



## **VOLUNTARY CARBON STANDARD 2007.1**

### **VERIFICATION REPORT**

#### **1.2 MW WORLD INSTITUTE OF SUSTAINABLE ENERGY WIND FARM IN KARNATAKA**

**Monitoring Period: 2006-04-01 to 2009-12-31  
(incl. both days)**

**Report No: 53610008 - 08/672**

**Date: 2011-04-19**

TÜV NORD CERT GmbH  
JI/CDM Certification Program  
Langemarckstraße, 20  
45141 Essen, Germany  
Phone: +49-201-825-3335  
Fax: +49-201-825-3290  
[www.tuev-nord.de](http://www.tuev-nord.de)  
[www.global-warming.de](http://www.global-warming.de)





## Abbreviations

<b>BAU</b>	Business as usual
<b>BESCOM</b>	Bangalore Electricity Supply Company
<b>CA</b>	Corrective Action / Clarification Action
<b>CAR</b>	Corrective Action Request
<b>CDM</b>	Clean Development Mechanism
<b>CMS</b>	Central Monitoring System
<b>CO<sub>2</sub></b>	Carbon dioxide
<b>CO<sub>2e</sub></b>	Carbon dioxide equivalent
<b>CP</b>	Certification Program
<b>CL</b>	Clarification Request
<b>DNA</b>	Designated National Authority
<b>EB</b>	CDM Executive Board
<b>EIA</b>	Environmental Impact Assessment
<b>ER</b>	Emission Reduction
<b>FAR</b>	Forward Action Request
<b>GHG</b>	Greenhouse gas(es)
<b>GWP</b>	Global Warming Potential
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>JMR</b>	Joint Meter Reading
<b>KERC</b>	Karnataka Electricity Regulatory Commission
<b>KPTCL</b>	Karnataka Power Transmission Corporation Limited
<b>MP</b>	Monitoring Plan
<b>MR</b>	Monitoring Report
<b>O&amp;M</b>	Operation and Maintenance
<b>PE</b>	Project Emissions
<b>QC/QA</b>	Quality control/Quality assurance
<b>SEB</b>	State Electricity Board
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change
<b>VCS</b>	Voluntary Carbon Standard
<b>VCS - PD</b>	VCS - Project Description
<b>VCU</b>	Voluntary Carbon Unit
<b>VVM</b>	Validation and Verification Manual
<b>WISE</b>	M/s. World Institute of Sustainable Energy



<b>Table of Contents</b>		<b>Page</b>
<b>1</b>	<b>INTRODUCTION .....</b>	<b>5</b>
<b>1.1</b>	<b>Objective.....</b>	<b>5</b>
<b>1.2</b>	<b>Scope and Criteria .....</b>	<b>5</b>
<b>1.3</b>	<b>VCS Project Description.....</b>	<b>6</b>
1.3.1	Project Characteristics .....	6
1.3.2	Project Location .....	6
1.3.3	Technical Project Description.....	7
1.3.4	Appointment of team members and technical reviewer.....	8
<b>1.4</b>	<b>Level of Assurance .....</b>	<b>8</b>
<b>2</b>	<b>METHODOLOGY .....</b>	<b>10</b>
<b>2.1</b>	<b>Review of Project Documentation .....</b>	<b>11</b>
<b>2.2</b>	<b>On-Site Assessment .....</b>	<b>11</b>
2.2.1	Review of Performance Records.....	11
2.2.2	Follow-up Interviews .....	11
2.2.3	Collection of Measurements.....	12
2.2.4	Observation of established practices and testing of the accuracy of monitoring equipment.....	12
<b>2.3</b>	<b>Determination of the reductions in GHG emissions .....</b>	<b>13</b>
<b>2.4</b>	<b>Review of additional data from other sources if appropriate.....</b>	<b>13</b>
<b>2.5</b>	<b>Review of monitoring results and verification of the correct application of monitoring methodologies.....</b>	<b>13</b>
<b>2.6</b>	<b>Resolution of any material discrepancy .....</b>	<b>13</b>
<b>3</b>	<b>VERIFICATION FINDINGS.....</b>	<b>15</b>
<b>3.1</b>	<b>Remaining issues, including any material discrepancy, from previous validation .....</b>	<b>15</b>
<b>3.2</b>	<b>Project implementation .....</b>	<b>16</b>
<b>3.3</b>	<b>Completeness of monitoring .....</b>	<b>18</b>
<b>3.4</b>	<b>Accuracy of emission reduction calculations .....</b>	<b>23</b>
<b>3.5</b>	<b>Quality of evidence to determine emission reductions .....</b>	<b>26</b>
<b>3.6</b>	<b>Management and operational system .....</b>	<b>28</b>
<b>4</b>	<b>VERIFICATION STATEMENT.....</b>	<b>30</b>
<b>5</b>	<b>REFERENCES .....</b>	<b>32</b>



## 1 INTRODUCTION

The client, Enercon (India) Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the verification of the project:

“1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka Project”

with regard to the relevant requirements of the Voluntary Carbon Standard 2007.1<sup>/VCS/1</sup> The verifiers have reviewed the implementation of the monitoring plan (MP) in the registered VCS project for the monitoring period 2006-04-01 to 2009-12-31.

The applied monitoring methodology is AMS-I.D, Version 13 “Grid connected renewable electricity generation”<sup>2</sup>.

### 1.1 Objective

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

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

### 1.2 Scope and Criteria

The verification of this project is based on the validated project design document<sup>/VCS-PD/</sup>, the monitoring report<sup>/MR/</sup>, emission reduction calculation spread sheet<sup>/XLS/</sup>, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore publicly available information was considered as far as available and required.

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

<sup>2</sup> <http://cdm.unfccc.int/methodologies/index.html>



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

### 1.3 VCS Project Description

#### 1.3.1 Project Characteristics

Essential data of the project is presented in the following Table 1-1.

**Table 1-1: Project Characteristics**

Item	Data
Project title	1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka
Project owner	WORLD INSTITUTE OF SUSTAINABLE ENERGY <sup>3</sup>
Any specific project categories	<input type="checkbox"/> Mega project (> 10 <sup>6</sup> t CO <sub>2eq</sub> / a) <input checked="" type="checkbox"/> Project (> 5000 t CO <sub>2eq</sub> / a < 10 <sup>6</sup> t CO <sub>2eq</sub> / a ) <input type="checkbox"/> Micro project (< 5000 t CO <sub>2eq</sub> / a) <input type="checkbox"/> AFOLU project <input type="checkbox"/> Grouped project <input type="checkbox"/> No specific project category
VCS PD dated	Draft: 2009-06-16 Final: 2009-11-17
Applied Methodology	Grid connected renewable electricity generation
Project starting date	2004-11-05
Crediting period	<input checked="" type="checkbox"/> Renewable Crediting Period (10 y) <input type="checkbox"/> Fixed Crediting Period (10 y)
Start of crediting period	2006-04-01

#### 1.3.2 Project Location

The details of the project location are given in table 1-2:

**Table 1-2: Project Location**

No.	Project Location		
Host Country	India		
Region:	Karnataka		
Project location address:	Vani Vilas Sagar		
Latitude and Longitude		Latitude	Longitude
	WISE 01	13° 49' 57.2" N	76° 30' 01.2" E
	WISE 02	13° 49' 54.3" N	76° 30' 01.5" E

<sup>3</sup> [www.wisein.org](http://www.wisein.org)



### 1.3.3 Technical Project Description

The project utilizes wind power for electricity generation. The total installed capacity is 1.2 MW (2\*0,6 MW) with an estimated electricity supplied to the grid of about 11.67 GWh per year. The project is equipped with state-of-art WEG model (E-40) of Enercon make.

Supporting documents such as technical specifications<sup>/TD/</sup> of the WEGs were made available to the TÜV NORD JI/CDM CP. The technical specifications<sup>/TD/</sup> annex to the purchase order for the WEG, issued by Enercon (India) Ltd. clearly specifies the technical details for the E-40 WEG. This was also confirmed during the interviews with the PP and the on-site visit.

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

**Table 1-3a:** Technical data of the project

Parameter	Unit	Value
Turbine Model	-	Enercon E-40
Rated Power	kW	600
Lifetime of the E-40 WEG	years	20
Cut in wind speed	m/s	3
Rated speed	m/s	11.6
Rotor Diameter	m	44
Hub height	m	46
Turbine type	-	Gearless horizontal axis
Power regulation	-	Independent electromechanical pitch system
No. of blades	-	3
Generator type	-	Synchronous
Rotor Speed	rpm	18 to 33
Output voltage	V	400
Yaw system	-	Active yawing with 4 electric yaw drives with brake motor and friction bearing
Tower height	m	45.15

**Table 1-3b:** Parameters confirmed during verification

Parameter	Name	Unit	Value
Electricity exported to the grid by the project during the monitoring period	EG,export	kWh	11,645,222
Electricity imported by the project activity	EG,import	kWh	12,140.55
Net electricity supplied to the grid during the monitoring period	EGy*	kWh	11,645,222-12140.55-197207=11435874

\* Transmission loss and 115% of import has been used in the JMR by KPTCL and BESCO for calculation of net electricity supplied to the grid.

### 1.3.4 Appointment of team members and technical reviewer

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

The list of involved personnel, the tasks assigned and the qualification status are summarized in the table 1-4 below.

**Table 1-4:** Involved Personnel

	Name	Company	Function <sup>1)</sup>	Qualification Status <sup>2)</sup>	Sectoral competence	Technical competence	Host country Competence	Controlling competence
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ma. Paa. Puratchikkanal	TUV India Private Limited	TL	SA	<input checked="" type="checkbox"/>	T	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> Mr. <input checked="" type="checkbox"/> Ms.	Manjari. Chandra	TUV India Private Limited	TM	E	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Shailendra Kewat	TUV India Private Limited	TM	TE/E	<input checked="" type="checkbox"/>	T	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	R. Murali	TUV India Private Limited	TM	E	<input checked="" type="checkbox"/>	-	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Ingo Klein	TÜV CERT NORD	TR <sup>3)</sup>	A	<input checked="" type="checkbox"/>	T	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Rainer Winter	TÜV CERT NORD	FA	SA	<input checked="" type="checkbox"/>	T	<input type="checkbox"/>	<input checked="" type="checkbox"/>

<sup>1)</sup> TL : Team Leader; TM : Team Member, TR: Technical review; FA: Final approval;

<sup>2)</sup> GHG Auditor Status: A : Assessor; E : Expert; SA: Senior Assessor; T : Trainee; TE Technical Expert

<sup>3)</sup> No team member

<sup>4)</sup> As per S01-MU03 or S01-VA070 A2 (such as A, B, C.....)

## 1.4 Level of Assurance

The verification has been planned and organized to achieve a





- 
- reasonable level of assurance
  - limited level of assurance.



## 2 METHODOLOGY

The verification of the project consisted of the following steps:

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

The sequence of the verification is given in the table 2.1 below:

**Table 2.1:** Verification sequence

Topic	Time
Assignment of verification	2008-11-17
On-site visit	2010-02-25
Draft reporting finalised	2010-08-24
Technical review on draft reporting finalised	2010-08-26
Final reporting finalised	2010-08-30
Technical review on final reporting finalised	2011-04-19
Final corrections	2011-04-19

The main verification steps are described below.



## 2.1 Review of Project Documentation

The VCS PD <sup>/PD/</sup> and supporting background documents related to the project design and baseline were reviewed. The MR <sup>/MR1-/MR5/</sup> and ER sheets <sup>/XLS1-/XLS4/</sup> and supporting documents <sup>/JMR/, /CAL07/, /CAL08/, /CAL09/, /CR/, /PPA1/, /PPA2/,TRNG/</sup>

Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

The references used in the course of this verification are summarized in section 5.

## 2.2 On-Site Assessment

### 2.2.1 Review of Performance Records

The project proponent has furnished project records such as monthly joint meter records issued by BESCO <sup>/JMR/</sup>, calibration records of all the energy meters <sup>/CAL07, CAL08, CAL09/</sup> for the years 2007, 2008 and 2009, training records conducted by EIL <sup>/TRNG/</sup>, Power Purchase Agreement <sup>/PPA1/, /PPA2/</sup> etc., which were thoroughly reviewed by the verification team. The values mentioned in the emission reduction spread sheet <sup>/XLS4/</sup> were based on the reviewed documents and the calculation procedure was found to be complete and correct, and in agreement with the MR <sup>/MR5/</sup>. These data values and other information related to project performance including calibration and meter testing details are available in the form of hard copy and records duly archived and maintained as per the quality assurance/quality control procedure specified as a part of monitoring plan given in the validated PD <sup>/VCS-PD/</sup>.

### 2.2.2 Follow-up Interviews

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

During verification the verification team has performed interviews to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarized in Table 2-2.

**Table 2-2:** Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives (M/s. World Institute of Sustainable Energy) – Mr. Kharul	<ul style="list-style-type: none"> <li>- General aspects of the project</li> <li>- Technical equipment and operation</li> <li>- Changes since validation</li> </ul>



Interviewed Persons / Entities	Interview topics
Project consultant (M/s. Enercon (India) Limited)- Mr. Saujanya	<ul style="list-style-type: none"> <li>- Monitoring and measurement equipment</li> <li>- Remaining issues from validation / previous verifications</li> <li>- Calibration procedures</li> <li>- Quality management system</li> <li>- Involved personnel and responsibilities</li> <li>- Training and practice of the operational personnel</li> <li>- Implementation of the monitoring plan</li> <li>- Monitoring data management</li> <li>- Data uncertainty and residual risks</li> <li>- GHG calculation</li> <li>- Procedural aspects of the verification</li> <li>- Maintenance</li> <li>- Environmental aspects</li> <li>- Editorial issues of the Monitoring Report</li> </ul>

A comprehensive list of all interviewed persons is part of section 5 ‘References’.

### 2.2.3 Collection of Measurements

As per the monitoring procedure in the validated PD, the data/parameters are rightly monitored. Measurements of the data parameters used for calculation of emission reductions such as Net electricity supplied to the grid by the project, import and export are under taken by the project proponent. All the procedure followed in the site are found to be in line with the monitoring plan<sup>/VCS-PD/</sup> & the PPA<sup>/PPA1/, /PPA2/</sup> signed for the project.

The verification team checked data measurement procedures including metering arrangements, collection, reporting/recording and archiving of data at the time of site visit and found the practices were in compliance with approved monitoring plan as contained in validated PDD<sup>/VCS-PD/</sup> and the deviation in the monitoring plan.

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

Accuracy of monitoring equipment in the project is maintained by means of periodic calibration by the PP as per the validated monitoring plan<sup>/VCS-PD/</sup>. The calibrations of the measuring equipments have been conducted during the monitoring period with some inconsistencies in the calibration duration which are not in line with the validated PD<sup>/VCS-PD/</sup>. Hence, as per EB 52 Annex 60 correction applied to the electricity supplied to the grid for the entire monitoring period, and the calibration reports were verified<sup>/CAL07/, /CAL08/, /CAL09/</sup>. Training procedures<sup>/TRNG/</sup>, roles and responsibilities are pre-defined by Enercon (India) Limited which is an ISO 9001:

2001 certified company. These established practices were checked on site and by means of document review.

## 2.3 Determination of the reductions in GHG emissions

The net electricity supplied to the grid is taken from joint meter readings<sup>/JMR/</sup> which are authentic documents for the basis for emission reduction calculations. The procedure for determining emission reductions from baseline, project and leakage is found as per the algorithm and formulae presented as per AMS I.D version 13 in the validated PD<sup>/VCS-PD/</sup> and monitoring plan<sup>/MR5/</sup>. The PP has used monitored data and ex ante fixed emission factor data as per the applied methodology. The Verification team has checked the input values as well as the computation in the emission reduction spreadsheet<sup>/XLS4/</sup> and found to be in line with the joint meter reading<sup>/JMR/</sup> reports. The estimation of the emission reduction was realized in a transparent and conservative manner. The calculation of emission reductions is based on the manner described under section 3.4 of this report.

## 2.4 Review of additional data from other sources if appropriate

Not applicable. The JMRs issued by the BESCO for the duration of the monitoring period are the basis for calculation of emission reductions achieved by the project.

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

The verification team has verified the emission reductions. The monitored results<sup>/MR5/,/XLS4/</sup> are in line with the applicable methodology AMS I.D , version 13.

## 2.6 Resolution of any material discrepancy

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

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

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



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

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

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in the next section 3 of this report.



### 3 VERIFICATION FINDINGS

In this section the assessments and findings from the desk review of the VCS PD, site visit, interviews and supporting documents as well as the final assessments are summarised. Table 3-1 includes an overview of all raised CARs, CLs and FARs.

**Table 3-1:** Overview of CARs, CLs and FARs issued

No.	Topic / Chapter	CAR	CL	FAR
3.1	Remaining issues, including any material discrepancy	-	-	-
3.2	Project implementation	-	1	-
3.3	Completeness of monitoring	2	1	-
3.4	Accuracy of emission reduction calculations	1	1	-
3.5	Quality of evidence to determine emission reductions	-	-	-
3.6	Management and operational system	-	1	-
-	<b>SUM</b>	<b>3</b>	<b>4</b>	<b>0</b>

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

##### Description

There are no remaining issues from validation.

##### Related Findings

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

##### Final Assessment

There are no remaining issues from validation. The validated VCS PD<sup>/PD/</sup> and the final validation report<sup>/FValR/</sup> was verified, and no remaining issues /FARs were found.



### 3.2 Project implementation

#### Description

The project activity involves 2 WEGs of total capacity of 1.2 (2X0.6) MW in Elladakere, Chitradurga District, Karnataka. The project generates electricity to be supplied to the Southern grid. During the verification a site visit was carried out. There are no major changes in the key equipment since the validation of the project. The WEGs are connected to energy meters of 0.2 s which measure the electricity supplied to the grid by the project. The meters are calibrated by the KPTCL and are under their control. The JMRs issued each month form the basis for the calculation of emission reductions achieved by the project. No change of equipment is envisaged. These facts have been verified during site visit.

#### Related Findings

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

Finding:	3.2-1		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	PPA with all annexes to be submitted. Annexes are missing. Also clarify the comment "Pending PPA" on the Form B/JMR.		





<p><b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>The PPA with Annexure is submitted herewith for the DOE's reference. We would like to bring to the DOE's notice that the PPA for the project activity was initially entered into on 24/06/2004 between Karnataka Power Transmission Company Limited and WISE. To improve the performance of the power sector and in tune with the reforms initiated by other States which proposed fundamental and radical reforms in the power sector the KPTCL was un-bundled and ESCOMs were carved out. Since the distribution and procurement of electricity lay in the jurisdiction of the DISCOMs, PPA for the project activity was re-signed between WISE and BESCO. For avoidance of any discrepancy, both the PPAs have been hereby submitted to the DOE which clearly detail that the projects for which the PPA's have been signed are the same. Moreover, the revised PPA was executed in February 2006 and was pending to be signed between WISE &amp; BESCO. The same was being reflected in the Form B by the BESCO officials. Since Form B is prepared by the BESCO officials using a standard format, the same was mistakenly reflected in all the Form Bs till September 2007. Thereafter, it was brought to the notice of the BESCO officials and the same was removed from the subsequent Form B's.</p>
<p><b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>As mentioned in the corrective action, both the PPAs have been submitted for verification. The initial PP<sup>/PPA1/</sup> signed between M/s. WISE and KPTCL is dated 2004-06-24, while the new PPA<sup>/PPA2/</sup> between M/s. WISE and the BESCO was signed on 2006-02-27. The JMR or B forms have been verified and it was found that until the month of September 2007, the JMR stated "Pending PPA". The verification team concludes that this was an error of oversight on the BESCO's part as the PPA signed with BESCO 2006-02-27 was verified and found to be OK. W.r.t the two PPA's, this came into practice in order to comply with the KERC notification No.D/01/03 dated 28.04.2004-04-28 "KARNATAKA ELECTRICITY REGULATORY COMMISSION (CONDITIONS OF LICENCE FOR ESCOMs) REGULATIONS, 2004" which states that KERC has granted license to the ESCOMs, the BESCO being one of them, for the distribution and retail supply of electricity in Karnataka State. <a href="http://www.kerc.org/website/../../../../newregea2003.html">http://www.kerc.org/website/../../../../newregea2003.html</a> As the PPA signed with KPTCL was prior to this notification, subsequently another PPA was signed with BESCO. Hence, CL 3.2-1 was closed.</p>
<p><b>Conclusion</b> <i>Tick the appropriate checkbox</i></p>	<p> <input type="checkbox"/> To be checked during the first periodic verification  <input checked="" type="checkbox"/> Appropriate action was taken  <input type="checkbox"/> Project documentation was corrected correspondingly  <input type="checkbox"/> Additional action should be taken  <input checked="" type="checkbox"/> The project complies with the requirements         </p>

## Final Assessment

On the basis of the site visit and the reviewed project documentation, it can be confirmed that w.r.t. the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the registered VCS PD<sup>/VCS-PD/</sup>. There are no major changes in the key equipment since the validation of the project. Supporting documents such as the commissioning certificates<sup>/CR/</sup>, technical specifications of the project<sup>/TD/</sup>, power purchase agreement<sup>/PPA1, PPA2/</sup> and the certificate of approval from the electrical inspectorate<sup>/ELEC/</sup> for all electrical equipment of the project were verified and found to be OK. The JMRs<sup>/JMR/</sup> for the monitoring period and the calibration reports were verified and found to be OK.

CL 3.2-1 was closed.

## 3.3 Completeness of monitoring

### Description

The project uses CDM approved methodology AMS-I.D Version 13: Grid connected renewable electricity generation, which is approved under VCS 2007.1.

The parameters to be monitored as per the monitoring plan are 'EG, export', 'EG, import' and 'EGy', i.e. the net electricity supplied to the grid by the Project. The energy meter readings (export and import) are recorded each month into the joint meter reading<sup>/JMR/</sup> issued by the BESCO. Transmission losses incurred during transmission of the electricity from the project site to the substation are taken into account by the BESCO in the JMR, and included in the electricity to be billed by the PP to the BESCO, which is nothing but the net electricity supplied to the grid by the project. Thus, the net electricity supplied to the grid by the project, after deducting the transmission losses is considered for the calculation of emission reductions. The JMRs are crosschecked with the payment vouchers made by the BESCO<sup>/VCR/</sup>, which were found to be in agreement. These form the basis for the emission reduction calculation for the project. The energy supplied to the grid during the monitoring period of 2006-04-01 to 2009-12-31 is 11.67 GWh.

The meters were calibrated<sup>/CAL07, CAL08, CAL09/</sup> annually by the BESCO officials as per Article 7 of the PPA<sup>/PPA1, PPA2/</sup> in the years 2007, 2008 and 2009 respectively. On account of the energy meters not having been calibrated in the year 2006, the PP has applied a correction of 0.2 (equal to the accuracy class of the meters) on the net energy supplied to the grid, for the entire monitoring period.

The O&M is performed by Enercon (India) Limited, which is an ISO 9001 certified company. The QA/QC procedures have been established, as was evident during the site visit. The main parameters to be monitored are measured by tri-vector meters at



the 33kV metering point at the project site. The energy readings are taken from the meters each month by the BESCO (a division of KPTCL) officials in presence of the EIL representatives. The online central monitoring system, SCADA, records the daily generation continuously. During the site visit, the verification team has analyzed the QA/QC procedures established by the O&M provider and reviewed the electricity measurement and recording procedures from SCADA and state electricity board. The O&M provider has a separate online database for the energy generation for each WTG and the same can be verified in their control monitoring system (CMS). The CMS is equipped with SCADA software to monitor all the parameters such as energy generation, wind speed, rotor speed, angle of the blade, emergency alarm, generator temperature etc. The accuracy of the measurements is assessed as high, because all measurement devices are of 0.2 accuracy class. . Annual calibration reports<sup>/CAL07, CAL08, CAL09/</sup> for the years 2007, 2008 and 2009 dated 2008-02-28, 2009-09-30, respectively, were verified. However, due to the unavailability of a record for calibration in 2006, a correction of 0.2% has been applied to the net electricity supplied to the grid by the project for the entire monitoring period for the sake of conservativeness. On this account, the 'import energy' has been increased by 0.2 and the 'export energy' has been decreased by 0.2 for each month of the monitoring period.

Thus the verification team concludes that the emission reductions reported in the MR<sup>/MR5/</sup> and the ER sheet<sup>/XLS4/</sup> are conservative and accurate.

During the onsite-visit on 2010-02-25, the data recorded and stored including the joint meter reading<sup>/JMR/</sup> reports duly signed by the representatives of BESCO submitted by the PP were verified. The procedure was thus found to be in line with the monitoring plan<sup>/PD/</sup> and the PPA<sup>/PPA1, PPA2/</sup> signed for the project and deemed to be OK. The monthly and yearly generation data<sup>/GEN/</sup> sourced by the SCADA and stored online was verified and found to be OK.

Nevertheless, the following CARs and CL were raised and closed successfully based on the revised Monitoring report.

Related Findings

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

Finding:	<b>3.3-1</b>		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	1. The emission reductions reported in the ER sheet do not depict the export, import, and transmission loss and emission reductions for <u>each month</u> as given in the JMR, for the entire monitoring period. The ER sheet with calculations should be traceable. The same is not		



	<p>reported in the MR.</p> <p>2. The differences between the monitored ER and the ex-ante ER needs to be sufficiently justified in the MR.</p>
<p><b>Corrective Action #1</b></p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>1. Changes have been made in the Monitoring report as well as Emission Reduction sheet detailing the Export, Import, transmission loss and Net Electricity values for the vintages.</p> <p>2. Corrections have been made in the Monitoring report detailing the difference.</p>
<p><b>DOE Assessment #1</b></p> <p><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>1. The ER sheet is incomplete with values of import, export, missing. The ER values are not rounded down</p> <p>2. ER sheet shall include ER for each month (rounded down) and computation of ER shall be traceable in the ER sheet.</p> <p>3. Designation of parameters in the ER sheet must reflect those in the PD. Please revise.</p> <p>4. The values in the ER sheet shall be included in the MR as well.</p>
<p><b>Corrective Action #2</b></p> <p><i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>Emission Reduction sheet has been amended accordingly.</p>
<p><b>DOE Assessment #2</b></p> <p><i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>1. The revised ER sheet <sup>/XLS3/</sup> and MR<sup>/MR3/</sup> have been modified suitably to include all the monitoring parameters, EG, export; EG, import and EGy.</p> <p>2. The calculation used for determining the ER, including that of transmission loss are traceable in the ER sheet and values of export, import, transmission loss and net electricity billed are found to be in agreement with the JMRs. The ER values have been rounded down and the correction factor has been rightly applied for the year 2006.</p> <p>3. The designations of the parameters are found to tally with that of the VCS PD.</p> <p>4. The revised MR<sup>/MR3/</sup> compares the electricity generation and emission reductions as estimated in the registered PD with that of the monitoring period of 2006-04-01 to 2009-12-31. The annual estimated ER as per the PD is 2,595 tCO<sub>2</sub>e, while the vintage ERs for the years 2006 (9 months), 2007, 2008 and 2009 are 2559, 2778, 2681 and 2767 tCO<sub>2</sub>e. This is due to high wind occurrences, leading to an increase in electricity generation. The net electricity supplied to the grid by the project as mentioned in the ER<sup>/XLS3/</sup> sheet and the MR<sup>/MR3/</sup> have been verified and found to be in agreement with the JMRs<sup>/JMR/</sup> and the vouchers of payment<sup>/VCR/</sup> credited by BESCO to WISE during the monitoring period. The verification team has verified the JMRs and the receipts for the entire crediting period. The verification team noted that the ER claimed by the PP is in line with the net electricity billed and paid for by the BESCO.</p>



	Hence CAR 3.3-1 is closed.
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements

Finding:	3.3-2		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The parameters given in the MR are not as per the registered VCS PD.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	The parameters in the Monitoring Report has been suitably amended in line with the validated VCS PD.		
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The MR <sup>/MR2/</sup> and the ER sheet <sup>/XLS2/</sup> have been revised as per the VCS PD. The designations, measurement methods and description of parameters in the revised documents are found to be in line with the VCS PD. The revised version has been verified by TÜV Nord and found to be OK. Supporting documents such as the JMR <sup>JMR/</sup> and the vouchers <sup>VCR/</sup> of payment from the BESCO have been verified and are in agreement with the values reported in the MR and the ER sheet. The MR is in line with the monitoring methodology. Hence, CAR 3.3-2 is successfully closed.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

Finding:	3.3-1		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The following issues are related to the general and editorial aspects of the MR (Version 0.1, dated 2010-01-27): <ol style="list-style-type: none"> <li>1. The cover page of the MR does not state the total emissions reduced during the monitoring period</li> <li>2. Please also include the VCS project ID of the project</li> <li>3. Name of PP in the MR is not as per section 1.1.5 of registered PD</li> <li>4. The monitoring plan can be streamlined. For e.g. heading "metering equipment" has been written twice. The layout and content of MP in the registered VCS PD should be adhered to as much as possible</li> <li>5. Please clarify the term "BESCO guidelines"</li> </ol>		



<p><b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<ol style="list-style-type: none"> <li>1. Total emissions for the Monitoring period have been mentioned on the cover page of the Monitoring Report.</li> <li>2. Validated VCS PD Report Number has been mentioned in the Monitoring report.</li> <li>3. Changes have been made on page 2</li> <li>4. The Monitoring plan has been revised.</li> <li>5. Suitable changes have been made in the Monitoring report.</li> </ol>
<p><b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>The following corrections have been made in the revised MR:</p> <ol style="list-style-type: none"> <li>1. The total ER for the chosen monitoring period have been mentioned on the cover page of the MR</li> <li>2. The VCS project ID VCS 244 of the project activity has been included in the MR</li> <li>3. The name of the PP has been made consistent throughout the MR</li> <li>4. The structure and general layout of the monitoring plan has been revised as per the VCS PD</li> <li>5. Calibration of monitoring instruments is as per the PPA. The term "BESCOM guidelines" has been replaced.</li> </ol> <p>The MR has been revised and CL 3.3-1 is closed.</p>
<p><b>Conclusion</b> <i>Tick the appropriate checkbox</i></p>	<p> <input type="checkbox"/> To be checked during the first periodic verification  <input type="checkbox"/> Appropriate action was taken  <input checked="" type="checkbox"/> Project documentation was corrected correspondingly  <input type="checkbox"/> Additional action should be taken  <input checked="" type="checkbox"/> The project complies with the requirements         </p>

Final Assessment

The parameters that are monitored are *EG, export, EG, import* and *EGy* or the net electricity to be supplied to the grid. These parameters are measured by two way tri-vector meters of accuracy class 0.2s, from which the reading are recorded into the JMR. Transmission losses have been accounted for by the BESCOM in the JMR, and hence not under influence of the PP. The values mentioned in the MR and the ER sheets are sourced from the JMRs for each month of the monitoring period issued to the PP by the BESCOM. TÜV Nord has verified the JMRs and crosschecked the same with the receipts of payment made by the BESCOM for the electricity supplied by the PP. The net electricity supplied to the grid for each month was found to tally with the receipts of payments.

The project satisfies all criteria of the applicable methodology and is in line with the power purchase agreement between the PP and the BESCOM and the registered VCS PD. The application of monitoring methodology is assessed as correct. Supporting documents such as the JMRs<sup>/JMR/</sup>, vouchers for credit<sup>/VCR/</sup> made by the BESCOM for the electricity supplied to grid have been verified and found to be OK.

CARs 3.3-1, 3.3-2 and CL 3.3-1 were successfully closed.

### 3.4 Accuracy of emission reduction calculations

#### Description

The net electrical energy supplied to the grid is calculated as the difference between total energy exported and the energy imported, transmission losses have been suitably subtracted as given in the JMR. Grid emission factor times the net electrical energy supplied to the grid give the baseline emission reduction.

The net export to grid times an emission coefficient for the Southern Regional Grid of India was taken into account for the calculation of baseline emissions.

For the calculation of baseline emissions the ex-ante validated value of baseline parameters, i.e., Southern Regional Grid Emission Factor is taken into account. The monitoring data to calculate the emission reductions is taken from the joint meter readings<sup>/JMR/</sup> issued by BESCO. This data is the basis for the calculation of the emission reductions as given in the spreadsheets<sup>/XLS4/</sup>. Appropriate calculation methods, in line with the methodology are applied. The grid emission factor of 0.926947 tCO<sub>2</sub>/MWh for the Southern Grid of India has been rightly applied in this monitoring period.

The accuracy of the measurements is assessed as high, because measurement devices are of 0.2 accuracy class. The energy meters were calibrated in the years 2007, 2008 as 2009 of the monitoring period. However, due to the absence of calibration in the year 2006, the PP has applied correction of 0.2 to the net electricity supplied to the grid. For the sake of being conservative, the PP has chosen to apply the correction for the entire monitoring period. Thus it is in accordance with Annex 60 of EB 52 "GUIDELINES FOR ASSESSING COMPLIANCE WITH THE CALIBRATION FREQUENCY REQUIREMENTS"- Ver 01 . Calibration reports for the years 2007, 2008 and 2009 have been verified and found to be OK. The ER sheet<sup>/XLS4/</sup> has been verified and the the correction applied found to be correct. Thus, the emission reductions remain conservative.

#### **Baseline Emissions:**

The formula used for the determination of baseline emissions which is consistent with the PDD is:

$$BE_y = EF_y \times EG_y$$

Where

EG<sub>y</sub> is the net electricity export to grid in a given year (KWh)

EF<sub>y</sub> is the emission factor for a given year (tonnes of CO<sub>2</sub>/MWh)

The baseline emissions (BE) during the monitoring period are 10,578 tCO<sub>2</sub>.



**Project Emission (PE<sub>y</sub>):**

Since the project is a wind power project, project emissions are nil.

**Leakage (L<sub>y</sub>):**

Since the project is a wind power project, there is no leakage involved.

**Emission Reduction:**

$$ER = BE_y - PE_y - L_y$$

Summary of Emission Reductions for the monitoring period:

Year	Net Electricity supplied (in KWh)	Baseline Emissions* (tCO <sub>2</sub> e)	Project Emissions (tCO <sub>2</sub> e)	Emission Reductions (tCO <sub>2</sub> e)
2006	2720996.31	2519	0	2519
2007	2942192.78	2722	0	2722
2008	2841886.37	2627	0	2627
2009	2930799.34	2710	0	2710
<b>Total</b>	<b>11435.870</b>	<b>10578</b>	<b>0</b>	<b>10578</b>

\*Grid Emission Factor = of 0.926947 tCO<sub>2</sub>/MWh

Hence the total emission reductions are 10,578 tCO<sub>2</sub>.

Related Findings

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

Finding:	<b>3.4-1</b>		
<b>Classification</b>	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> CL	<input type="checkbox"/> FAR





<p><b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<ol style="list-style-type: none"> <li>1. Calibration on a “regular basis” is mentioned in the MR. Please be specific</li> <li>2. The calibration reports for the year 2006 are to be submitted</li> <li>3. Please provide check meter details in the table on page 7 as well</li> </ol>
<p><b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<ol style="list-style-type: none"> <li>1. The statements have been revised in the MR. “Regular basis” has been replaced with “Annual basis”.</li> <li>2. Calibration reports of the entire monitoring period are to be submitted for verification.</li> <li>3. Check meter details have been added in the table.</li> </ol>
<p><b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<ol style="list-style-type: none"> <li>1. Calibration frequency has been specified as annual calibration, in line with the VCS PD.</li> <li>2. The calibration reports issued to the PP by KPTCL for the years 2007, 2008 and 2009 dated 2007-01-17, 2008-02-26 and 2009-09-30, respectively have been verified and found to be OK. In accordance with EB 52 Annex 60, and as calibration report for the year 2006 is not available, a correction of 0.2%, which is the maximum permissible error for meters of 0.2s accuracy, has been applied to the net electricity supplied to the grid by the project for the monitoring period. The same has been explained in the MR<sup>/MR3/</sup>. Hence, the VERs reported in version 3 of the MR<sup>/MR3/</sup> and ER sheet<sup>/XLS3/</sup> are accurate and conservative.</li> <li>3. Details of the check meters of the project that were in use during the monitoring period have been included in version 02 of the MR.</li> </ol> <p>CAR 3.4-1 was thus closed.</p>
<p><b>Conclusion</b> <i>Tick the appropriate checkbox</i></p>	<p> <input type="checkbox"/> To be checked during the first periodic verification  <input checked="" type="checkbox"/> Appropriate action was taken  <input checked="" type="checkbox"/> Project documentation was corrected correspondingly  <input type="checkbox"/> Additional action should be taken  <input checked="" type="checkbox"/> The project complies with the requirements         </p>

<p><b>Finding:</b></p>	<p><b>3.4-1</b></p>		
<p><b>Classification</b></p>	<p><input type="checkbox"/> CAR</p>	<p><input checked="" type="checkbox"/> CL</p>	<p><input type="checkbox"/> FAR</p>
<p><b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i></p>	<p>The net energy to be billed for the month of Oct ‘2008 is not in line with the JMR.</p>		
<p><b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i></p>	<p>Changes have been made in the Emission Reduction sheet. Invoices for the Monitoring period are submitted for the DOE’s reference.</p>		
<p><b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i></p>	<p>The net electricity supplied in the month of October 2008, in the ER has been corrected to 126,182 kWh, which is line with the value in the JMR. Vouchers of payment<sup>/VCR/</sup> made to WISE by BESCOM for the electricity supplied has been verified and found to be in agreement with the JMRs for the monitoring period. Hence CL 3.4-1 is closed.</p>		



<p><b>Conclusion</b> <i>Tick the appropriate checkbox</i></p>	<p><input type="checkbox"/> To be checked during the first periodic verification</p> <p><input checked="" type="checkbox"/> Appropriate action was taken</p> <p><input type="checkbox"/> Project documentation was corrected correspondingly</p> <p><input type="checkbox"/> Additional action should be taken</p> <p><input checked="" type="checkbox"/> The project complies with the requirements</p>
-------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Final Assessment

A revised ER calculation sheet <sup>/XLS4/</sup> was prepared by the PP which was verified by the verification team. W.r.t calibration report for the year 2006, the PP has applied a correction of 0.2% which is the maximum permissible error for energy meters of 0.2 accuracy to the electricity exported and imported during the monitoring period. This procedure is in compliance with EB 52 Annex 60-“GUIDELINES FOR ASSESSING COMPLIANCE WITH THE CALIBRATION FREQUENCY REQUIREMENTS” All raised issues were addressed appropriately so the corresponding CAR and CL were closed out. Thus it is confirmed that the ER calculation is correct and conservative. The supporting documents JMRs, receipts and calibration reports <sup>/CAL07, CAL08, CAL09/</sup> were verified and found to be OK.

CAR 3.4-1 and CL 3.4-1 were closed successfully.

**3.5 Quality of evidence to determine emission reductions**

Description

Proper data management including data acquisition, aggregation and data management system is being followed for the project activity. EIL is responsible for the O&M activities, which is an ISO 9001 certified company. The QA/QC procedures have been established, as was evident during the site visit. The central monitoring system, SCADA, records the daily generation continuously. The O&M provider has a separate online database for the energy generation for each WTG and the same can be verified in their control monitoring system (CMS). The CMS is equipped with SCADA software to monitor all the parameters such as energy generation, wind speed, rotor speed, angle of the blade, emergency alarm, generator temperature etc.

The main parameters to be monitored are measured by tri-vector meters at the 33kV metering point at the project site. The energy readings are taken from the meters each month by the BESCO (a division of KPTCL) officials in presence of the EIL representatives. The accuracy of the measurements is assessed as high, because all measurement devices are of 0.2 accuracy class and calibrated. Due to delay in calibration during the monitoring period, correction as per EB 52 Annex 60 has been applied.

All records needed for monitoring are archived in line with the requirements of the validated monitoring plan <sup>/VCS-PD/</sup>. The data contains the JMRs <sup>/JMR/</sup> and vouchers <sup>/VCR/</sup>



stored in paper format. The daily monitored data from the SCADA is maintained electronically and in the form of hard copies at the site as well as the Enercon corporate office. No significant lack of evidence and missing data were detected during on-site verification.

The net electricity supplied to the grid is taken from the joint meter reading<sup>/JMR/</sup> reports and the vouchers<sup>/VCR/</sup> maintained by BESCO for the payments made for the electricity to be billed in the JMR, which form the basis for emission reduction calculations. The amount of electricity supplied to the grid by the project activity is continuously metered by the tri-vector meters of 02.s which measure both import and export. The readings are recorded by the BESCO, and hence are authentic. The meters are calibrated by BESCO and calibration reports were verified and found to be OK. The online CMS system is maintained by the O& M party, EIL.

#### Related Findings

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

#### Final Assessment

The significant documentary evidence in support of the net electricity supplied to the grid is the JMRs verified and crosschecked with the receipts of payment made by the BESCO. The annual calibration reports were verified by the verification team and found to be OK. For the year 2006, as calibration reports are not available, a correction of 0.2 % was used as per EB 52, Annex 60. The ER thus reported are conservative and accurate. It is evident from the monitoring data that the monitoring system ensures continuous operation, no major break down has been found to occur during the monitoring period. As EIL is an ISO 9001 certified company, QMS procedures are already in place. All internal data are subjected to QA/QC measures. The data contains the JMRs and vouchers stored in paper format. The daily monitored data from the SCADA is maintained electronically and in the form of hard copies at the site as well as the Enercon corporate office. These were verified during the site visit and found that proper procedures were adopted for data handling.

Supporting documents such as JMRs, receipts, and calibration reports were verified and found to be OK.



### 3.6 Management and operational system

#### Description

The allocation of responsibilities is documented in a written form and is followed as described in the PD and MR. This has been verified. Routines for the archiving of data are defined and documented. The monitoring personnel at site are well trained and follow reproducible routines as was evident during the site visit. Training records<sup>TRNG/</sup> were verified and found to be OK. Representatives from the O&M team were interviewed. Procedure for training and maintenance of critical equipments were discussed during site visit. Day to day operation is supervised by the technically qualified site engineers. A combination of competent personnel and on –the –job training is the procedure practiced for all monitoring personnel. This ensures that competent people carry out tasks with sufficient accuracy. All necessary monitored and measured raw data were checked during on-site verification.

#### Related Findings

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

Finding:	3.6-1		
<b>Classification</b>	<input type="checkbox"/> CAR	<input checked="" type="checkbox"/> CL	<input type="checkbox"/> FAR
<b>Description of finding</b> <i>Describe the finding in unambiguous style; address the context (e.g. section)</i>	The MR does not make a mention of the training procedures adopted for the monitoring personnel.		
<b>Corrective Action #1</b> <i>This section shall be filled by the PP. It shall address the corrective action taken in details.</i>	Details of training procedure for EIL personnel is mentioned in the revised MR and documents submitted for verification.		
<b>DOE Assessment #1</b> <i>The assessment shall encompass all open issues. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.</i>	The revised MR dated 2010-06-22, Version 03 was verified. Training procedures have been included in this version. The procedures are in compliance with information provided during the site interviews. Training records <sup>TRNG/</sup> were verified and found to be OK. CL 3.6-1 was closed.		
<b>Conclusion</b> <i>Tick the appropriate checkbox</i>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Appropriate action was taken <input checked="" type="checkbox"/> Project documentation was corrected correspondingly <input type="checkbox"/> Additional action should be taken <input checked="" type="checkbox"/> The project complies with the requirements		

#### Final Assessment



As EIL is an ISO 9001 certified company with a pre-defined QMS in place, the management and operation of equipment, handling and storage and data, and training of monitoring personnel was found to be satisfactory. This was verified during the site visit and supporting documents on training conducted for monitoring personnel.

- CL 3.6-1 was closed during the course of the verification.



## 4 VERIFICATION STATEMENT

M/s. Enercon (India) Limited has commissioned the TÜV NORD JI / CDM Certification Program to carry out the verification of the Project “1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka” of M/s. World Institute of Sustainable Energy in Chitradurga district, Karnataka, India with regard to the requirements of VCS 2007.1 Standard.

The project activity involves the generation of electricity from 2 nos. of wind electricity generators of Enercon make E-40, a total capacity of 1.2 MW (2x0.6 MW) in Chitradurga, Karnataka, India. The project supplies electricity to the Southern grid of India, thereby replacing use of fossil fuels, and contributing to GHG reductions.

Reporting period: From 01-04-2006 to 31-12-2009

In the course of the verification 3 Corrective Action Requests (CARs), 4 Clarification Requests (CLs) were successfully closed. No Forward Action Request (FAR) was raised.

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

In detail the conclusions can be summarised as follows:

- all operations of the project are implemented and installed as planned and described in the validated project description.
- the monitoring plan is in accordance with the applied approved methodology ,i.e., AMS I.D Ver 13
- the installed equipment essential for measuring parameters required for calculating emission reductions is calibrated. However, due to delays in consecutive annual calibrations, appropriate correction to the electricity supplied to the grid has been applied. This is in line with EB 52 Annex 60.
- the monitoring system is in place and functional. The project has generated GHG emission reductions.

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

Year-wise vintage	Emission Reductions (t CO <sub>2</sub> e)
1-Apr-2006 to 31-Dec-2006	2,519
1-Jan-2007 to 31-Dec-2007	2,722
1-Jan-2008 to 31-Dec-2008	2,627



1-Jan-2009 to 31-Dec-2009	2,710
<b>Total ER</b>	<b>10,578</b>

Project emissions 0 t CO2 equivalents  
Baseline emissions 10,578 t CO2 equivalents  
**Emission reductions 10, 578 t CO2 equivalents**

Bangalore, 2011-04-01

Essen, 2011-04-19

Ma Paa Puratchikkanal  
TÜV NORD JI/CDM Certification  
Program  
Verification Team Leader

Rainer Winter  
TÜV NORD JI/CDM Certification  
Program  
Final Approval



## 5 REFERENCES

**Table 5-1:** Documents provided by the project participant

Reference	Document
<b>/CAL07/</b>	Calibration report (DVG/RT/WF-129/364-68) issued by KPTCL for 0.2S tri-vector meters 04219535 (M) and 04219530(C) at Hiriur. Calibration was performed on 2007-01-17.
<b>/CAL08/</b>	Calibration report (DVG/RT/F-WF-VVS/07-08/1004-08) issued by KPTCL for 0.2S tri-vector meters 04219535 (M) and 04219530(C) at Hiriur. Calibration was performed on 2008-02-26.
<b>/CAL09/</b>	Calibration report (AEE/NCE/HT/MT/CTA) issued by BESCO for 33kV billing meters of 0.2S tri-vector meters 04219535 (M) and 04219530(C). Calibration was performed on 2009-09-30.
<b>/CR/</b>	Certificate of commissioning (EEE/TL&SS/DVG/F) of the 1.2 MW (2x600kW) wind power project of M/s. World Institute of Sustainable Energy issued by KPTCL dated 2004-11-05
<b>/ELEC/</b>	Approval of commissioning (CEIG/DCEI/EI(T)/DEI-1/16762-67) of electrical equipment of the 1.2 MW (2x600kW) wind power project of M/s. World Institute of Sustainable Energy from the Electrical Inspectorate of the Govt. Of Karnataka dated 2004-11-02.
<b>/GEN/</b>	Extracts from CMS of recorded monthly generation consolidated to yearly, recorded at the project for the monitoring period.
<b>/JMR/</b>	Joint meter readings of the net electricity supplied (billed) measured by the meters (04219535 and 04219530) issued by KPTCL, Hiriur Division from April 2006 to April 2008, and by BESCO, Hiriur Division from May 2008 to December 2009 for the duration of the monitoring period 2006-04-01 to 2009-12-31.
<b>/LAND/</b>	Land lease agreement between the Karnataka Renewable Energy Development Limited and M/s. World Institute of Sustainable Energy dated 2004-11-20
<b>/MR1/</b>	1. Monitoring Report "1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka" for the period 2006-04-01 to 2009-12-31, version 1.0 dated 2010-01-27.
<b>/MR2/</b>	2. Monitoring Report "1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka" for the period 2006-04-01 to 2009-12-31, version 2.0 dated 2010-08-24





Reference	Document
<b>/MR3/</b>	3. Monitoring Report “1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka” for the period 2006-04-01 to 2009-12-31, version 3.0 dated 2010-08-27
<b>/MR4/</b>	4. Monitoring Report “1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka” for the period 2006-04-01 to 2009-12-31, version 4.0 dated 2011-01-28
<b>/MR5/</b>	5. Monitoring Report “1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka” for the period 2006-04-01 to 2009-12-31, version 5.0 dated 2011-03-31
<b>/O&amp;M/</b>	Operation and maintenance contract between M/s. Enercon (India) Limited and M/s. World Institute of Sustainable Energy dated 2005-07-04 for the O&M of the 2 Nos. of WEGs of 60kW each.
<b>/ORG/</b>	Organization structure of M/s. Enercon (India) Limited, in charge of the monitoring and maintenance operations.
<b>/PPA1/</b>	Power purchase agreement between KPTCL and M/s. WISE dated 2004-06-24 for the 1.2 MW wind power project at Hiriyur Taluk, Chitradurga District.
<b>/PPA2/</b>	Power purchase agreement between BESCOM and M/s. WISE dated 2006-02-27 for the 1.2 MW wind power project at Hiriyur Taluk, Chitradurga District.
<b>/TD/</b>	Technical specifications of the Enercon make E-40 model, 600 kW capacity extracted from Annexure -1 of the purchase order.
<b>/TRNG/</b>	Training records for monitoring personnel in the inspection and working of electrical equipment, and safety conducted by M/s. EIL.
<b>/VCR/</b>	Vouchers of credit made to M/s. WISE by BESCOM for the electricity supplied, issued by BESCOM for the monitoring period.
<b>/XLS1/</b>	Emission calculation sheet provided by the project participant w.r.t /MR1/
<b>/XLS2/</b>	Emission calculation sheet provided by the project participant w.r.t /MR2/
<b>/XLS3/</b>	Emission calculation sheet provided by the project participant w.r.t /MR3/
<b>/XLS4/</b>	Emission calculation sheet provided by the project participant w.r.t /MR4/and /MR5/



**Table 5-2:** Background investigation and assessment documents

Reference	Document
<b>/AMS I.D/</b>	Approved CDM Methodology AMS I.D, version 13: “Grid connected electricity generation”
<b>/CPM/</b>	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
<b>/ISO 14064/</b>	Greenhouse gases -- Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals Greenhouse gases -- Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements Greenhouse gases -- Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions
<b>/ISO14065/</b>	Greenhouse gases -- Requirements for greenhouse gas validation and verification bodies for use in accreditation or other forms of recognition
<b>VCS</b>	Voluntary Carbon Standard 2007.1
<b>/VDS-PD /</b>	VCS PD of project “1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka” dated 2009-11-17
<b>/FVaIR/</b>	Validation report of project “1.2 MW World Institute of Sustainable Energy Wind Farm in Karnataka” , dated 2009-11-18
<b>/VVM/</b>	Validation and Verification Manual (Version as per EB 51)

**Table 5-3:** Websites used

Reference	Link	Organisation
<b>/vcs/</b>	<a href="http://www.v-c-s.org">www.v-c-s.org</a>	VCSA
<b>/unfccc/</b>	<a href="http://cdm.unfccc.int">http://cdm.unfccc.int</a>	UNFCCC
<b>/wise/</b>	<a href="http://www.wisein.org">www.wisein.org</a>	M/s. World Institute of Sustainable Energy
<b>/kerc/</b>	<a href="http://www.kerc.org/">http://www.kerc.org/</a> <a href="http://www.kerc.org/newregea2003.html">website/ / / / /newregea2003.html</a>	Karnataka Electricity regulatory Commission (KERC)



**Table 5-4:** List of interviewed persons

Reference	Mol <sup>1</sup>		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Mr. R. Kharul	M/s. World Institute of Sustainable Energy
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Himanshu Bhatnagar	Enercon (India) Limited
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Saujanya	Enercon (India) Limited

<sup>1)</sup> Means of Interview: (Telephone, E-Mail, Visit)