changes in PDD(version 6), approved on 16 June 2011*



- /19/ *CDM Executive Board: Request for revision of monitoring plan, approved on 21 July 2011*
- /20/ *SGS: Validation report of the project activity, ver 3 dated 25 October 2009.*
- /21/ *CEA: Baseline carbon dioxide emission database version 6*
http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
- /22/ [*DNV: First Verification Report for the monitoring period 18 March 2010 to 31 August 2010 dated 5 October 2011*](#)
- /23/ *Copies of maintenance and Services agreements between the owners of sub projects and Enercon (India) Limited*
- /24/ *Calibration Certificate of the changed meter dated 24 August 2010*

Persons interviewed during the initial verification, or persons who contributed with other information that are not included in the documents listed above.

- /25/ *Mr. Puneet Dwiwedi – EIL - Chitradurga*
- /26/ *Mr. Abhishek Jain, Site Engineer, Enercon(India) Ltd., Chitradurga*
- /27/ *Mr. Ashok P Shintre, Manager, EIL, Gadag*

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APPENDIX A

CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS

Corrective action requests:

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 1	<p>The following issues in the values used for the emission reduction calculations were noticed during verification:</p> <ol style="list-style-type: none"> 1. Joint meters readings for the customers Elpro International and Gangadhar Narsingdas Agarwal for the month of March 2011 have not been submitted. 2. Values of electricity export, import, TL and net electricity export in few cases were not matching with the JMRs and the invoices submitted for the months September, October, November, December of 2010, January, February, March, April and May of 2011 for the customers Elpro Internicational, Panama Infrastructure, MK Agrotech Private Limited, Gangadhar Narsigdas Agarwal and Siddaganga Oil Extractions Limited. 	<ol style="list-style-type: none"> 1. JMR of customers Elpro International and Gangadhar Narsingdas Agarwal for the month of March 2011 has been attached here for your reference 2. Values of electricity export, import, TL and net electricity export have been reviewed to match with the JMRs and the invoices submitted. 	<p>OK</p> <ol style="list-style-type: none"> 1. The Joint Meter Readings for both Elpro International and Gangadhar Narsigdas Agarwal for the month of March 2011 have been received /6/.The values provided in the ER sheet /2/ have been cross checked with the readings in the Joint Meter Reading documents 3. The mismatch in the values of export, import, TL and net electricity provided in the ER sheet with respect to the readings in the Joint Meter Readings for the months September, October, November, December of 2010, January, February, March, April and May of 2011 for the customers Elpro Internicational, Panama Infrastructure, MK Agrotech Private Limited, Gangadhar Narsigdas Agarwal and Siddaganga Oil Extractions Limited. have been tallied and are correct. <p>Accepted and CAR 1 is closed</p>

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 2	<p>The calibration certificate issued for the meters 5390229 & 5390230, for the customer "Panama Businesses centre" indicates that the values from the check meter need to be used for billing purpose and the same has not been adopted for emission reduction calculations. Also the MR and the CER calculation do not include the details of the meter change.</p>	<p>The same has been revised and values used for emission reduction has been referred from Check meter reading in the ER sheet for the customer "Panama Businesses centre". The meter change details have been incorporated in the MR & ER sheet.</p>	<p>OK</p> <p>The Calibration Certificates for the meters 5390229 & 5390230 under the customer "Panama Business Centre" indicates that the readings from the Check Meter are to be considered for the purpose of billing. The check meter readings have now been considered and the same reflects in ER sheet.</p> <p>The meter change details have been incorporated in Section C of the MR and included in the ER sheet. The readings on the replaced meters have been checked and found to be taken correctly. The new meters have been calibrated on 24 August 2010 which meets the calibration frequency requirements for this monitoring period.</p> <p>Accepted and CAR 2 is closed</p>

CAR ID	Corrective action request	Response by Project Participants	DNV's assessment of response by Project Participants
CAR 3	The calibration certificate issued for the meters 5389981 & 5389986, for the customer "Panama Infrastructure" indicates that the check meter has been changed and the MR and the CER calculation do not include the details of the meter change.	The meter change details have been incorporated in the MR & ER sheet.	<p>OK</p> <p>The Calibration Certificates for the meters 5389981 & 5389986 under the customer "Panama Infrastructure" indicates that the readings from the Check Meter are to be considered for the purpose of billing. The check meter readings have now been considered and the same reflects in ER sheet.</p> <p>The meter change details have been incorporated in Section C of the MR and included in the ER sheet. The readings on the replaced meters have been checked and found to be taken correctly. The new meters have been calibrated on 24 August 2010 which meets the calibration frequency requirements for this monitoring period.</p> <p>Accepted and CAR 3 is closed</p>

Clarification Request:

CL ID	Clarification request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	<p>There was a gap in the validity of calibration for the meters in the Bannikoppa substation with serial numbers: 06607369, 06605135, 06606801 & 06607373</p> <p>As per the Guidelines for assessing compliance with the calibration frequency requirements, the maximum permissible error has been applied for calculating the transmission losses covering the entire set of readings. This needs to be clarified.</p>	<p>The same has been revised and a correction factor of +0.2% has been applied for the transmission loss for the month May-2011, Jun-2011 & Jul-2011 only for the WECs that are connected to Banikoppa Substation, which can be verified from calculation of emission reductions provided in spreadsheet.</p>	<p>OK</p> <p>There was a gap in the validity of calibration for the meters in the Bannikoppa substation for the meters numbered 06607369, 06605135, 06606801 & 06607373 (the customers connecting the machines to these energy meters are Abhilash Garments & Estates (P) Ltd., Prasad Global Solutions, Siddaganga Oil Extractions Ltd. and Gangadhar Narsingdas Agarwal), Calibration Certificate of the delayed calibration showed that the meter had error within the permissible limit hence for conservativeness, as per guidelines for assessing compliance with the calibration frequency requirements, the maximum permissible error +0.2% has been applied for calculating the transmission losses covering the set of readings for the months May, June and July 2011.</p> <p>This has been cross checked with the calculations in the ER sheet</p> <p>Accepted and CL 1 is closed</p>

CL ID	Clarification request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 2	The estimated emission reduction values indicated under section E.5 (i.e ER for 335 days) and its related working on deviation between the estimated and the actual ER under Section E.6 need to be clarified.	The same has been revised to 365 days in section E.5 and calculation of CERs and its related working on deviation between the estimated and the actual ER under Section E.6 has also been corrected.	<p>OK</p> <p>The duration for which the monitoring is done is 365 days; there was no requirement to calculate on pro-rata basis to find out the difference in generated CERs. Now correctly considered to be 365 days and ER are now calculated on the basis of correct monitoring duration. The CERs generated is 52 254 tCO_{2e} as compared to the wrongly calculated CERs 52 058 tCO_{2e} for the duration 335 days,</p> <p>Accepted and CL 2 is closed</p>
CL 3	The mismatch in the calibration dates for the meters at Enercon Sub-station at Imangala need to be clarified.	The calibration dates for the meters at Enercon Sub-station at Imangala has been made consistent though out the MR & ER sheet.	<p>The calibration dates for the meters at Enercon sub-station at Imangala have been tallied in MR & ER sheet to be consistent. This has been checked in both MR & ER sheet</p> <p>Accepted and CL 3 is closed</p>

Forward action requests from Validation

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
	<i>No FAR was issued in validation report</i>	NA	NA

Forward action requests from the previous verification

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
FAR 1	Procedures to address the reporting and other communication details in case of change in the investors involved in the project activity from time to time need to be implemented.	A comprehensive procedure to address the reporting and other communication details in case of change in the investors involved in the project has been established and a copy of the same has been submitted.	OK Enercon has established a comprehensive procedure addressing “Procedure for informing change of investor in registered CDM bundle post project implementation”, “Communication channel with service team EL”, “Communication to each investor in the bundle” and “Billing and invoicing for investors in the bundle”. The details provided in the document address the reporting and other communication details in case of change in the investors involved in the project activity from time to time. Accepted and FAR 1 is closed

Forward action requests from this verification

FAR ID	Forward action request	Summary of how FAR has been addressed in this reporting period	Assessment of how FAR has been addressed
FAR 1	No FAR identified during this verification.		

APPENDIX B

CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS

Mr. 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 Twelve years. Prior to joining DNV having around seven years of 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 5 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 energy sources.

Ms. Preeti Jolad holds a Master Degree in Environmental Engineering, a Bachelor Degree in Civil Engineering, a Post Graduate Diploma in Environmental Law, with certifications such as Business English Certification from Cambridge University, having an overall experience of around 6 years. Prior to joining DNV, she has about six years of experience in construction industry, regulations on construction industry, air/water/noise monitoring, reporting to state & central pollution control boards, designing of water supply system & works on UK Water Industry. Her experience covers fields of Water & Waste Water infrastructure. She is gaining experience in CDM 3rd party validation/verification services. Her qualification & industrial experience are convening the quick and efficient learning of 3rd party validation/verification services.

Mr.Seshan Ranganathan, holds a Bachelor's Degree in Chemical Engineering and has done diploma course in Management and completed the graduate ship course in Industrial Engineering and has an overall working experience of around twenty nine years. Prior to joining DNV has around twenty four years experience in Chemical process industry (fertilizer & petrochemical manufacturing) covering production, technical services including energy audits and efficiency studies, waste heat recovery, efficiency studies of boilers ,power plants , safety audits and pollution control activities including waste water treatment, project management, corporate planning, sales, logistics in fertilizer & petrochemical industry . With respect to the thermal power plant the job assignment included the monitoring of flue gas exit temperatures, excess air used efficiency of fuel additives, condition of boiler refractory, insulation of steam lines etc. The experience also includes 5 years in process design & engineering for chemical process industry.

He is qualified validator and verifier for CDM projects. He has completed the EMS lead auditor course. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in areas of (a) 1.1 Thermal energy generation from fossil fuels and Biomass including thermal electricity from solar (b) 1.2 Energy generation from renewable energy sources (c) 2.2 Heat distribution (d) 5.1/11.1/12.1 Chemical Processes Industries and (e) 13.1 Waste handling and disposal.