



VALIDATION OPINION – CREDITING PERIOD RENEWAL

“14.65 MW WIND POWER
PROJECT” IN MAHARASHTRA
BY BF UTILITIES LTD

IN
INDIA

(UNFCCC Registration Ref. No. 0792)

REPORT NO. 2013-1189

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VALIDATION OPINION – CREDITING PERIOD RENEWAL

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Approved by: Ole A. Flagstad	Organisational unit: Accredited Climate Change Services
Client: BF Utilities Ltd	Client ref.: Mr. Bhalchandra S Mitkari.

DNV CLIMATE CHANGE
SERVICES AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 994 774 352 MVA

Summary:

Project Name: “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd

Registration Ref. No.: 0792

Country: India

Methodology: AMS-I.D **Version:** 17

GHG reducing Measure/Technology: Electricity generation from wind energy

ER estimate: 27 929 tCO₂e per year (average)

Size

☐ Large Scale

☒ Small Scale

Validation Phases:

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

Validation Status

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and request for renewal

☐ Rejected

In summary, it is DNV's opinion that the project activity “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd” in India, as described in the PDD, version 1.1 of 26 September 20013, meets all relevant UNFCCC requirements for the renewal of the crediting period. Hence DNV requests the renewal of the crediting period of the project.

Report No.: 2013-1189	Subject Group: Environment
Report title: “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd in India	
Work carried out by: Sharmistha Shome	
Work verified by: Kakaraparthi Venkata Raman	
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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of approval
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PS	Clean Development Mechanism Project Standard
tCO ₂ e	Tonnes of CO ₂ equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard



1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed an assessment of the request by BF Utilities Ltd to renew the crediting period of CDM project activity (0792) “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd in India. The assessment was performed in accordance with the Validation and Verification Standard (Version 04.0) and the CDM Project Standard (Version 04.0) and included an assessment of:

- (a) An impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the Board with regard to renewal of the crediting period at the time of requesting renewal of crediting period;
- (b) The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the validity of the original baseline scenario. The project correctly applies the baseline and monitoring methodology AMS-I.D, version 17

The total emission reductions from the project are estimated to be on the average 27 929 tCO₂e per year over the 2nd renewable crediting period. The emission reduction forecast has been checked, and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design, and it is DNV’s opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV’s opinion that the CDM project activity 0792 “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd in India meets all relevant UNFCCC requirements for the renewal of the crediting period. Hence DNV requests the renewal of the crediting period of the project.

Bangalore and Oslo, 26 September 2013

Sharmistha Shome
Validator
DNV India

Ole A. Flagstad
Approver,
DNV Climate Change Services AS



2 INTRODUCTION

DNV Climate Change Services AS (DNV) was commissioned by BF Utilities Ltd to perform an assessment of the request by to renew the crediting period of CDM project activity 0792 “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd in India.

The assessment was performed in accordance with the Validation and Verification Standard (Version 04.0) and the CDM Project Standard (Version 04.0) and included an assessment of:

- (a) An impact of new relevant national and/or sectoral policies and circumstances on the baseline taking into account relevant guidance from the Board with regard to renewal of the crediting period at the time of requesting renewal of crediting period;
- (b) The correctness of the application of an approved baseline methodology for the determination of the continued validity of the baseline or its update, and the estimation of emission reductions for the applicable crediting period.

3 METHODOLOGY

The validation consisted of the following three phases:

- I document review
- II follow-up actions (e.g. on-site visit and telephone or email interviews)
- III the closing out of validation findings and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Document Review

The following tables list the documentation that was reviewed during the validation.



3.1.1 Documentation provided by the project participants

/1/	BF Utilities Ltd: <i>CDM-PDD for project activity “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd in India</i> , Version 01 dated 12 August 2013 and version 1.1 dated 26 September 2013.
/2/	BF Utilities Ltd: Emission factor excel sheet, dated 13 September 2013 Excel sheet for average net egenration from 1 April 2007 to 1 April 2012.
/3/	Wind World (India) Limited (previously Enercon India Limited): Letter to BF Utilities Ltd to certify that WEG controller meter are continueosly monitored and are auto calibrated, dated 25 May 2010.
/4/	Maharashtra State Electricity Distribution Company Limited: <i>Calibration certificates of the MSEB Meter Point Number: 2060, MSEB Meter Point Number: 2141 and MSEB Meter Point Number: 2023.</i>
/5/	Wind World (India) Limited (previously Enercon India Limited): <i>Line diagram of the relevant monitoring points of the project activity.</i>
/6/	Central Electricity Authority: <i>Baseline carbon dioxide emissions from power sector</i> , Version 8, Date 1 January 2013.

3.1.2 Methodologies, tools and other guidance by the CDM Executive Board

/7/	CDM Executive Board: <i>Clean Development Mechanism Validation and Verification Standard</i> , version 04.0
/8/	CDM Executive Board: <i>Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period.</i> Version 03.0.1
/9/	CDM Executive Board: <i>Clean Development Mechanism Project Standard</i> , version 04.1
/10/	CDM Executive Board: <i>Clean Development Mechanism Project Cycle Procedure</i> , version 04
/11/	CDM Executive Board: <i>Baseline and monitoring methodology AMS-I.D.</i> , version 17

3.1.3 Documents used by DNV to validate / cross-check the information provided by the project participants

/12/	BF Utilities Ltd: UNFCCC Reference Number: 0792: CDM SSC PDD (registered): “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd.
/13/	DNV Validation report: Report number 2007-1074 “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd, version 1, dated 29 March 2008
/14/	DNV verification report of “14.65 MW Wind Power Project” in Maharashtra by BF Utilities Ltd” for the period: 1) 1 April 2007 to 17 March 2008 2) 18 March 2008 to 13 August 2009 3) 14 August 2009 to 21 march 2011 4) 22 March 2011 to 1 July 2012.

3.2 Follow-up actions

On 29 August 2013, DNV visited the project activity site at Satara district of Maharashtra and performed interviews with project stakeholders.



	Date / Type of interview	Name / Organization	Topic
/15/	29 August 2013 ☒ On-site ☐ Face-to-face at office ☐ Telephone ☐ E-mail	Mr. Sandeep Kolte- BF Utilities Ltd. Mr. Prakash Shinde - BF Utilities Ltd. Mr. Ramesh K. Nikam – Wind World (India) Limited (previously known as Enercon India Limited) Mr. Amit Gupta - Emergent Ventures India	• Project activity implementation, operation and maintenance. • Monitoring plan. • Baseline scenario • PDD process • The technical issues • The methodology justification

3.3 Closing out of validation findings

The objective of this phase of the assessment was to resolve any issues which needed be clarified prior to DNV's positive conclusion on the project's compliance with applicable CDM requirements.

In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity "14.65 MW Wind Power Project" in Maharashtra by BF Utilities Ltd" in India is enclosed in Appendix A to this report.

Table 1 of the validation protocol documents the findings of the desk review of the project design documentation and follow-up interviews with project stakeholders. Any findings raised in Table 1 are listed in Table 2 of the protocol, and changes to the description of the project design as a result of these findings will be addressed in Table 2. Table 1 thus may not reflect all aspects of the project as described in the final PDD submitted for registration.

A corrective action request (CAR) is raised if one of the following occurs:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- (b) The applicable CDM requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

A clarification request (CL) is 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 raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

The validation identified one CAR and three CLs. No FAR is identified. The CARs and CLs were satisfactorily addressed by the project participants by among other revising the PDD (please refer to Table 3 in Appendix A for further details).

The changes made in the PDD are all related to response to CAR and CLs.

Validation Protocol Table 1: Requirement Checklist				
Checklist question	Reference	Means of verification (MoV) of	Assessment by DNV	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD	Gives reference to documents where the answer to the checklist question or item is found.	Means of verification (MoV) are document review (DR) , interview (I) or any other follow-up actions (e.g., on site visit and telephone or email interviews) and cross-checking (CC) with available information relating to projects or technologies similar to the proposed CDM project activity under validation.	The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.	OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A corrective action request (CAR) is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A forward action request (FAR) during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.

Validation Protocol Table 2: Resolution of Corrective Action and Clarification Requests			
Corrective action and/or clarification requests	Ref. to checklist question in table 2	Response by project participants	Validation conclusion
The CARs and/or CLs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the CAR or CL is explained.	The responses given by the project participants to address the CARs and/or CLs.	The validation team's assessment and final conclusions of the CARs and/or CLs.

Validation Protocol Table 3: Forward Action Requests		
Forward action request	Ref. to checklist question in table 2	Response by project participants
The FARs raised in Table 2 are repeated here.	Reference to the checklist question number in Table 2 where the FAR is explained.	Response by project participants on how forward action request will be addressed prior to first verification.

Figure 1 Validation protocol tables



3.4 Internal quality control

This validation opinion underwent a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation team

Role	Last Name	First Name	Country	Type of involvement					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence
Team leader (Validator)	Shome	Sharmistha	India	✓	✓	✓	✓		✓
Technical reviewer	Kakaraparthi	Venkata Raman	India					✓	✓

The qualification of each individual validation team member is detailed in Appendix B to this report.



4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The final validation findings relate to the project design as documented and described in the PDD, version 1.1 dated 26 September 20013.

4.1 Validity of selected baseline and monitoring methodology

The project was originally registered using small scale methodology AMS-ID, version 12 “Grid connected renewable electricity generation”. The revised CDM-SSC-PDD (version 1.1 dated 26 September 20013) applies AMS-I D, version 17 /11/, in line with the paragraph 230 (a) of the VVS, version 04 /7/.

4.2 Application of selected baseline and monitoring methodology

The assessment of the project’s compliance with the applicability criteria of AMS-I.D (version 17) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

As per the VVS, the PDD of the renewal crediting period has been revised as per the applicable methodology AMS-I.D version 17

The applicability of the methodology is justified as follows:

- The project activity is a greenfield wind energy based electricity generation project, supplying power to the NEWNE grid of India.
- The installed capacity of the project activity is 14.65MW which is below the stipulated limit of 15 MW. The installed capacity of the project activity has been verified by DNV during the site visit.
- The project activity is a renewable (wind) energy based project and does not involve fossil fuel or co-firing.

The boundary of the project activity includes the WTGs and the metering and substation system connected to NEWNE Grid.

Thus, inline with CDM VVS, DNV confirms that the project activity is applicable to the applied methodology AMS-I.D version 17

4.3 Validity of the original baseline or its update

The validity of the baseline has been assessed as per the “Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period” version 03.0.1 /8/.

Step 1: Assess the validity of the current baseline for the next crediting period

The validity of the current baseline is assessed using the following Sub-steps:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

The project activity is a wind energy based electricity generation project and supply of electricity to the NEWNE grid of India. In absence of the project activity, similar amount of



electricity would have been generated by the power plants connected to the fossil fuel dominated NEWNE grid. Thus, it is concluded that the baseline for the project activity remains same and is inline with the relevant mandatory national and/or sectoral policies.

Step 1.2: Assess the impact of circumstances

The project activity was registered on 9 March 2007 for the crediting period started from 1 April 2000 to 31 March 2007. Subsequently, the project activity has undergone renewal of crediting period and was approved by UNFCCC on 5 May 2008. At the time of renewal of crediting period validation and registration of the project activity, the electricity transmission and distribution sector of India comprises of five regional grids, namely northern, eastern, western, southern and north-eastern regional grid.

In October 2008, Central Electricity Authority, has reorganized the five regional grids in to two grid systems, namely the southern regional grid and the NEWNE grid (comprising of the earstwhile northern, eastern, western and north-eastern regional). The project activity continues to supply power to the regional grid and hence, the introduction of NEWNE grid has no impact on the project activity baseline scenario. The applicable grid for the project activity is NEWNE grid.

Step 1.3: Assess whether the continuation of the use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested

In absence of the project activity, similar amount of electricity would have been generated by the power plants connected to the fossil fuel intense NEWNE grid.. Thus, re-assessment of the baseline scenario is not required and the current baseline scenario is applicable to the project activity.

Step 1.4: Assessment of the validity of the data and parameters

The combined margin emission factor, calculated in the registered PDD was 0.903t CO₂/MWh. In the renewal crediting period, the grid emission factor has been revised as per the latest available CO₂ database, version 8, published by Central Electricity Authority/6/ to 0.958 tCO₂/MWh .

Conclusion on step 1

In view of the fact that grid emission factor needs to be updated, as per the latest CO₂ database of Central Electricity Authority, for the renewal crediting period step 2 has been used as per the requirement.

Step 2: Update the current baseline and the data and parameters

As per the applied methodology, AMS –I.D, version 17, the baseline emission for the project activity is the product of electricity generated and the grid emission factor. In the renewal crediting period, the grid emission factor has been calculated as per the latest available CO₂ database, version 8, published by Central Electricity Authority and inline with the “Tool to calculate the emission factor for an electricity system” guidance for the calculation of grid emission for renewal crediting period.



Step 2.1: Update the current baseline

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentation relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD.

Step 2.2: Update the data and parameters

The grid emission factor for the project activity has been calculated to be 0.958 tCO₂/MWh, considering a weight of $w_{OM} = 0.25$ and $w_{BM} = 0.75$, as stipulated for renewable crediting period in the “Tool to calculate the emission factor for an electricity system”.

4.4 Validity of monitoring plan

The project monitoring plan is in compliance with the monitoring methodology AMS-ILD (version 17)

Since the project is a wind energy generation activity, no project emission is envisaged. Leakage accounting has not been considered for the project since the renewable energy technology equipment used is new and not transferred from another activity. It is DNV’s opinion, that the project participant is able to implement the monitoring plan.

It is DNV’s opinion, that the project participants are able to implement the monitoring plan.

4.4.1 Parameters determined ex-ante

Baseline emission factor for the integrated NEWNE grid is established *ex-ante* based on the approved methodology using a combined margin approach. The emission coefficients are determined from official data published by the Central Electricity Authority (CEA) of India in ‘CO₂ Baseline Database for the Indian Power Sector’ version 08 /6/ which was the latest published data available at the time of web hosting of the PDD.

The operating margin, build margin and combined margin for wind projects (as per the “Tool to calculate the emission factor for an electricity system”, the weights for OM and BM have been taken as 75:25.) thus estimated are as follows.

Operating Margin ($EF_{grid, OM, y}$)	0.972
Build Margin ($EF_{grid, BM, y}$)	0.916
Combined Margin ($EF_{CO_2, grid, y}$)	0.958

The calculations and assumptions have been elaborated under section 4.5 of this report and the same were verified and found to be correct by DNV

4.4.2 Parameters monitored ex-post

The parameter that will be monitored *ex-post* is:

The amount of electricity supplied by wind turbine generators to the NEWNE grid.: This parameter shall be sourced from the monthly joint meter readings and monthly generation reports. The two-way energy meters of accuracy class 0.2s, used for the data monitoring, is



under the control of MSEB. The same meters readings are used for the billing purpose as well as for the calculation of net electricity supplied by the project activity. Three numbers of energy meters are there and the details of the energy meters are as:

a) MSEB Meter Point Number: 2060. The project activity WEGs number: BFL 40-51 are connected. Total of 12 WEGs generation is captured using this meter. No other WEGs are connected to this meter.

b) MSEB Meter Point Number: 2141. The project activity WEGs number: BFL 1-11 are connected. Total 11 of WEGs generation is captured using this meter. No other WEGs are connected to this meter.

c) MSEB Meter Point Number: 2023. The total number of 30 WEGs generation is captured using this meter. Out of the 30 WEGs, 7 numbers of WEGs (BFL 20 -26) are not within the project activity. Thus, 23 numbers of project activity WEGs are connected to this meter. The sum of controller readings of 7 machines, which are not the part of project activity is subtracted from MSEB meter reading of all 30 machines to reach value of export figure for project activity from 23 WEGs (BFL 10 – 19 and BFL 27 – 39). The formula to be used is :

$$EG_{BL,y} = (\text{Net Export by MSEB meter number 2023}) - (\Sigma \text{ net generation by 7 WTGs})$$

Where $EG_{BL,y}$ is the net electricity supplied by the project activity from meter point number 2023.

Since, the gross generation (without any transmission losses) at the tower level of 7 WEGs is deducted from the net electricity supplied by the meter point 2023, this approach is considered to be conservative and appropriate.

The project activity is connected to SCADA system, where each WEG wise generation is continuously monitoring and recorded. The energy meters shall be calibrated by MSEB as per MSEB's schedule.

It has been verified from the letter from Enercon India Limited /3/, the WEG supplier and O&M contractor, that the controller meter of the WEGs continuously monitored by Main Processor Unit and it is certified by the manufacturer that the controller meter of WEGs are auto calibrated. Any fault in the controller meter will result to shutdown of the WEG. Thus, the WEG controller panel does not require any scheduled calibration.

DNV confirms that the monitoring arrangements described in the monitoring plan are feasible within the project design, and the mean of implementation of the monitoring plan is able to ensure the achievement of emission reductions.

4.4.3 Management system and quality assurance

The monitoring involves the metering of the net electricity supplied to the NEWNE grid. Details of the data collection and frequency of data recording are described in PDD and found to be adequate. The export/import electricity metering system will comprise of three metering point numbers as described in the above section. The accuracy class of electricity meters for monitoring net electricity supplied is of class 0.2. The meter reading of the electricity



exported to the grid will be taken by the MSEB officials in presence of the project participant once in a month. Data collected can be cross-checked with invoices for the sold electricity.

The project developer has established a CDM Management Team and the details of the authorities and responsibilities have been indicated in the PDD. All paper based information will be stored by the proposed project owner.

4.5 Algorithms and/or formulae used to determine emission reductions

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average *ex-ante* estimation of emission reduction conservatively calculated to be 27 929 tCO₂e per year for the selected crediting period.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.

4.6 Estimation of GHG emissions

The calculations and formulae as addressed in the approved baseline and monitoring methodology AMS-I.D, version 17, have been applied. All aspects related to the direct and indirect GHG emissions as relevant to the project activity have been addressed and are presented in a transparent manner, in line with the approved methodology.

Baseline emission: Baseline emissions (BE_y in tCO₂) are the product of the combined margin grid emission factor (EF_{CO₂,grid,y} in tCO₂/MWh) times the net electricity supplied by the project activity to the grid (EG_{BL,y} in MWh).

The combined margin emission coefficient for the NEWNE grid of India is 0.958 tCO₂e/MWh has been fixed *ex-ante* for the crediting period. The data used for determining the combined margin emission factor has been sourced from Central Electricity Authority data, version 8, dated 1 January 2013, which is the latest public data available at the time of renewal of the crediting period. The Central Electricity Authority, Ministry of Power, Government of India has published a database of carbon dioxide emission factors from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. the CO₂ baseline database provides information about the OM and BM factors of all the regional electricity grids in India. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM baselines and the OM in the CEA database is calculated *ex ante* using the simple OM approach based on the generation-weighted average emissions per electricity unit of all fossil-fuelled generating sources serving the system over a three year period of 2009-2010, 2010-2011 and 2011-2012. As low cost must run power plants constitutes less than 50% of the total generation in Integrated NEWNE regional grid of India in line with the guidance provided in tool to calculate emission factor for an electricity system, simple OM approach has been used. BM is calculated *ex ante* based on 20% most recent capacity



additions in the grid based on net generation as described in “Tool to calculate the emission factor for an electricity system”.

The selection of the north east west and north-eastern regional (NEWNE) grid of India as the grid system boundary for the project activity is in line with the EB guidance for large countries such as India. In line with the guidance provided in the “Tool to calculate the emission factor for an electricity system”, the weights for OM and BM have been taken as 75:25.

The project activity is envisaged to supply net electricity of 29 154 MWh per year based on the average net electricity supply of last 5 years from 1 April 2007 to 1 April 2012 /2/.

Project emission: In line with the applied methodology, no project emission is associated with the project activity.

Leakage: It has been addressed and verified by DNV that no transfer of equipment has taken place in the project activity, thus leakage is not involved in the project activity as per the methodology.

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Requirements checklist

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity						
A.1 Title of the project activity (PS § 31, VVS § 62-63)						
A.1.1	Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	☒ Clearly identifiable title of the project activity ☒ Version number of the PDD is included ☒ Date of the PDD is included.		OK
A.1.2	Is the PDD in accordance with the applicable requirements for completing PDDs?	/1/	DR	☒ Yes <i>If no, list where the PDD is not in accordance:</i>		OK
B Application of a baseline and monitoring methodology						
B.1 Methodology applied (VVS para 70-133 and VVS § 150-153 for small-scale project activities, as applicable)						
B.1.1	Does the project apply an approved methodology and the correct version thereof? <i>If during the course of validation the originally applied version of the methodology expires, a CAR shall be raised in Table 3 of the validation protocol. Any new requirements of the revised version of the methodology not yet validated in Table 2 of the validation protocol shall be validated in Table 3 as part of the assessment of the CAR raised.</i>	/1/	DR	Yes, the project activity applies AMS-I.D, version 17.		OK
B.2 Applicability of methodology (and tools) (VVS § 73-77) <i>Insert a row for each applicability criteria of the applied methodology (and tools)</i>						
B.2.1	How was it validated that project complies with the following applicability criteria: Applicability criteria 1 of	/1/	DR	The project generates energy from wind turbine generator and supply electricity to the		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	AMS-I.D, version 17?			regional grid.		
B.2.2	How was it validated that project complies with the following applicability criteria: Applicabilty criteria 2 of AMS-I.D, version 17?	/1/	DR	As the project activity supplies power to the regional grid, the applicability is satisfied.		OK
B.2.3	How was it validated that project complies with the following applicability criteria: Applicabilty criteria 3 of AMS-I.D, version 17?	/1/	DR	The project activity is a wind power project.		OK
B.2.4	How was it validated that project complies with the following applicability criteria: Applicabilty criteria 4 of AMS-I.D, version 17?	/1/	DR	The project activity is a wind based renewable electricity generation project. There is no fossil fuel co fired in this project activity. The total installed capacity of this project activity is 14.65 MW, which is below than the limit of 15 MW.		OK
B.2.5	How was it validated that project complies with the following applicability criteria: Applicabilty criteria 5 of AMS-I.D, version 17?	/1/	DR	The project activity is a wind based renewable electricity generation project and not a combined heat and power activity.		OK
B.2.6	How was it validated that project complies with the following applicability criteria: Applicabilty criteria 6 of AMS-I.D, version 17?	/1/	DR	The project activity is a greenfield wind based renewable energy project and there is no capacity addition.		OK
B.2.7	How was it validated that project complies with the following applicability criteria: Applicabilty criteria 7 of AMS-I.D, version 17?	/1/	DR	The project activity does not include the retrofit or replacement.		OK
B.2.8	Is the selected baseline on of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/	DR	Yes, the applied methodology is applicable to the project activity.		OK
B.3 Project boundary (VVS § 82-87)						
B.3.1	What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined?	/1/	DR	The project boundary includes the WTGs and the metering/substation system connected to NEWNE Grid.		OK
B.3.2	Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to	/1/	DR	The net electricity generated and supplied to the regional grid is the GHG source. The project boundary identifies the GHG surces of the project		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
arrive at this conclusion.				activity, inline with the methodology.		
B.3.3	Do the system boundaries for the project as described in the PDD fully comply with the project boundaries stipulated by the applied baseline methodology?	/1/	DR	Yes, the project boundary is as per the applied methodology.		OK
B.3.4	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/	DR	No, the project is a wind based renewable energy generation and there is no un-identified emission source.		OK
B.4 Baseline scenario determination and description (VVS § 88-95 / Identification of alternatives to the project activity (VVS § 113-116) <i>Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.</i>						
B.4.1	Which baseline scenarios have been identified? Is the list of baseline scenarios complete? Does the list include as one of the options that the project activity is undertaken without being registered as a proposed project activity? Does the list contains all plausible alternatives which are viable means of supplying the comparable outputs or services that are to be supplied by the proposed project activity?	/1/	DR	There is no change in the baseline scenario from the original registered PDD.		OK
B.4.2	Could the project activity in absence of the CDM or other baseline alternatives also be implemented by other entities than the CDM project participants? If so, has this also been	/1/	DR	There is no change in the baseline scenario from the original registered PDD.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	included in the list of baseline scenarios?					
B.4.3	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR	There is no change in the baseline scenario from the original registered PDD.		OK
B.4.4	What is the baseline scenario?	/1/	DR	There is no change in the baseline scenario from the original registered PDD. The baseline scenario is the equivalent electricity is generated by the NEWNE grid.		OK
B.4.5	Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR	Yes.		OK
B.4.6	Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Yes, the baseline scenario has been determined as per the applied methodology.		OK
B.4.7	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies? Does the baseline scenario comply with all applicable and enforced legislation?	/1/	DR	Yes.		OK
B.4.8	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes.		OK
B.4.9	Is the baseline determination adequately documented in the PDD? - All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. - All documentation is relevant as well as correctly quoted and interpreted. - Assumptions and data can be deemed reasonable - Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. - The methodology has been correctly applied to identify what would occurred in the absence of the proposed	/1/	DR	There is no change in the baseline scenario from the original registered PDD.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
CDM project activity						
B.5 Calculations of GHG emission reductions						
Data and parameters that are available at validation and that are not monitored (VVS § 96-100)						
B.5.1	How was the Combined margin grid emission factor available at validation verified?	/1/	DR	CM emission factor has been fixed ex-ante for the crediting period and has been sourced from most recent CEA database, version 8.		OK
Baseline emissions (VVS § 96-100)						
B.5.2	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Yes, the emission reduction calculation is as per the applied methodology.		OK
B.5.3	Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	The emission reduction calculation is as per the applied methodology.		OK
B.5.4	Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	The emission reduction calculation is as per the applied methodology.		OK
Project emissions (VVS § 96-100)						
B.5.5	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	The project activity being a wind based electricity generation, in line with the applied methodology, no project emission source has been identified.		OK
B.5.6	Have conservative assumptions been used when calculating the project emissions?	/1/	DR	No project emission source has been identified.		OK
B.5.7	Are uncertainties in the project emission estimates properly addressed?	/1/	DR	No project emission source has been identified.		OK
Leakage (VVS § 96-100)						
B.5.8	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Not applicable in line with the methodology		OK
Emission Reductions (VVS § 96-100)						
B.5.9	Algorithms and/or formulae used to determine emission	/1/	DR	The algorithms and formula used are as per the		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
reductions: • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.				methodology.		
B.6 Monitoring plan (VVS § 131-133)						
Data and parameters monitored						
B.6.1	Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/	DR	Yes, the monitoring plan meets the methodology requirement.	`	OK
B.6.2	Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	Yes, the monitoring plan meets the methodology requirement.		OK
B.6.3	In case parameters are measured, is the measurement equipment described?	/1/	DR	Yes. The electricity shall be measured by energy meters.		OK
B.6.4	In case parameters are measured, is the measurement accuracy addressed and deemed appropriate?	/1/	DR	The accuracy of the meter has not been mentioned in the PDD.	CL1	OK
B.6.5	In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate?	/1/	DR	The energy meter at the substation shall be calibrated by MSEB. The most recent calibration certificate of the energy meters at substation and 7 non-project WEGs have not been provided.	CL2	OK
B.6.6	Is the monitoring frequency adequate for all monitoring parameters?	/1/	DR	Yes, the electricity shall be moniotired continueously.		OK
B.6.7	Is the recording frequency adequate for all monitoring parameters?	/1/	DR	Monthly recording will happen.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Ability of project participants to implement monitoring plan						
B.6.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/	DR	The project activity has been operating as per this monitoring plan from earlier crediting periods. The monitoring plan is feasible to the project design. It has been observed that there are no check meters installed. The emergency preparedness in case of main meter failure is to be clarified.		OK
B.6.9	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/1/	DR	Yes, the day to day data handling has been mentioned in the PDD.		OK
B.6.10	Are the data management and quality assurance and quality control procedures sufficient to ensure that the emission reductions achieved by/resulting from the project can be reported ex post and verified?	/1/	DR	The project activity has been operating as per this monitoring plan from earlier crediting periods. The monitoring plan is as per the methodology and meets the requirements.		OK
B.6.11	Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	Data storing for 2 years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later, is not mentioned in the PDD.	CAR1	OK

Table 2 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR1: Data storing for 2 years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later, is not mentioned in the PDD.	B.6.11	The required information on data archiving is added in section B.7.3 of the revised PDD version 1.1 dated 13/09/2013.	The PDD has been revised adequately to mention the data storage for 2 years after the completion of the crediting period. OK. CAR 1 is closed.
CL 1 The accuracy of the meter has not been mentioned in the PDD. All meters numbers and the number of WEGs connected to each of the energy meters have not been mentioned in the PDD.	B.6.4	The information on accuracy class of the energy meters is now added in section B.7.1 of the revised PDD version 1.1 dated 13/09/2013. All meter point numbers and the numbers of WEGs connected to each of the these metering locations are now incorporated in B.7.1 of the revised PDD version 1.1 dated 13/09/2013.	The PDD has been adequately revised to include the accuracy class of the meters and the metering details. All the meter numbers, including the number of project activity WEGs connected to each energy meters, are mentioned in the revised PDD. OK. CL 1 is closed.
CL 2: The calibration certificate of the 7 non-project WEGs have not been provided The factor of 1.5 to be accounted, in absence of the calibration certificates of 7 WEGs to be clarified.	B.6.5	Since the controller meters of the WEGs are continuously monitored for any fault or deviation in the reading thus providing on line tracking of metering arrangement by MPU (Main Processor Unit). Moreover the controller meters operates in interlocking with the operation of the WEGs. It means that if there is some fault in the controller meter then the WEGs would not rotate and would stall immediately. Hence there could not be any instance of measurement of any faulty reading of generation. So it is established from the above mentioned facts that the controller meter	It has been verified from the letter from Enercon India, the WEG supplier and O&M contractor, that the controller meter of the WEGs continuously monitored by Main Processor Unit and it is certified by the manufacturer that the controller meter of WEGs are auto calibrated. Any fault in the controller meter will result to shutdown of the WEG. Thus, the calibration of the controller meter of WEG is not required, as the same is auto calibrated. Since, the factor of 1.5 was considered earlier in the event of absence of the calibration of controller meter, based on the above mentioned facts and the letter from the manufacturer it is

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		does not require any external calibration. PP has provided one undertaken from technology supplier "Enercon" on the same.	concluded that factor of 1.5 is not relevant. Thus, the removal of factor 1.5 has been accepted by DNV. The monitoring plan of the PDD has been adequately revised. OK. CL 2 is closed.
CL 3: It has been observed that there are no check meters installed. The emergency preparedness in case of main meter failure is to be clarified.		The information on emergency preparedness is incorporated in section B.7.3 of the revised PDD version 1.1 dated 13/09/2013.	The PDD has been revised to include the emergency preparedness in case of meter failure. In the even of any metering failure or fault, the faulty meter shall immediately replaced. A stand by calibrated meter is always kept available for such emergency. OK. CL 3 is closed.

Table 3 Forward action requests

Forward action request	Reference to Table 1	Response by project participants
Not applicable		Not applicable

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Sharmistha Shome, DNV Bangalore, India holds a Master's Degree in Energy Systems. Her educational qualification covers the fields of sustainable development, power plant technology, renewable energy technology, performance of thermal & electrical utilities and project financing.

She has experience in validation and verification of several CDM projects/JI and other 3rd party validation/verification services.

She has completed the ISO14001 EMS and ISO 5001 EnMS Lead Auditor course. Her qualification and experience in CDM demonstrate her sufficient sectoral competence in renewable energy sector (TA 1.2).

Kakaraparthi Venkata Raman holds a bachelor degree in Chemical Engineering (B.Tech) and a Diploma in Management. He has an overall experience of 18 years in the Chemical Process Industry - Fertilisers and Chemicals industry (FACT). His main areas of work include a) Technical Services (for Ammonia, Urea, Co-generation thermal power plants (captive), and complex fertilizers plants) for 10 years b) Erection, commissioning and hands-on operation of state of art HTAS 900 TPD Ammonia plant c) Management and operation of Sulphuric acid plant as Plant Manager and d) assisting Management of production unit (General Manager) in management Information System operation and planning of Production & Operations. As a part of the Technical services team, involved in the conduction of technical energy audits of plants and in HAZOP studies (under guidance of EIL).

While in FACT has completed the ISO14001 EMS LA course. Implemented the Environmental Management Systems in the production unit and conducted internal audits.

Experience prior to joining Fertiliser industry includes six months experimental work on charcoal manufacture in Karnataka Regional Engineering college.

Joined DNV in November 2005 as Auditor. Till date has experience of around 7.5 years in validation and verification of CDM/JI projects. For the last five to four years, holding the responsibility of Sernor Manager (Technical) / (Operations), in addition to working on projects as either Team Leader or Technical Reviewer. As per the UNFCCC competency requirements, the industrial experience and project experience in CDM demonstrate sufficient sectoral competence in areas of (a) 1.1 Thermal energy generation from fossil fuels and Biomass as well as thermal electricity from solar (b) 1.2 Energy Generation from renewable energy sources (c) 5.1/4.13/11.1/12.1 Chemical Processes Industries and (d) 13.1 Waste handling and disposal.