



VERIFICATION / CERTIFICATION REPORT

“BUNDLED WIND ENERGY POWER PROJECTS (2004 POLICY) IN RAJASTHAN” IN INDIA

(UNFCCC Registration Ref. No. 1166)

Monitoring Period:
1 September 2010 to 31 August 2011

REPORT NO. 2011-9811

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VERIFICATION / CERTIFICATION REPORT

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Approved by: Edwin Aalders	Organisational unit: DNV Climate Change and Environmental Services
Client: Enercon (India) Limited	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 “Bundled wind energy power projects (2004 policy) in Rajasthan” in India (UNFCCC Registration Ref. No. 1166) for the period 1 September 2010 to 31 August 2011.

In our opinion, the GHG emission reductions reported for the project in the revised monitoring report (Version 1.1) of 18 November 2011 are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 (version 06), revised monitoring plan approved on 2 August 2010 and the Project Design Document version 06 dated 23 October 2008.

DNV Climate Change Services AS is able to certify that the emission reductions from the “Bundled wind energy power projects (2004 policy) in Rajasthan” in India during the period 1 September 2010 to 31 August 2011 amount to 24 255 tonnes of CO₂ equivalent.

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<i>Table of Content</i>	<i>Page</i>
1 INTRODUCTION	1
1.1 Objective	1
1.2 Scope	1
1.3 Description of the project activity	1
1.4 Methodology for determining emission reductions	2
2 METHODOLOGY	3
2.1 Review of documentation	4
2.2 Site visit	4
2.3 Reporting of findings	5
3 VERIFICATION FINDINGS	6
3.1 Remaining issues, FARs from previous validation / verification	6
3.2 Project implementation	6
3.3 Information (data and variables) provided in the monitoring report that is different from that stated in the registered PDD	10
3.4 Compliance of monitoring plan with monitoring methodology	10
3.5 Compliance of monitoring with the monitoring plan	10
3.5.1 Monitoring parameters	10
3.6 Assessment of data and calculation of emission reductions	15
3.6.1 Baseline emissions	15
3.6.2 Project emissions	15
3.6.3 Leakage	15
3.6.4 Emission reductions	16
3.7 Quality of evidence to determine emission reductions	16
3.8 Management system and quality assurance	16
4 CERTIFICATION STATEMENT	17
5 REFERENCES	18
Appendix A Corrective action requests, clarification requests and forward action requests	
Appendix B Curricula vitae of the verification team members	

**Abbreviations**

AVVNL	Ajmer Vidyut Vitran Nigam Limited
C-I	Class-I
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction(s)
CL	Clarification request
CMS	Central Monitoring Station
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	DNV Climate Change Services AS
EIL	Enercon (India) Limited
FAR	Forward Action Request
GHG	Greenhouse gas(es)
JMR	Joint Meter Reading
LCS	Local Control System
MP	Monitoring Plan
NABL	National Accreditation Board for Testing and Calibration Laboratories
NZR	Nordwestdeutsche Zahlerrevision Ing.Aug.Knemeyer GmbH &Co. KG
PDD	Project Design Document
PPA	Power Purchase Agreement
RRVPNL	Rajasthan Rajya Vidhyut Prasaran Nigam Limited
RPPC	Rajasthan Power Procurement Center
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 “Bundled wind energy power projects (2004 policy) in Rajasthan” (the project) in 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.

1.1 Objective

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

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

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

1.3 Description of the project activity

Project Parties:	India (Host Party) and Japan (Annex-1 Party)
Title of project activity:	Bundled wind energy power projects (2004 policy) in Rajasthan
UNFCCC registration No:	1166
UNFCCC registration date:	30 October 2008
Baseline and monitoring methodology	ACM0002 (version 06)
Project Participants:	Enercon (India) Ltd from Host Party, India and Japan Carbon Finance Ltd from Annex-1 Party Japan.



Location of the project activity: The project activity is located at Kita and Bhu village, in Jaisalmer district of Rajasthan that forms the part of northern (now part of north east west and north-eastern grid of India) grid of India. The project area extends between latitude 26°41' and 26°46.5' North and longitude 70°57.5' and 71°4' East.

Project's crediting period: 30 October 2008 to 29 October 2018

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

The project activity harnesses wind energy in the Jaisalmer region of Rajasthan to generate electricity and export to the northern grid (now part of north east west and north-eastern grid) of India. The project activity has an aggregated installed capacity of 24.8 MW comprising of 31 Enercon made wind electricity generators (WEGs) each having a capacity of 0.8 MW /6/. All the WEGs are connected to the RRVPNL 33/132/220 kV substation at Amarsagar, which is part of the Rajasthan state electricity grid. The energy generated in the project is measured by individual LCS meters and energy meters installed (bulk meter) at the substation after stepping up to 33 kV. The operation and maintenance of the machines are carried out by Enercon (India) Limited, who is also the supplier of the machines. The project activity results in the reduction of GHG emissions through displacement of fossil fuel based northern (now part of north east west and north eastern grid of India) grid of India by the wind based renewable power /18/.

1.4 Methodology for determining emission reductions

According to the applied methodology ACM0002, version 06 /13/, the emission reductions for the project are determined as the difference between the baseline emissions, project emissions and leakage:

$$ER_y = BE_y - PE_y - L_y$$

Being a wind generation project, PE_y and L_y are considered as to be zero as stated in the registered PDD version 06 dated 23 October 2008/14/ and validation report dated 27 October 2008 /15/. 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 northern grid of India to which the project is connected, and was determined and validated *ex-ante* as 873.87 tCO₂/GWh /18/and will not be updated during the entire fixed crediting period.

EG_y is the net electricity supplied to the northern grid of India by wind turbines of the project activity is determined by following a process of allocating the total electricity exported/imported by the wind farm (recorded at the main meters and back up meters installed at substation) to the individual turbines in proportion of the electricity generation recorded by the LCS meters at the individual wind turbines /7/. Following parameters were used for apportioning:

- Electricity imported, as recorded by the main meter at the EB substation/3/;
- Electricity exported, as recorded by the main meter at the EB substation/3/;
- Electricity exported by a WEG, as measured at the controller (LCS) /5/;



- Electricity exported by a WEG to the grid, calculated in line with the formulae provided in section B.7.2 of the approved revised monitoring plan /2/;
- Electricity imported by a WEG from the grid, calculated in line with the formulae provided in section B.7.2 of the approved revised monitoring plan /2/;
- Summation of electricity exported to the grid by all the WEGs included in the project activity /2/;
- Summation of electricity imported from the grid by all the WEGs included in the project activity /2/;

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:

- Review of project documentation; including the registered PDD /14/, validation report /15/, applied version of methodology (ACM0002 version 06) /13/, revised approved monitoring plan /16/, previous verification report /17/, webhosted monitoring report /1/ and the emission reduction spreadsheet /2/.
- The emission reductions achieved by the project activity is calculated as a product of net electricity supplied to the northern grid of India by wind turbines of the project activity and a fixed baseline combined emission factor of 873.87 tCO₂e/GWh for the northern grid of India/14/.
- The actual installed capacity of the project activity is 24.8 MW, consisting of 31 WEGs of 0.8 MW each /6/, is in conformance with the descriptions provided in the registered PDD/14/;

The verification process has been based on the recommendations in the Validation and Verification Manual (version 01.2) /12/.

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)	Srivastava	Gaurav	India	✓	✓	✓	✓		✓
Assessor under training	Jolad	Preeti	India	✓	✓	✓			
Technical reviewer	Prabhu	Ravi Kumar	India					✓	✓

***Duration of verification***

Monitoring report publication: 14 October 2011
Preparations: 17 October 2011 to 28 October 2011
On-site verification: 9 November 2011
Reporting, calculation checks and QA/QC: 18 November 2011 to 16 December 2011

2.1 Review of documentation

The monitoring report, version 1.0 dated 11 September 2011 /1/, has been made publicly available on the CDM website. In addition to the monitoring report, the verification has been performed based on the review of the following documents:

- The registered PDD /14/ and the corresponding validation report /15/.
- Revised approved monitoring plan /16/.
- The previous verification reports /17/.
- The approved baseline and monitoring methodology ACM0002 version 06 applied by the project /13/.
- Relevant decisions, clarifications and guidance from the CMP and the CDM Executive Board /12/ /19/.
- Other information and references relevant to the project activity's resulting emission reductions including the emission reduction spreadsheet /2/, PPA /11/, joint meter reading (JMR) records /3/, generation of individual WEGs /5/, electricity sales invoices /4/ and O&M records /8/.

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 MR /1/, registered PDD /14/, revised approved monitoring plan /16/ and monitoring methodology ACM0002 version 06 /13/, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements /10/, and the quality assurance and quality control procedures /7/; and
- An evaluation of data management and the quality assurance and quality control system in the context of their influence on the net electricity supplied to the northern grid of India by wind turbines of the project activity and reporting of emission reductions.

2.2 Site visit

Detailed verification of all data contained in the monitoring report was performed during the site visit by DNV at the wind farm of Enercon (India) Limited on 9 November 2011. The site visit was carried out and covered all the WEGs installed as part of this project activity. The key personnel of the project were interviewed or assisted the verification team /20/-/24/.

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 /6/ /7//11/.



- The information flow for generating, aggregating and reporting of the monitoring parameters /2/ /7/; and
- The operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD /14/.

Further, the following activities were performed:

- A cross-check between information provided in the monitoring report and data from other sources e.g. monthly electricity sales invoices /4/ and payment received against electricity sold /9/;
- A check of the monitoring equipment including calibration performance /10/ and observations of monitoring practices against the requirements of the revised approved monitoring plan /16/ and the selected methodology /13/;
- 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 /7/.

The data presented in the monitoring report was assessed by review of the detailed project documentation and net electricity supplied to the grid records /5/, as well as by interviews with personnel at Enercon (India) Limited /20/-/24/, 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 06/13/, 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 monitoring period.

During this verification, one CAR has been identified. The CAR was satisfactorily addressed by Enercon (India) Limited by revising the monitoring report and emission reduction spreadsheet. No clarification or forward action requests were identified during the current verification period (refer to Appendix A of this report).



3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “Bundled wind energy power projects (2004 policy) in Rajasthan” for the period 1 September 2010 to 31 August 2011.

3.1 Remaining issues, FARs from previous validation / verification

According to the previous verification report /17/, no CAR’s /FAR’s or CL’s were required to be closed out during this verification period.

3.2 Project implementation

As part of the site visit DNV was able to confirm that the project implementation is in accordance with the project description contained in registered PDD of version 06 dated 23 October 2008 /14/. The verification team confirmed through visual inspection and document review 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 /14/. DNV confirmed during the on-site visit that the CDM project is completely operational. DNV confirmed that neither a notification nor request for approval of changes has been requested to CDM Executive Board.

The project activity has an aggregated installed capacity of 24.8 MW comprising of 31 Enercon made wind electricity generators (WEGs) each having a capacity of 0.8 MW each commissioned between 25 March 2006 and 13 May 2006 /6/, prior to its CDM registration on 30 October 2008; hence, only the emission reductions occurred after 30 October 2008 can be claimed. The selected monitoring period 1 September 2010 to 31 August 2011 is within the first crediting period of 30 October 2008 to 29 October 2018.

All the WEGs are connected to the RRVNPL 33/132/220 kV substation at Amarsagar, which is part of the Rajasthan state electricity grid. The energy generated in the project is measured by individual LCS meters and energy meters installed (bulk meter) at the substation after stepping up to 33 kV. The commissioning certificates for the wind turbines were verified against the commissioning capacity details and found to be correct /6/. The key details of the plant equipment are provided below:

Serial No:	Parameter:	Equipment Details:
1.	Number of WEGs	31 Machines
2.	Capacity of Individual WEGs	800 kW
3.	WEG Supplier	Enercon
4.	WEG Model:	E-48
5.	Date of Commissioning:	Between 25 March 2006 and 13 May 2006
6.	Power Purchase Agreement signed for the WEGs of the project activity	CEPCO Industries: <ul style="list-style-type: none"> • PPA signed with Jaipur Vidyut Vitran Nigam Limited dated 28 March 2006 for 1.6 MW /11/. • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March



		<p>2006 for 9.6 MW /11/.</p> <ul style="list-style-type: none"> • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>Delta Enterprises:</p> <ul style="list-style-type: none"> • PPA signed with Jaipur Vidyut Vitran Nigam Limited dated 28 March 2006 for 2.4 MW /11/. <p>Ushdev International:</p> <ul style="list-style-type: none"> • PPA signed with Ajmer Vidyut Vitran Nigam Limited dated 28 March 2006 for 2.4 MW /11/. <p>Brindavan Agro Industries :</p> <ul style="list-style-type: none"> • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 1.6 MW /11/. <p>Amrit Bottlers Ltd.</p> <ul style="list-style-type: none"> • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>Brindavan Bottlers Ltd.</p> <ul style="list-style-type: none"> • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>Dee Dee Enterprises:</p> <ul style="list-style-type: none"> • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>J.N. Investment:</p> <ul style="list-style-type: none"> • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>Malani Impex Inc:</p> <ul style="list-style-type: none"> • PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>Metalfab high-tech private limited:</p>
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		<ul style="list-style-type: none"> PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>Sankalp International:</p> <ul style="list-style-type: none"> PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/. <p>S.E. Investment:</p> <ul style="list-style-type: none"> PPA signed with Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW /11/.
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Metering Arrangement for Electricity Generated by Individual WEGs:

The electricity generated by the individual WEGs is measured through the local control system (LCS) meters, which are connected to the central monitoring station (CMS) for the entire wind farm. These LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case of any mismatch in the energy values recorded by the LCS meter and the energy value calculated by inverting the system, the machine will stop automatically and will generate an error report. The operation and maintenance staff will calibrate the meter immediately and a correction factor will be determined accordingly. The unique identification number of individual WEG and LCS meter Serial Numbers, supplier type and accuracy are provided below:

Serial No:	Project Proponent	Unique Identification Number	LCS meter serial number	Supplier	Type	Accuracy Class
1	Cepco Industries Private Limited	Cepco-01	466706	NZR	ITZR	Class - I
2		Cepco-02	466699	NZR	ITZR	Class - I
3		Cepco-03	466657	NZR	ITZR	Class - I
4		Cepco-04	466690	NZR	ITZR	Class - I
5		Cepco-05	466694	NZR	ITZR	Class - I
6		Cepco-06	466683	NZR	ITZR	Class - I
7		Cepco-07	466382	NZR	ITZR	Class - I
8		Cepco-08	466385	NZR	ITZR	Class - I
9		Cepco-09	466303	NZR	ITZR	Class - I
10		Cepco-10	466689	NZR	ITZR	Class - I
11		Cepco-11	466398	NZR	ITZR	Class - I
12		Cepco-12	466269	NZR	ITZR	Class - I
13		Cepco-13	466659	NZR	ITZR	Class - I
14		Cepco-14	466408	NZR	ITZR	Class - I
15		Cepco-15	466693	NZR	ITZR	Class - I
16	Delta Enterprises	DE-01	466685	NZR	ITZR	Class - I
17		DE-02	466390	NZR	ITZR	Class - I
18		DE-03	466532	NZR	ITZR	Class - I
19	Ushdev	UIL-01	466702	NZR	ITZR	Class - I
20		UIL-02	466404	NZR	ITZR	Class - I



21	International Limited	UIL-03	466670	NZR	ITZR	Class - I
22	Brindavan Agro Industries Limited	BAIL-01	466478	NZR	ITZR	Class - I
23		BAIL-02	466701	NZR	ITZR	Class - I
24	Amrit Bottlers Ltd.	ABL-01	466704	NZR	ITZR	Class - I
25	Brindavan Bottlers Ltd.	BBL-01	466678	NZR	ITZR	Class - I
26	Dee Dee Enterprises	DDE-01	266705	NZR	ITZR	Class - I
27	JN Investment	JNI-01	466397	NZR	ITZR	Class - I
28	Malani Impex Inc.	MII-01	466526	NZR	ITZR	Class - I
29	Metalfab Hightech Private Limited	MHPL-01	466281	NZR	ITZR	Class - I
30	Sankalp International	SI-01	466304	NZR	ITZR	Class - I
31	SE Investment	SE-01	466389	NZR	ITZR	Class - I

Metering Arrangement Details for cluster:

The bulk electricity meters used are of 0.2 class accuracy and have been calibrated by Yadav Measurements Pvt. Limited (accredited by National Accreditation Board for Testing and Calibration Laboratories) /10/. The net electricity supplied to the northern regional grid of India by the cluster of WEGs for the period 1 September 2010 to 31 August 2011 were monitored by two sets of bi-directional main (with serial number TNU00946 and TNU00945) installed at Amarsagar substation and back up meters (with serial number RJB00052 and ABB00691) installed at Temdarai substation. The details of bulk meters are provided below:

Meter Details		
Line I	Main Meter	Back up Meter
Type	Tri-Vector, 3 Phase Static Energy Meter, 3 Phase 4 wire	Tri-Vector, 3 Phase Static Energy Meter, 3 Phase 4 wire
Make	Secure Meter	Secure Meter
Model	E3M021	E3M021
Class	0.2 class	0.2 class
Serial No.	TNU00946	RJB00052

Line 2	Main Meter	Back up Meter
Type	Tri-Vector, 3 Phase Static Energy Meter, 3 Phase 4 wire	Tri-Vector, 3 Phase Static Energy Meter, 3 Phase 4 wire
Make	Secure Meter	Secure Meter
Model	E3M021	E3M021
Class	0.2 class	0.2 class
Serial No.	TNU00945	ABB00691



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

During the current verification period (1 September 2010 to 31 August 2011) the project activity has supplied 27.756 GWh of net electricity to the northern grid of India /2/ in comparison to 47.795 GWh of net electricity estimated in the registered PDD (for 365 days) /14/, the variation is deemed to be within a reasonable range due to the uncertainty in the wind pattern. It has been confirmed by DNV that the maximum output capacity has not been exceeded on any given month during the monitoring period /2/. The variation in electricity generation has resulted in corresponding reduction of emission reduction achieved by the project activity in comparison to the estimates provided in the registered PDD of 23 October 2008/14/. The emissions reductions reported in this monitoring period are 24 255 tonnes of CO₂ equivalents in the period from 1 September 2010 to 31 August 2011 (i.e. 365 days). The yearly expected emission reductions in the registered PDD are 41 766 tonnes of CO₂ equivalent and hence the reported emission reductions 24 255 tCO₂e are 41.93% lower than the expected.

There is no other variation observed during the current verification except the one mentioned above that is different from what has been stated in the registered PDD /14/.

3.4 Compliance of monitoring plan with monitoring methodology

DNV is able to confirm that the approved revised monitoring plan /16/, is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 (version 06) /13/.

3.5 Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the revised monitoring plan approved on 2 August 2010/16/.

All parameters stated in the revised approved monitoring plan /16/ are monitored and reported appropriately. The revised monitoring report version 1.1 dated 18 November 2011 /1/ lists each parameter required by the revised approved monitoring plan and the information flow (i.e. from data generation, aggregation, to recording, calculation and reporting) for these parameters. The information flow for the each parameter has been verified and elaborated further in the following sections.

The monitoring plan implemented by the project proponent describes about the monitoring organization, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving. A CDM team has been formed for monitoring and verification of all the monitoring parameters as per the guidelines formulated by the management. Qualified and trained people monitor the parameters and emission reduction calculations.

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

As per the revised approved monitoring plan /16/, the parameter net electricity supplied to the northern grid of India EGY is calculated as the difference of the electricity exported and the electricity imported from the grid by the WEGs pertaining to the project activity. It also indicates that (a) the electricity is measured with electronic meters at the wind farm substation, (b) the data is measured continuously and recorded monthly, (c) calculation of net



electricity supplied to the grid is calculated based on 100% monitored data and (d) data will be archived electronically. The monitoring plan and the applied methodology have been properly implemented; all parameters stated in the approved revised monitoring plan /16/ and the applied methodology /13/ have been sufficiently monitored and updated.

The 31 WEG machines of the project activity form a small cluster in the large wind farm and are hence, not connected to a dedicated uploading meter in the wind farm sub-station. The revised monitoring plan, approved by UNFCCC on 2 August 2010 /16/, has been properly implemented and elaborates on the monitoring of gross electricity exported to the grid (E_{G_y}) and the apportioning plan practiced by Enercon (India) Limited to arrive at the net electricity supplied to grid from the project activity. The apportioning is performed based on the following parameters:

- a) The gross electricity fed to the state utility grid ($E_{JMR, Export}$) and electricity imported from the grid ($E_{JMR, Import}$) for the wind farm is monitored through the meters available at the substation, by two sets of bi-directional main (with serial number TNU00946 and TNU00945) and back up meters (with serial number RJB00052 and ABB00691). The net electricity exported to the grid is difference between the gross export and import. The joint meter readings are carried out at the above meters once in a month in presence of both parties (the developer's representative and RRVPNL officials) /3/.
- b) The electricity generated from the individual WEGs in the entire wind farm is measured through the local energy meters (local control system (LCS) meters $E_{Controller, Export}$) which are connected to the central monitoring station (CMS) of the entire wind farm /7/.
- c) The export multiplication factor and import multiplication factor is arrived as per the revised approved monitoring plan and DNV has confirmed that the electricity export and electricity import as stated under (a) above is used in establishing the multiplication factors. $E_{WEG, Import}$ and $E_{WEG, Export}$ is calculated based on the multiplication factors, and $E_{Controller, Export}$, as indicated under (b) above.
- d) The net electricity exported to the grid from the project activity is arrived based on the $E_{WEG, Import}$, $E_{WEG, Export}$ data for the individual WEGs connected to this project activity as indicated under equation 5 of the revised approved monitoring plan.

In line with the details provided in the section B.7.2 of the revised approved monitoring plan, the state electricity distribution company provides a monthly statement to individual party/owner which forms the basis for the emission reduction calculations /2/. The generation details have also been cross checked with electricity sales invoices /4/ and payment details issued by RPPC to individual owners /9/. All the records, as signed by both the parties, have been verified by DNV. All the backup data are also being archived.

The accuracy of equipment used for monitoring has been controlled and calibrated in accordance with the revised approved monitoring plan. All necessary management system procedures including responsibility and authority of monitoring activities have been verified to be consistent with the registered PDD and the revised approved monitoring plan for the project activity. Knowledge of personnel associated with the project activity was also found to be satisfactory.

As the revised approved monitoring plan for the project activity/methodology following parameters are required to be monitored:



	Assessment/ Observation																				
Data / Parameter: (as in revised approved monitoring plan):	Total electricity exported/Imported recorded by the main and back meters at the EB substation. Main Meters (Serial Number: TNU00946 and TNU00945) and Back up Meters (RJB00052 and ABB00691)																				
Measuring frequency:	Continuously																				
Reporting frequency:	Monthly in Joint Meter Reading (JMR) certificates /3/.																				
Is measuring and reporting frequency in accordance with the revised approved monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency is in accordance with the approved revised monitoring plan /16/ and the applied monitoring methodology/13/.																				
Type of monitoring equipment:	Tri-Vector, 3 Phase Static Energy Meter, 3 Phase 4 wire /10/																				
Is accuracy of the monitoring equipment as stated in the revised approved monitoring plan? If the revised approved monitoring plan does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	The PDD /13/ or revised approved monitoring plan /16/ does not specify any accuracy of the monitoring equipment. However the main meters and back up meters are of 0.2 class accuracy class and is in line with the accuracy class specified in the power purchase agreement /11/.																				
Calibration frequency /interval:	Annual																				
Is the calibration interval in line with the revised approved monitoring plan? If the revised approved monitoring plan does not specify the frequency of calibration, does the selected frequency represent good monitoring practise?	Yes																				
Company performing the calibration:	Yadav Measurements Pvt. Limited (accredited by National Accreditation Board for Testing and Calibration Laboratories)/10/.																				
Did calibration confirm proper functioning of monitoring equipment? (Yes / No):	Yes																				
Does the validity of the calibration(s) cover the whole reporting period? Show all calibration dates relevant for the reporting period	Yes <table><tr><th>Serial No.</th><th>Calibrated on</th><th>Valid till</th></tr><tr><td rowspan="2">TNU00946 Main meter (Line I)</td><td>26 March 2011</td><td>25 March 2012</td></tr><tr><td>30 March 2010</td><td>29 March 2011</td></tr><tr><td rowspan="2">RJB00052 Backup meter (Line I)</td><td>28 March 2011</td><td>27 March 2012</td></tr><tr><td>31 March 2010</td><td>30 March 2011</td></tr><tr><td rowspan="2">TNU00945 Main meter (Line II)</td><td>26 March 2011</td><td>25 March 2012</td></tr><tr><td>30 March 2010</td><td>29 March 2011</td></tr></table>			Serial No.	Calibrated on	Valid till	TNU00946 Main meter (Line I)	26 March 2011	25 March 2012	30 March 2010	29 March 2011	RJB00052 Backup meter (Line I)	28 March 2011	27 March 2012	31 March 2010	30 March 2011	TNU00945 Main meter (Line II)	26 March 2011	25 March 2012	30 March 2010	29 March 2011
Serial No.	Calibrated on	Valid till																			
TNU00946 Main meter (Line I)	26 March 2011	25 March 2012																			
	30 March 2010	29 March 2011																			
RJB00052 Backup meter (Line I)	28 March 2011	27 March 2012																			
	31 March 2010	30 March 2011																			
TNU00945 Main meter (Line II)	26 March 2011	25 March 2012																			
	30 March 2010	29 March 2011																			



	ABB00691 Backup meter (Line II)	28 March 2011 31 March 2010	27 March 2012 30 March 2011
If applicable, has the reported data been cross-checked with other available data?	Yes the total electricity exported/Imported figures have been cross checked against the figures provided in electricity sales invoices /4/raised to electricity board and payment details issued by RPPC /9/.		
How were the values in the monitoring report verified?	The total electricity exported/Imported figures have been verified against the energy break up report /5/ prepared based on JMR/3/. The joint meter readings are carried out at the above meters once in a month in presence of both parties (the developer's representative and RRVPNL officials)/3/.		
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Monthly reports are monitored on regular basis by the project management team. CDM team is responsible for data monitoring and management.		
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the revised approved monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been approved?	Not Applicable		

	Assessment/ Observation
Data / Parameter: (as in revised approved monitoring plan):	Electricity generated from the individual WEGs in the entire wind farm is measured through the local energy meters (local control system (LCS) meters E _{Controller, Export})
Measuring frequency:	Continuously
Reporting frequency:	Daily
Is measuring and reporting frequency in accordance with the revised approved monitoring plan and monitoring methodology? (Yes / No)	Yes, the measuring and reporting frequency is in accordance with the revised approved monitoring plan /16/ and the applied monitoring methodology /13/.
Type of monitoring equipment:	Local control system (LCS) meters, accuracy class: I
Is accuracy of the monitoring equipment as stated in the revised approved monitoring plan? If the revised approved monitoring	The PDD /14/ or revised approved monitoring plan /16/ does not specify any accuracy of the monitoring equipment. However the local



plan does not specify the accuracy of the monitoring equipment, does the monitoring equipment represent good monitoring practise?	control system (LCS) meters are of Class-I accuracy and represent good monitoring practise in host country.
Calibration frequency /interval:	Not applicable The LCS meters are do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report.
Is the calibration interval in line with the revised approved monitoring plan? If the revised approved monitoring plan 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
Does the validity of the calibration(s) cover the whole reporting period? Show all calibration dates relevant for the reporting period	Not applicable
If applicable, has the reported data been cross-checked with other available data?	Yes the electricity generated from the individual WEGs in the entire wind farm have been cross checked against energy break up report /5/.
How were the values in the monitoring report verified?	Electricity generation data recorded at central monitoring station /7/.
Does the data management (from monitoring equipment to emission reduction calculation) ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes. Monthly reports are monitored on regular basis by the CDM team. CDM team is responsible for data monitoring and management.
In case only partial data are available because activity levels or non-activity parameters have not been monitored in accordance with the revised approved monitoring plan, has the most conservative assumption theoretically possible been applied or has a request for deviation been	Not Applicable



approved?	
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Calibration records and accreditation certificates have been provided for verification team. DNV can confirm that the meters were calibrated /10/ covering this monitoring period as per the revised approved monitoring plan/16/.

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 northern grid, which was calculated *ex-ante* and will not be updated during the fixed crediting period. EF_y of the proposed project in the registered PDD is $873.87 tCO_2/GWh$ /14/, which has been verified to be correct, based on the availability of grid data.

EG_y is the net electricity generation supplied to the northern grid by the project activity, which is determined by following a process of allocating the total electricity exported/imported by the wind farm (recorded at the main meters and back up meters installed at substation) to the individual turbines in proportion of the electricity generation recorded by the LCS meters at the individual wind turbines as explained in section 1.4 of the report. During the current verification period (1 September 2010 to 31 August 2011), the project activity has supplied $27.756 GWh$ /2/ of net electricity to the northern grid of India and same has been checked against the figures provided in electricity sales invoices raised to electricity board /4/ and payment details issued by RPPC /9/ and same has been used for emission reduction calculations.

Hence,

$$EG_y = 27.756 GWh, \text{ and}$$

$$BE_y = EF_y * EG_y = 24\,255 tCO_2e$$

3.6.2 Project emissions

The project emissions are regarded as zero according to the methodology ACM0002 version 06 /13/.

3.6.3 Leakage

There are no leakages that need to be considered in applying the methodology ACM0002 version 06 /13/.



3.6.4 Emission reductions

Therefore, the emission reductions in this monitoring period are:

$$ER_y = BE_y - PE_y - L_y = 24\,255 - 0 - 0 = 24\,255 \text{ tCO}_2\text{e.}$$

The yearly expected emission reductions in the registered PDD /14/ are 41 766 tonnes of CO₂ equivalents, and hence the reported emission reductions are considerably lower than the expected.

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 revised approved monitoring plan/16/.

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 via electricity sales invoices /4/ and payment details issued by RPPC /9/. No assumptions are used that have any material influence on reported emission reductions.

3.8 Management system and quality assurance

Enercon (India) Limited is responsible for the operation and maintenance of the project, the monitoring equipments and data collection. The management system for the project has been verified to be in place by DNV on site. 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 /7/ are in accordance with the responsibilities and authorities stated in the registered PDD /14/ and revised approved monitoring plan /16/.



4 CERTIFICATION STATEMENT

DNV Climate Change Services AS (DNV) has performed the verification of the emission reductions that have been reported for the “Bundled wind energy power projects (2004 policy) in Rajasthan” (UNFCCC Registration Reference No. 1166) for the period 1 September 2010 to 31 August 2011.

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

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

DNV conducted the verification on the basis of the monitoring methodology ACM0002 (version 06), revised approved monitoring plan and the revised monitoring report (Version 1.1) dated 18 November 2011. The verification included i) checking whether the provisions of the monitoring methodology and the monitoring plan were consistently and appropriately applied and ii) the collection of evidence supporting the reported data.

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

In our opinion the GHG emissions reductions of the “Bundled wind energy power projects (2004 policy) in Rajasthan” (UNFCCC Registration Ref. No. 1166) for the period 1 September 2010 to 31 August 2011 are fairly stated in the revised monitoring report (Version 1.1) dated 18 November 2011.

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

DNV Climate Change Services AS is able to certify that the emission reductions from the “Bundled wind energy power projects (2004 policy) in Rajasthan” during the period 1 September 2010 to 31 August 2011 amount to amount to 24 255 tonnes of CO₂ equivalent.

Bangalore and Oslo, 16 Dec 2011

Gaurav Srivastava
CDM Verifier
DNV Bangalore, 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 of “Bundled wind energy power projects (2004 policy) in Rajasthan” in India for the period 1 September 2010 to 31 August 2011, version 1.0 dated 11 September 2011 and 1.1 dated 18 November 2011.
/2/	EIL: Monthly data archiving and project monitoring Excel sheet, “Emission reduction and generation calculation” for the period 1 September 2010 to 31 August 2011, version 1.0 dated 11 September 2011 and 1.1 dated 18 November 2011.
/3/	RRVPN/Jodhpur Discom: Record of JMR monthly statements for the energy generated through wind mills covering the entire monitoring period (1 September 2010 to 31 August 2011).
/4/	EIL: Record of invoices issued by EIL for electricity sales covering this entire monitoring period (1 September 2010 to 31 August 2011).
/5/	EIL: Record of monthly power generation details from the individual WEGs covering this entire monitoring period provided in energy break up report (1 September 2010 to 31 August 2011).
/6/	RRVPN/Jodhpur Discom: Commissioning certificates of all the 31 WEGs dated between 25 March 2006 and 13 May 2006.
/7/	EIL: Records of daily and monthly generation details in CMS, Maintenance records and Internal audit reports covering this entire monitoring period (1 September 2010 to 31 August 2011).
/8/	EIL: Instantaneous monitoring of the electricity generation from the individual WEGs and the location numbers and operation and maintenance records of WEGs and substation checked during the site visit.
/9/	RPPC: Monthly Cheque details indicating the transaction for the purchase of wind electricity covering this entire monitoring period (1 September 2010 to 31 August 2011).
/10/	Yadav Measurements Pvt. Limited (accredited by National Accreditation Board for Testing and Calibration Laboratories): <ul style="list-style-type: none"> • Calibration Records for the main meters (Serial Number: TNU00946 and TNU00945) installed at the substation conducted on 26 March 2011 and valid from 26 March 2011 to 25 March 2012 and previous period valid from 30 March 2010 to 29 March 2011. • Calibration Records for the backup meters (Serial Number: RJB00052 and ABB00691) installed at the substation conducted on 28 March 2011 and valid from 28 March 2011 to 27 March 2012 and previous period valid from 31 March 2010 to 30 March 2011.



/11/	<p>Power purchase agreements of all the 31 WEGs :</p> <ul style="list-style-type: none"> • PPA signed between CEPCO Industries and Jaipur Vidyut Vitran Nigam Limited dated 28 March 2006 for 1.6 MW. • PPA signed between CEPCO Industries and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 9.6 MW. • PPA signed between CEPCO Industries and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between delta enterprises and Jaipur Vidyut Vitran Nigam Limited dated 28 March 2006 for 2.4 MW. • PPA signed between Ushdev International and Ajmer Vidyut Vitran Nigam Limited dated 28 March 2006 for 2.4 MW. • PPA signed between Brindavan Agro Industries and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 1.6 MW. • PPA signed between Amrit Bottlers Ltd. and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between Brindavan Bottlers Ltd. and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between Dee Dee Enterprises and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between J.N. Investment and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between Malani Impex Inc and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between Metalfab high-tech private limited and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between Sankalp International and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW. • PPA signed between S.E. Investment Limited and Jodhpur Vidyut Vitran Nigam Limited dated 28 March 2006 for 0.8 MW.
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Background documents related to the design and/or methodologies employed in the design or other reference documents.

/12/	CDM Executive Board: Validation and Verification Manual. Version 1.2
/13/	CDM Executive Board: ACM0002 – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, version 06.
/14/	EIL: CDM PDD for the “Bundled wind energy power projects (2004 policy) in Rajasthan” in India, version 06 dated 23 October 2008.
/15/	SGS: Validation report for the “Bundled wind energy power projects (2004 policy) in Rajasthan” in India Report No: CDM.VAL0800 dated 27 October 2008.



/16/	UNFCCC: Approved revision of monitoring plan for the project activity dated 02 August 2010. http://cdm.unfccc.int/Projects/DB/SGS-UKL1181723770.26/view
/17/	DNV Verification Report: “Bundled wind energy power projects (2004 policy) in Rajasthan” in India Report No: 2010:0558 version 02 dated 15 February 2011.
/18/	CEA: CO2 Baseline Database for Indian Power Sector -User Guide, Version 1.1 dated 21 December 2006 published by CEA. http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
/19/	CDM EB Guidance and procedures in respect for Issuance: <ul style="list-style-type: none"> • Guidance for completing the monitoring report form (CDM-MR) version 01. • Procedure for request for Issuance version 1.2 • Completeness checklist version 02 • Information and reporting checklist version 02

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

/20/	Mr. Vikas Mandrapa : Junior Engineer: RRVPNL, 220 kV Amarsager Substation
/21/	Mr. Ramswaroop Saini: Technical Services: Temdarai Substation
/22/	Mr. Yogesh Panwar: Technical Services: Amarsager Substation
/23/	Mr. Chunesk Kumar: Technical Services: Temdarai Substation
/24/	Mr. Navneet Kumar: Deputy Manager: Enercon (India) Limited

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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>It was observed during the document review that there is cross referencing formulae error in emission reductions spreadsheet for the month of August 2010, April 2011, May 2011, June 2011, July 2011 and August 2011, due to which the electricity export, electricity import and net electricity exported figures provided for all the investors in the spreadsheet are not correct.</p> <p>Hence in line VVM Para 190 (b) project proponent needs to correct the emission reduction calculation and monitoring report also needs to be addressed to reflect these changes.</p>	<p>Formulae error in cross referencing values of excel sheet has been regretted. Electricity export, electricity import and net electricity exported figures for these months have been revised accordingly in monitoring report. These changes are now incorporated in revised Monitoring Report version 1.1 and emission reduction calculation sheet. Please find appended revised MR and emission reduction spread sheet.</p>	<p>The emission reduction spread sheet has been revised to correct the cross referencing formulae error in emission reductions spreadsheet. Monitoring report has also been corrected to reflect these changes.</p> <p>The applied changes resulted in reductions of 14116 tCO₂e from webhosted MR.</p> <p>Revised monitoring report and emission reductions spread sheet has been reviewed by DNV and was found to be correct.</p> <p>OK Accepted.</p> <p>CAR 1 is closed.</p>

Clarification requests

CL ID	Clarification request	Response by Project Participants	DNV's assessment of response by Project Participants
CL 1	No clarification requests were identified.		

Forward action requests from 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
	No forward action requests were identified in the last verification.		

Forward action requests from this verification

FAR ID	Forward action request	Response by Project Participants	DNV's assessment of response by Project Participants
	No forward action requests were Identified.		

APPENDIX B

CURRICULA VITAE OF THE VERIFICATION TEAM MEMBERS

Gaurav Srivastava

Gaurav Srivastava, CDM Validator/Verifier, DNV Bangalore, India holds a Master's Degree in Energy Systems. His educational qualification covers the fields of sustainable development, power plant technology, renewable energy technology, performance of thermal & electrical utilities and project financing. He has received extensive training in the CDM validation and verification process. He has experience of more than 4 years in validation and verification of numerous CDM projects in DNV, both Indian and international. He has completed ISO 14001:2004 - Environmental Management System Auditor / Lead Auditor Program, approved by IRCA.

Preeti Jolad

Preeti Jolad has a post graduate degree in Environmental Engineering, a Bachelor's degree in Civil Engineering and a Post Graduate Diploma in Environmental Law. She has overall experience of about five years. Prior to joining DNV she was with WS Atkins for four years. The work experience was associated with the UK Water Industry and its working. She monitored the performance of the team along with completing jobs under various Sections of UK Water Industry Act of 1991.

She has work experience with TTI (Trenchless Technology International) in the design of Water Supply Systems to parts of Libiya. The role included studying the plans, maps, generating long sections, quality control, locating special structures etc.

Prior to TTI Preeti has a work experience with ETA Karnataka Estatic Ltd. She provided services as an Environmental Engineer to a large scale construction project "The Gardens", fulfilling the compliance requirements of the MoEF (Ministry of Environment and Forestry). The role included monitoring, recording and reporting of air quality, water quality and noise pollution; it also included blasting vibration monitoring during excavation and submitting reports to the State and Central Pollution Control Boards.

She has carried out an extensive project on "Effect of Distillery Spent wash on the properties of Soil, Leachate and crop growth" in GKVK, Bangalore.

Preeti has completed her ISO 14001 certification with IEMA, UK.

Ravi Kumar Prabhu

Holds Bachelor's Degree in Chemical Engineering and has done Post Graduate Diploma course in Management and has an overall working experience of around twenty five years. Prior to joining DNV has around twenty three 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, pollution control activities and waste water treatment. With respect to the Thermal Power Plant, the job assignment included the monitoring of flue gas stack

temperatures and excess air, efficiency of fuel additives, condition of boiler refractory and insulation of steam lines, residual life assessment of boilers etc. His experience also includes 7 years in the Process design of fertilizer & petrochemical plants, wherein he was involved in the development of process flow diagrams, development of P&IDs, equipment design, HAZOP studies, procurement and commissioning activities.

He has over three years' experience in validation and verification of CDM projects in DNV and is also an EMS lead auditor.

His qualification, industrial experience and experience in CDM projects demonstrate sufficient sectoral competence in Chemical Process Industries (TA 5.1), Thermal Energy Generation from fossil fuels (TA1.1), Heat distribution (TA 2.2), Energy generation from Renewable Energy sources (TA 1.2) and Waste handling and disposal (TA 13.1).