VALIDATION REPORT

"WIND POWER PROJECT IN MAHARASHTRA BY TVS ENERGY LIMITED" IN INDIA

REPORT NO. 2012-0802

REVISION NO. 01

DET NORSKE VERITAS

VALIDATION REPORT

Date of first issue: 18 May 2012	ConCert Project No.: PRJC-380166-2012-CCS-IND
Approved by: Ole A. Flagstad	Organisational unit: DNV KEMA Energy & Sustainability Accredited Climate Change Services
Client: TVS Energy Limited	Client ref.: Mr.R.Ragavan

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Summary:

Project Name: Wind power project in Maharashtra by TVS Energy Limited

Country: India

Methodology: ACM0002 **Version:** 12.3.0

GHG reducing Measure/Technology: Grid-connected electricity generation from renewable sources

ER estimate: 48 590 tCO_2e 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 submission for registration ☐ Rejected

In summary, it is DNV's opinion that the project activity "Wind power project in Maharashtra by TVS Energy Limited" in India, as described in the PDD, version 05 of 29 November 2012 meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 12.3.0. Hence DNV requests the registration of the project as a CDM project activity.

Report No.: 2012-0802	Subject Group: Environment
Report title: "Wind power project in Maharashtra by TVS Energy Limited" in India	
Work carried out by: G.Murali, Nitin Kapoor	
Work verified by: Sharmistha Shome	
Date of this revision: 2012-12-3	Rev. No.: 01 / Number of pages: 31

Indexing terms

Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction(s)
CERC	Central Electricity Regulatory Commission
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
DPR	Detailed Project Report
FAR	Forward Action Request
GBI	Generation Based Incentive
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
IREDA	Indian Renewable Energy Development Agency Limited.
IRR	Internal Rate of Return
LoA	Letter of approval
MEDA	Maharastra Energy Development Agency
MERC	Maharastra Electricity Regulatory commission
MNRE	Ministry of New and renewable energy
MoEF	Ministry of Environment and Forest
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PLF	Plant Load Factor
RBI	Reserve Bank of India
RPPL	ReGen Powertech Private Limited
REGPL	Renewable Energy Generation Private Limited
SBAR	State Bank Advance Rate
tCO_2e	tonnes of CO_2 equivalents
TVSEL	TVS Energy Limited
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment program
VVM	Validation and Verification Manual
WACC	Weighted Average cost of the capital
WEG	Wind Electricity Generators

1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity "Wind power project in Maharashtra by TVS Energy Limited" in India. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is India and no Annex I Party is proposed. Host party India fulfils the participation criteria and have approved the project and authorized the project participants TVS Energy Limited. The DNA from India confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology ACM0002, version 12.3.0 "Grid-connected electricity generation from renewable sources".

The project activity envisages installation of 17 WEGs with a capacity of 1.5 MW each thereby aggregating to an installed capacity of 25.5 MW. The annual electricity delivered to the NEWNE grid of India is expected to be 50 997 MWh corresponding to a plant load factor of 22.83%. The proposed project will achieve CO_2 emission reductions by replacing electricity generated by fossil fuel fired power plant connected into the NEWNE Grid. As a result, the project results in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 48 590 tCO_2e per year over the selected 7 years 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 project activity "Wind power project in Maharashtra by TVS Energy Limited" in India, as described in the PDD, version 05 dated 29 November 2012, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 12.3.0. Hence, DNV requests the registration of the project as a CDM project activity.

Bangalore and Oslo, 2012-12-3

Murali Govindarajulu
CDM Validator
DNV India

Ole A. Flagstad
Approver,
DNV Climate Change Services AS

2 INTRODUCTION

TVS Energy Limited (TVSEL) has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the Wind power project in Maharashtra by TVS Energy Limited project in India (hereafter called "the project"). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0002 (version 12.3.0). The validation was based on the recommendations in the Validation and Verification Manual, version 1.2 /31/.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design documents

II follow-up interviews with project stakeholders

III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Desk review of the project design documentation

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

3.1.1 Documentation provided by the project participants

/1/	TVSEL: *CDM-PDD for "Wind power project in Maharashtra by TVS Energy Limited" in India*, version 01 dated 29 March 2012, version 4 dated 31 July 2012 and version 05 dated 29 November 2012.
/2/	TVSEL: *IRR Analaysis.xls including the benchmark working* dated 9 July 2012.
/3/	TVSEL: *Extract of the board minutes* dated 6 June 2011 indicating the CDM consideration of the project activity.
/4/	TVSEL: *Proposal received from Regen for the 25.5 MW wind project involving 17 Nos of Regen make Vensys 82 WEGs each with 1.5 MW capacity* dated 27 May 2011.
/5/	TVSEL: *Detailed project report for the 25.5 MW wind project in Maharastra* dated 3 June 2011.
/6/	TVSEL: *Supply agreement for the WEGs aggregating to a capacity of 25.5 MW involved in the project activity* dated 19 August 2011
/7/	TVSEL: *Development agreement between REGPL and TVSEL* dated 19 August 2011
/8/	TVSEL: *Erection and commissioning contract between REGPL and TVSEL for the WEGs aggregating to a capacity of 25.5 MW involved in the project activity* dated 19 August 2011
/9/	TVSEL: *O&M agreement between RPPL and TVSEL for the WEGs aggregating to a capacity of 25.5 MW involved in the project activity* dated 19 August 2011
/10/	TVSEL: *Invitation for stakeholder consultation meeting advertised in Lokmat and Tarun Bharat (leading English and Marathi) news papers* dated 26 January 2012.
/11/	TVSEL: *Minutes of the local stakeholder consultation meeting* held on 14 February 2012
/12/	TVSEL: *Attendance and feedback sheet for the stakeholder meeting* held on 14 February 2012.
/13/	TVSEL: *Land purchase agreements related to various sites of the project activity* dated 13 Feb 2012, 14 Feb 2012, 28 February 2012, 1 March 2012
/14/	TVSEL: *Prior consideration form submitted to the Secretariat of UNFCCC* dated 29 December 2011 *and the acknowledgement from UNFCCC* dated 30 December 2011.
/15/	TVSEL: *Notification of Prior consideration of CDM submitted to the DNA of India* dated 29 December 2011 and *the acknowledgement from the DNA of India* dated 30

	December 2011.
/16/	ReGen: *Specification of the vensys 82/1500 kW WEGs indicating the lifetime of the WEG*.
/17/	TVSEL: *Engagement letter issued to the PwC for the carbon advisory* dated 20 December 2011.
/18/	TVSEL: *Loan application for the 25.5 MW wind project in Maharastra submitted to ICICI bank* dated 29 July 2011.
/19/	ICICI Bank: *Credit arrangement letter from ICICI bank, International Banking group, Hong Kong* dated 28 September 2011.
/20/	MAHADISCOM: *No Objection certificate for the commissioning of the WEGs indicating the locations of the WEGs of TVS Energy Limited,* and indicating the sale of electricity to the grid, issued on 14 March 2012,
/21/	ICICI Bank: *Letter indicating the plant load factor considered while considering the credit arrangement* dated 30 April 2012.
/22/	MAHADISCOM: *Commissioning certificates of the WEGs with 1.5 MW capacity each at locations N3 and RP11P* on 31 March 2012, *at locations G3, G5, G6 & RP11PB* on 30 May 2012, *locations RP67-RP76 and N2 on* 17 September 2012.
/23/	IREDA: *Letter indicating the registration of the 3.00 MW out of 25.5 MW wind power project under GBI scheme* dated 24 May 2012.
/24/	TVSEL: *Declaration indicating that no accelerated depreciation will be availed for the two commissioned WEGs* dated 30 April 2012.
/25/	TVSEL: *Land lease agreement between Maharastra State Forest department and Sri Maruthi wind park developers, Satara* dated 2 March 2012 and 27 March 2012.
/26/	United India Insurance company: *Quotation for windfarm insurance* dated 30 May 2011.
/27/	TVSEL: *Undertaking on the overhead cost for the proposed wind farm project* dated 21 June 2012.
/28/	Regen: *Technical specification of Vensys 82 Type WEG*

3.1.2 Letters of approval

/29/	National CDM Authority, Ministry of Environment and Forest (DNA of India): *Letter of approval* dated 22 November 2012

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

/30/	CDM Executive Board: *Validation and Verification Manual*, Version 01.2
/31/	CDM Executive Board: *Baseline and monitoring methodology ACM0002*, version 12.3.0
/32/	CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, Version 02.2.1.
/33/	CDM Executive Board: *Guidelines on the assessment of investment analysis*, Version 5.
/34/	CDM Executive Board: *Guidelines on the demonstration and assessment of prior consideration of the CDM*, version 4 EB 62 Annex 13.
/35/	CDM Executive Board: *Guidelines for the reporting and validation of plant load*

	factors of the EB 48 Annex 11.
/36/	CDM Executive Board: *Tool for demonstration and assessment of additionality*, version 06.1.0

3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

/37/	CEA: *Baseline Carbon Dioxide Emission Database*, Version 7, available in the weblink http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
/38/	RBI: *Details on the "Survey of Professional Forecasters on Macroeconomic Indicators" relevant at the time of decision making* available at the weblink accessed on 17 July 2012. http://rbi.org.in/scripts/PublicationsView.aspx?id=13360
/39/	MERC: *Tariff order* dated 29 April 2011 *and Tariff order* dated 20 March 2012.
/40/	IPCC: *2006 IPCC Guidelines for National Greenhouse Gas Inventories*
/41/	UNEP: *CDM pipeline Overview* http://uneprisoe.org/
/42/	CERC: *CERC (Terms and Conditions of Tariff) Regulations 2009*
/43/	Ministry of Finance: *Income Tax act 1961 providing the details of the applicable Tax and the Minimum Alternate tax*
/44/	Ministry of Corporate affairs: *Companies Act 1956, Section 350.*
/45/	Ministry of New & Renewable Energy (MNRE): Order dated 17 December 2009 on "*Scheme for Implementation of Generation Based Incentive (GBI) for Grid Interactive Wind Power Projects"*.
/46/	Ministry of Environment and Forests (MoEF), India: *As per Ministry of Environment and Forests (MoEF) notification dated 1 December 2009, wind power projects are exempted from obtaining the environmental clearance*: http://envfor.nic.in/legis/eia/so1533.pdf
/47/	Ministry of Environment and Forest: 2004: *India's national communication to UNFCCC.* http://unfccc.int/resource/docs/natc/indnc1.pdf
/48/	MERC: *Clarification of various provisions of Order dated 24.11.2003, regarding procurement of Wind Energy* available at http://www.mercindia.org.in/Clarificatory%20Order-Wind%20Energy%20%5BCase%20Nos%207,%2015%20&%2016%20of%202004%5D_W.htm
/49/	Tariff Advisory Committee: *General rules and regulation for Insurance of equipment's against fire dated 31 March 2001* http://iib.gov.in/IRDA/tac/tariffs/AIFT2001.pdf
/50/	MNRE: *Details of the installed capacity of Biomass based power projects in various states of India*; details in the weblink http://mnre.gov.in/schemes/grid-connected/biomass-powercogen/
/51/	*Details of the Biomass projects commissioned in various states have been cross checked from the details available from the respective government/department websites*. The details have been given below: *Details of the Biomass projects commissioned in Rajasthan*: http://www.rrecl.com/PDF/Commissioned.pdf

	Details of the Biomass projects commissioned in Tamil Nadu: http://www.teda.in/index.php?r=site/index&id=2O8i9U4E3U *Details of the Biomass projects commissioned in Andhra Pradesh*: http://nedcap.gov.in/Biomass_Power_Projects.aspx *Details of the Biomass projects commissioned in Karnataka*: http://www.kredltest.in/Bioreport.aspx *Details of the Biomass projects commissioned in Chhatisgarh*: http://www.credacg.org/bpg_projects_commissioned.htm *Details of the Biomass projects commissioned in Haryana*: http://hareda.gov.in//store/document/hareda232341752.pdf
/52/	Wind power India: *Details of installed capacity of wind projects in various states across India*: http://www.windpowerindia.com/index.php?option=com_content&view=article&id=18&Itemid=23 Wind power India: *Wind power directory 2011- indicating the capacity wise details of various investors covering all wind projects in India*.
/53/	MEDA: *Details of the wind projects in the state of Maharastra available in the weblink* http://www.mahaurja.com/Download/WindInvestorList.xls

Main changes between the version of the PDD published for the 30 days global stakeholder consultation period and the final version of the PDD submitted for registration:

- Revision in applied version of the "Tool for demonstration and assessment of additonality" from version 05.2 to version 06.1.0.
- Change in the coordinates of one WEG location with identification number "N2" based on the clearance from MAHADISCOM.
- Revision in sensitivity analysis in line with the requirement of Tool for the demonstration and assessment of additionality.
- Other Minor changes related to CAR/CLs identified in table 3 of the report.

3.2 Follow-up interviews with project stakeholders

On 10 May 2012, DNV visited the project site and performed interviews with project stakeholders.

	Date	Name	Organization	Topic
/54/	10 May 2012	Mr.G.R.V. Rajan, President, Mr.R.Ragavan	TVS Energy Limited	➢ Proof of CDM consideration ➢ Review of monitoring and verification procedure, management structure of the organization. ➢ Environmental consents and permits. ➢ Review of the

				stakeholder consultation process. ➢ Joint meter reading procedures. ➢ Operation & maintenance procedures. ➢ Third party assessment of PLF. ➢ Financial of the project activity.
	10 May 2012	Mr.Sharique Ahmad	PwC, Delhi	➢ Applicability of methodology ➢ Review of project design and technology used. ➢ Determination of baseline. ➢ Emission reduction calculations and date used therein.

3.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. 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 "Wind power project in Maharashtra by TVS Energy Limited" in India is enclosed in Appendix A to this report.

Table 2 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 2 are listed in Table 3 of the protocol, and changes to the description of the project design as a result of these findings will be addressed in Table 3. Table 2 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 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 two CARs and four CLs. The CARs and CLs were satisfactorily addressed by the project participants by among other revising the PDD (please refer to Table 3 for further details).

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**) or a **corrective action request (CAR)** if a requirement is not met.*

Validation Protocol Table 2: Requirement Checklist				
Checklist question	***Reference***	***Means of verification (MoV)***	***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 3: 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 4: 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

The validation report 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

				Type of involvement						
Role	***Last Name***	***First Name***	***Country***	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence	Financial expertise
Team leader (Validator)	Govindarajulu	Murali	India	✓	✓	✓	✓		✓	
Expert	Kapoor	Nitin	India	✓		✓			✓	✓
Technical reviewer	Shome	Sharmistha	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 validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings related to the project design as documented and described in the PDD, version 05 dated 29 November 2012 have been indicated under Table 3 of this report.

4.1 Participation requirements

The project participant is TVS Energy Limited of host Party of India and no project participant from Annex I Party has been identified for the project activity. The host Party India fulfils the participation requirements, having ratified the Kyoto Protocol on the 26 August 2002 and having established National Clean development Mechanism Authority, Ministry of Environment and Forests (MoEF), as its DNA. The DNA of India has issued a Letter of Approval (LoA) on 22 November 2012, authorizing TVS Energy Limited as a project participant and confirming that the project assists in achieving sustainable development /29/.

The letters of approval were received from the project participants. DNV does not doubt the authenticity of the letters of approval. DNV considers the letters are in accordance with paragraphs 45- 48 of the VVM /30/.

4.2 Project design

The project activity envisages installation of 17 Nos of Vensys 82 type WEG, each with a capacity of 1.5 MW thereby aggregating to an installed capacity of 25.5 MW. The WEGs forming part of the project activity are located in the villages Vibhutwadi, Kurundwadi, Kaledhon, Mulikwadi and Panchwad, Satara and Sangli Districts in the state of Maharastra, India. The individual geographical coordinates of the WEGs forming part of the project activity are indicated in the PDD.

The project construction has commenced already and 2 WEGs have been commissioned as on 31 March 2012 /22/, 4 WEGs were commissioned on 30 May 2012 and the last 11 WEGs have been commissioned on 17 September 2012 /20/. All the WEGs in the project have been supplied by ReGen, which is also responsible for the operation, maintenance and management of the project /9/. The technology used in the project activity is indigenously available in India and there is no transfer of technology envisaged.

The electricity generated from the wind farm will be exported to the regional electricity grid and sold to the state electricity utility thereby marginally contributing to reducing the energy demand supply gap in the state of Maharastra.

The starting date of the project activity has been identified as 19 August 2011, which is the date of signing the supply agreement with ReGen for the wind turbines of the project activity /6/. As per the technical specification sheet provided by ReGen (manufacturer of WEGs) the lifetime of the project is 20 years /28/. The project has selected a renewable crediting period of 7 years with the start date of the crediting period to be 20 December 2012 (or on the date of registration of the CDM project activity, whichever is later). The project is expected to result in 48 590 tCO_2e emission reductions per annum over the first 7 years renewable crediting period /2/.

DNV considers the project description of the project contained in the PDD to be complete and accurate. The PDD complies with the relevant forms and guidance for completing the PDD.

4.3 Application of selected baseline and monitoring methodology

The project correctly applies the approved baseline methodology ACM0002 version 12.3.0 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /31/. The applicability of this methodology is justified as:

- The project is a new installation of wind electricity generators which harnesses the wind potential available in the region and it displaces fossil fuel based electricity from the north east west north-eastern grid (NEWNE) of India and has been verified from (i) supply agreement signed for the WEGs dated 19 August 2011 and NoC issued by MAHADISCOM for the erection and commissioning of the WEGs of TVS in Maharastra dated 14 March 2012 /20/.
- The project activity is connected to the north east west north-eastern grid of India, and the system boundaries are clearly identified and information on the characteristics of this grid is available /20//37/.
- The project does not involve an on-site switch from fossil fuels to a renewable source /20/.

The project activity being a renewable energy generation project, the rest of the applicability conditions as mentioned in the applied methodology ACM0002 version 12.3.0 do not apply to this project activity /20/.

The assessment of the project's compliance with the applicability criteria of ACM0002 (version 12.3.0) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.4 Project boundary

The geographic and system boundary includes the wind electricity generators installed as part of the project activity, the evacuation lines till the grid interconnection point (Substation) and the north east west north-eastern grid of India. The system boundary for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.

	GHGs involved	Description
Baseline emissions	CO_2	The major emission source. The GHG emission reduction is achieved by displacing the electricity generated by fossil fuel based power plants in the north east west and north-eastern regional grid of India.
Project emissions	No project emissions	NA
Leakage	No leakage	NA

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring

within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0002 (version 12.3.0) /31/.

4.5 Baseline identification

Two alternatives to the project activity have been considered as the baseline scenario. These are i) the project activity without CDM benefits and ii) continuation of current scenario of power generation from existing grid-connected power plants. Both alternatives are in compliance with the laws and regulations of India and might be considered as baseline scenarios.

However, the implementation of the project activity without CDM benefits faces investment barriers (c.f. section B.4.6.3) and hence the selected baseline scenario is that in the absence of the project activity an equivalent amount of electricity would have been generated by the operation of grid connected power plants and by the addition of new generation sources. DNV considers the list of realistic and credible alternatives to be complete and the determination of the baseline transparent.

As the project activity supplies electricity to the Maharastra state electricity grid which forms a part of north east west and north-eastern regional grid of India, the baseline for this project activity is a function of the generation mix of the north east west and north-eastern regional grid of India. The selection of the north east west and north-eastern regional 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" /32/, the weights for OM and BM have been taken as 75:25. The combined margin emission coefficient for the north east west and north-eastern regional grid of India has been calculated to be 0.9528 tCO_2/MWh and is fixed *ex ante* for the selected 7 year crediting period /1/. The CM emission factor value has been sourced from the data published by the Central Electricity Authority (CEA) of the Ministry of Power, Government of India /37/. CEA has published the database of carbon dioxide emission factor for the power sector in India based on detailed authentic information obtained from all operating power stations in the country. This CO_2 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 /37/. The emission factors for coal and lignite were based on the values provided in India's Initial National Communication under the UNFCCC (Ministry of Environment & Forests, 2004) /47/. The emission factor for coal is supported by the results of an analysis of approximately 120 coal samples collected from different Indian coal fields. For all other fuels, default emission factors were derived from the IPCC 2006 Guidelines /40/. DNV confirms that the CEA database version 7 used to calculate the combined margin emission factor was the latest database available at the time of start of validation, which is in line with the "Tool to calculate the emission factor for an electricity system", which states "*For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation*" /32/. DNV also confirms that the combined margin emission factor for the north east west and north-eastern regional grid of India is fixed *ex-ante* for the selected 7 year crediting period for the project activity.

DNV confirms that the approved baseline methodology ACM0002 version 12.3.0 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 are 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.

4.6 Additionality

The additionality of the project activity has been demonstrated by applying the "Tool for demonstration and assessment of additionality", version 06.1.0 /36/, and primarily through a financial analysis.

4.6.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

The start date of the project activity has been identified as 19 August 2011, which is the date of signing the supply contract with ReGen for the wind turbines of the project activity /6/. It could also be verified that all other major financial commitments like development agreement /8/ has been signed on 19 August 2011. Any civil work or transmission network can only be started after the placement of purchase order for the wind turbines and signing of the agreement for Development of the wind farm. Thus, the date of purchase order is considered to be the earliest financial commitment thereby confirming to the requirements of the EB guidance on start date of project activity.

The starting date of the proposed project is 19 August 2011 (which is later than 2 August 2008) and the project proponent has submitted the prior CDM consideration form to UNFCCC and DNA of India on 29 December 2011 /14//15/ and the acknowledgement has been received from DNA of India on 30 December 2011, and the acknowledgement from UNFCCC was received on 30 December 2011 /14//15/. Since these two notifications were sent within six month from the start date of the project activity (19 August 2011), it has been accepted that the revenue from CDM was seriously considered in the decision to proceed with the project activity.

The PDD of the project activity was web hosted in UNFCCC website on 5 April 2012 and thus the validation of the project activity has commenced within 8 months from the starting date of 19 August 2011. Since no gaps of more than two years were identified between actions to secure CDM status, sufficient actions to secure CDM status in parallel with the physical implementation of the project activity was confirmed.

It is DNV's opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM /34/.

4.6.2 Identification of alternatives to the project activity

Two alternatives to the project activity have been identified and discussed:

i) the project activity without CDM benefits and

ii) continuation of current scenario, an equivalent amount of electricity would in the absence of the project activity, have been generated by the operation of grid connected power plants and by the addition of new generation sources.

Both the identified alternatives are consistent with current laws and regulations as potential alternatives and thus will be discussed at the next steps. DNV considers the listed alternatives to be credible and complete.

4.6.3 Investment analysis

Choice of approach

The project proponent has selected a benchmark analysis for demonstrating the additionality of the project activity. The project generates revenues without CDM and the alternative of grid based electricity generation does not involve any investment on the part of the project proponent. Therefore, the selected benchmark analysis, in line with the CDM EB's 'Guidelines on the assessment of investment analysis' /33/, is considered justified for demonstrating the additionality of the project.

Benchmark selection:

The selected benchmark is calculated based on weighted average costs of capital (WACC) which is appropriate benchmark for the project activity and complies with the "Guidelines of assessment of investment analysis" version 5 /33/. As per the guidelines /33/ local commercial lending rates or weighted average cost of the capital (WACC) are suitable benchmarks for projects using project IRR as financial indicator. Thus, the benchmark of nominal post tax WACC used for the project activity is found to be appropriate. Also, the data before 6 June 2011 is used for arriving at the benchmark since the investment decision was made in 6 June 2011.

Cost of equity: Cost of equity is calculated based on the default return on equity indicated in the "guidelines on the assessment of investment analysis", version 5 /33/. The investment analysis has been performed in nominal terms and hence the value of cost of equity for host country India (11.75%) has been converted to nominal terms by adding inflation forecast (5.5%) published by Reserve Bank of India (RBI) for a period of 10 years /38/. The selected 10 years period being the maximum period of inflation forecast published RBI, the selected period has been considered acceptable by DNV. Thus the cost of equity is calculated to be 17.90% /2/.

The cost of debt: MERC tariff order dated 29 April 2011 has used 13.73% as interest rate applicable for wind energy projects in the region and the interest rate in the tariff order has been worked out as the average State Bank Advance Rate (SBAR) prevalent for one year period prior to the tariff order /39/. It has been verified that the tariff order was available at the time of decision making and the interest rate of 13.73% has been used by the MERC for tariff working /39/. Since the interest cost is tax deductible, taking into account marginal tax rate of 20.01% /43/, the cost of debt for the project activity has been worked out to be 10.98% /2/ and found acceptable by DNV.

The ratio of Debt to equity has been fixed at 70:30 for the project activity and the same has been checked based on the MERC tariff order dated 29 April 2011 /39/ and found to be appropriate for wind projects in the region.

The weighted average cost of capital is calculated as follows:

WACC = [D/ (D+E)]*[Cost of Debt] + [E/ (D+E)]*[Cost of Equity]

Where:

- cost of equity is calculated as 17.90% as per indicated above;
- cost of debt is calculated as 10.98% as per indicated above;
- [E/ (D+E)] - weight of equity and [D/ (D+E)] - weight of debt are 30% and 70%.

Thus, WACC is calculated to be 13.06% /2/.

This benchmark is not specific to the project, since it has been calculated based on public data considering the risks faced by any power project in India. DNV confirmed that the assumptions taken and the values considered for the benchmark calculation are reasonable. Hence, DNV concludes that the benchmark calculated for the proposed project is reasonable and complies with the requirements of VVM paragraph 112.

Input parameters

The input parameters used for the investment analysis were based on the detailed project report /5/. Given the scenario that time gap of around three months between preparation of DPR (3 June 2011) and the start date of the project activity (19 August 2011), it is reasonable to assume that the DPR was the basis of the decision to proceed with the investment in the project. DNV has validated each input parameters used for IRR calculation against respective sources. This has been cross checked with the actual contracts, signed for the project activity. The table below provides a detailed assessment of validation for the same in line with the VVM paragraph 111.

Input parameter	Values used for investment Analysis	Source for Value used in investment analysis	Reference used by DNV for cross checking
Technical Parameters			
Capacity	25.5 MW	Detailed project report dated 3 June 2011 prepared by TVSEL based on the proposal received from M/s Regen Powertech Pvt Limited /4/ /5/.	DNV has cross checked the supply agreement signed between TVSEL and RPPL for supply of 17×1500 kW WEGs dated 19 August 2011 /6/. This has been further cross checked against NoC for commissioning of the WEGs issued by MAHADISCOM /20/. Thus the capacity considered in the financial analysis is appropriate.
Operational Parameters			
Plant Load Factor	22.83%	Detailed project report dated 3 June 2011	The plant load factor has been cross checked based

		prepared by TVSEL based on the proposal received from M/s Regen Powertech Pvt Limited /4/ /5/.	on the loan application, loan sanction letter and the letter dated 30 April 2012 issued by ICICI bank /18//19//21/. Thus the PLF considered in the financial analysis is found to be appropriate.
Free O and M	For three years	Detailed project report dated 3 June 2011 prepared by TVSEL based on the proposal received from M/s Regen Powertech Pvt Limited /4/ /5/.	DNV has cross checked the O&M agreement signed between TVSEL and RPPL for Operation and Maintenance of 17×1500 kW WEGs dated 19 August 2011 /9/ and could confirm that the free O&M is applicable for a period of three years.
O & M cost in million INR for fourth year	20.6	Detailed project report dated 3 June 2011 prepared by TVSEL based on the proposal received from M/s Regen Powertech Pvt Limited /4/ /5/.	DNV has cross checked the O&M agreement signed between TVSEL and RPPL for Operation and Maintenance of 17×1500 kW WEGs dated 19 August 2011 /9/ and it has been confirmed that the O&M cost considered in the financial analysis is appropriate.
Annual escalation in O & M cost after 4th year (in %)	5%	Detailed project report dated 3 June 2011 prepared by TVSEL based on the proposal received from M/s Regen Powertech Pvt Limited /4/ /5/.	The O&M agreement signed between TVSEL and RPPL for Operation and Maintenance of 17×1500 kW WEGs dated 19 August 2011 /9/ indicates the escalation cost to be 5% and thus it has been cross checked that the value in the financial analysis is appropriate.
Insurance cost (in % of project cost)	0.15% of the project cost	Detailed project report dated 3 June 2011 prepared by TVSEL and quotation for Windfarm	As per rate prescribed by tariff advisory committee guidance on general rules and regulations for

		insurance received from United India Insurance company /5/ /26/.	insurance /49/.
Project Revenue			
Electricity tariff (in INR/kWh)	5.37 INR/kWh without any escalation fixed for 13 years	As per MERC tariff order dated 29 April 2011 /39/, electricity tariff was fixed at 5.37 INR/kWh without any escalation fixed for 13 years.	The NoC for commissioning of the WEGs issued by MAHADISCOM indicates that the WEGs installed as part of the project activity intends to sell electricity to the grid /20/. The mentioned tariff order is applicable at the time of decision making, thus it has been cross checked that the tariff applied in the financial analysis is appropriate.
Tariff from 14th year	5.37 INR/kWh	Detailed project report dated 3 June 2011 prepared by TVSEL /5/.	The tariff of INR 5.37 is the levelized tariff for wind energy projects determined by MERC after considering the applicable parameters for the entire lifetime of the WEGs. Also, the tariff working has adopted cost plus approach in working the tariff and going by the same assumptions the tariff from year 14 may be lower for the following reasons: • No element of interest for loans involved; • No capital cost repayment factor. The approach has been cross checked from the tariff order /39/ and the guidelines on tariff working issued by CERC /43/.

			Thus the tariff applied in the financial analysis from 14th year is found to be appropriate.
Generation based incentive (in INR/kWh), applicable to wind power projects with cap of 6.2 Million INR/MW	0.5 INR/kWh	Incentive provided by Ministry of new and renewable energy sources for wind energy projects /46/.	The project activity has applied for generation based incentives and it has been verified by DNV that project proponent can avail only under either a. accelerated depreciation or b. GBI scheme /46/ and the project proponent has intimated Ministry /24/ about the option opted and ministry have procedure in place to track that project can avail benefit under one scheme only.
Project Cost			
Total project cost in million INR (including land)	1 640	Detailed project report dated 3 June 2011 prepared by TVSEL based on the proposal received from M/s Regen Powertech Pvt Limited /4/ /5/.	The project cost used in the financial analysis is cross checked from the following agreements signed for this project activity and found to be matching: a. Agreement for supply of 17×1500 kW WEGs dated 19 August 2011 /6/. b. Development agreement for this 25.5 MW wind project /7/. c. Erection and commissioning contract for the 25.5 MW wind farm /8/. d. Land lease and purchase documents /13//25/.
Means of Finance			
Debt in %	70	Detailed project report	DNV has also cross

		dated 3 June 2011 prepared by TVSEL /5/ and MERC tariff order dated 29 April 2011 /39/.	checked the Debt equity ratio used in the financial analysis against the loan sanction letter issued by ICICI Bank /19/ and could confirm that the values used in the financial analysis are applicable at the time of decision making.
Equity in %	30	Calculated as difference of total project cost and loan amount.	DNV has also cross checked the Debt equity ratio used in the financial analysis against the loan sanction letter issued by ICICI Bank /19/ and could confirm that the values used in the financial analysis are conservative and applicable at the time of decision making.
Terms of loan			
Interest rate	10.5%	Actual used in line with the requirement of the guidelines on the assessment of investment analysis /33/.	Cross checked against the loan sanction letter issued by ICICI Bank dated 28 September 2011 /19/. DNV has also cross checked the interest rate used in the MERC tariff order to be 13.73% and could confirm that the interest rate used in the financial analysis is conservative.
Loan tenure in years	10 With no Moratorium	Detailed project report dated 3 June 2011 prepared by TVSEL /5/ and MERC tariff order dated 29 April 2011 /39/.	MERC tariff order dated 29 April 2011 /39/.
Depreciation			
Book depreciation rate (as per straight line method) on all assets	5.28%	Companies act 1956 /44/.	The project participant is availing Generation Based Incentive cross checked from the IREDA letter indicating the

			registration of the project under Generation Based Incentive (GBI) scheme /23/. Thus the project cannot avail accelerated depreciation benefits as per the MNRE order dated 17 December 2009 /45/.
Book depreciation up to (% of asset value)	90%	As MERC tariff order dated 29 April 2011 /39/.	As MERC tariff order dated 29 April 2011 /39/.
Salvage Value of project (except land)	10%	As MERC tariff order dated 29 April 2011 /39/, depreciation can be claimed for 90% of the asset, 100% land cost has been added back in last year of operation.	As MERC tariff order dated 29 April 2011 /39/.
Tax Rates			
Effective Income Tax rate	32.45%	As per Indian Income Tax Act 1961 /43/.	As per Indian Income Tax Act 1961 /43/.
Effective Minimum Alternative Tax	20.01%	As per Indian Income Tax Act 1961 /43/.	As per Indian Income Tax Act 1961 /43/.

Calculation and conclusion

The assumptions and calculations of IRR provided in the spread sheet for project investment analysis /2/ are consistent with the DPR of 3 June 2011 /5/. The calculations were verified by DNV and found to be in line with the CDM EB's 'guidelines on the assessment of investment analysis' /33/. The investment analysis has been done for the lifetime of the project i.e. 20 years. The assumptions used in the calculations are deemed to be correct and have been verified by DNV. The post-tax project IRR of the project over 20 years is 10.23% without the income from CERs /2/. The project is therefore financially less attractive compared to the benchmark of 13.06 % in the absence of CDM benefits.

Sensitivity analysis:

A sensitivity analysis has been carried out for parameters contributing to more than 20% to revenues or costs to check the robustness of the financial analysis. Reasonable variations of the capital cost, PLF (annual electricity generation), electricity tariff and annual operation and maintenance cost were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen. None of the parameters in the sensitivity analysis are considered to have any significant positive correlation

Decrease in Capital cost: The estimated project cost as per the DPR is INR 1 640 million. With a decrease in investment cost by 19% the project IRR reaches the benchmark adopted

for the project activity. In DNV's opinion, a decrease of 19% in capital cost is deemed not to be realistic considering the fact that the contracts for the project activity involving the purchase of Land, supply of WEGs, development of the wind farm, Erection & Commission of the WEGs have already been signed /6//7//8//13//25//26/ and the cost in the agreements are matching with the DPR. Hence a decrease of 19% in project cost is highly unlikely. In DNV's opinion, in the worst case scenario, there can only be an escalation in the project cost (which decreases the IRR) and not a decrease.

Increase in PLF: With an increase in PLF by 21.2% (27.67% PLF) the project IRR reaches the benchmark. This is an unlikely scenario considering the fact that the wind farm is located in wind zone 1, as categorised by MERC, which has a plant load factor of 20 -23% /39/. The application for the PPA also indicates that the wind farm lies in Zone 1 and any change in the PLF will affect the category selected for the project and thereby affecting the tariff realised for the project. Also, the plant load factor of 22.83% has been verified by DNV from the loan application, loan sanction letter and the letter dated 30 April 2012 issued by ICICI bank /18//19//21/. Hence in DNV's opinion, it is unlikely for the project activity to consistently operate at 27.67% PLF.

Decrease in O & M cost: Even after 100% decrease in the O&M costs the IRR for the project activity does not cross the benchmark /2/. It is DNV's opinion that this scenario is highly unlikely in the case of the project activity.

Increase in electricity tariff: As per MERC tariff order dated 29 April 2011, the tariff for the wind project in the state of Maharastra commissioned in the year 2011-2012 has been fixed for 13 years and the applicable tariff is INR 5.37 per kWh /39/. As per the tariff order dated 30 March 2012, the tariff for the wind project in the state of Maharastra commissioned in the year 2012-2013 has been fixed for 13 years and the applicable tariff is INR 5.67 per kWh /39/. Since two WEGs have been commissioned during the year 2011-2012, the tariff of INR 5.37 per kWh is applicable and for rest of the WEGs tariff of INR 5.67 per kWh will be applicable.

From MERC tariff orders, it has been confirmed that the tariff is fixed for 13 years and from the NoC issued MAHADISCOM it could be checked that the WEGs installed as part of the project activity intends to sell electricity to the grid /20/, thus it has been verified that the tariff is fixed for 13 years and any variation in tariff is possible only from the 14th year of operation. When the tariff is increased to INR 15.5 per kWh, from 14th year of operation, the project IRR reaches the benchmark /2/. It's in DNV's opinion that an increase of 180% is highly unlikely.

Also, when the tariff is increased to INR 6.52 per kWh for the entire lifetime, the project IRR reaches the benchmark /2/. As per the MERC tariff order/39/, the PPAs are signed for a period of 13 years without any escalation in tariff /39/, thus, the scenario of realizing INR 6.52 per kWh for the electricity sold throughout the lifetime of the project activity is unlikely in DNV's opinion.

The above discussion establishes that the project activity is financially not viable without the benefits from CDM

4.6.4 Barrier analysis

As per provision of the 'Tool for demonstration and assessment of additionality', the project proponent has chosen only investment analysis to demonstrate project aditionality and has skipped barrier analysis /36/.

4.6.5 Common practice analysis

The project being a large scale renewable energy based project (>15 MW), the common practice analysis is carried out as per EB Tool for demonstration and assessment of additionality, version 6 /36/. As indicated by the tool, the geographical scope for common practice analysis has been taken as the host country (India).

The applicable output range of +/-50% of the design capacity of the proposed project activity was calculated considering the installed capacity of 25.5 MW. Thus, the applicable output range has been worked out to be 12.75 MW to 38.25 MW. All power projects in the host country India with an installed capacity ranging between 12.75 MW to 38.25 MW have been taken up for analysis.

Projects delivering the same output or capacity, that have started commercial operation before the start date of the project activity, falling within the calculated output range and not proposed as CDM project accounts to 373 /42/. Thermal and Hydro power projects falling within the identified capacity range account to 355 plants and the same has been checked from CEA database version 7 /37/. The details of the installed capacities of biomass based power projects in various states of India have been checked from the data published by MNRE /50/, and the details of the individual biomass based power plants in various states was checked from the details available in the respective ministries and department websites /51/. Thus, 12 Biomass based power projects have been included to arrive at N_{all}. Wind projects in various states and the installed capacities of various projects falling within the selected capacity have been verified from the wind power directory of India, 2011 /52/. Thus, 6 wind power plants between 12.75 MW and 38.25MW have been included to arrive at N_{all}, resulting in $N_{all} = 373$.

Following the steps of the "Tool for the demonstration and assessment of additonality" *version* 6.1.0 /36/, the definition of "Different Technologies" and sorting the listed project activities based on the difference in the energy source/ fuel, investment climate and promotional polies, N_{diff} has been calculated /36/.

The tariff policies and the regulations governing the renewable energy projects in different states are handled by their respective regulatory commissions /42/. Thus, wind projects installed in states other than Maharasta fall in different regulatory regimes and included to arrive at N_{diff}.

Within a state various promotional policies specific to renewable energy development have been in vogue during various periods. DNV could verify that in the state of Maharastra, wind projects that were commissioned prior to 2003 have availed sales tax benefits /48/. Thus, in light of clause 9 of the additionality tool version 6, $N_{diff,}$ works out to be 373.

Finally, calculating F as $1-N_{diff}/N_{all}$; which equals to 0 and $N_{all}-N_{diff}$ which equals to 0, it is possible to conclude that Wind power project in Maharashtra by TVS Energy Limited does not represent a common practice in India.

In conclusion, it is DNV's opinion that the project is not a likely baseline scenario and that emission reductions from the project are thus additional.

4.7 Monitoring

The project monitoring plan is in compliance with the monitoring methodology ACM0002 (version 12.3.0). The monitoring plan will give opportunity for real measurement of emission reductions achieved. 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 /7/. It is DNV's opinion, that the project participant is able to implement the monitoring plan.
As required by the DNA of India, the project proponent has committed to spend 2% of the CERs revenue every year for Sustainable Development including society/community development. The monitor-able action plan for the same has been included as Appendix 1 in the PDD.

4.7.1 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 'CO_2 Baseline Database for the Indian Power Sector' version 07 /37/ which was the latest published data available at the time of web hosting of the PDD.

The operating margin, build margin and combined margin thus estimated are as follows.

Item	Value in tCO_2e/MWh
Operating margin	0.9842
Build margin	0.8587
Combined margin	0.9528

The calculations and assumptions have been elaborated under section 4.8 of this report and the same were verified and found to be correct by DNV.

4.7.2 Parameters monitored ex-post

The monitoring involves the measurement of the following parameters:

a. Net electricity supplied to the gird by the project activity.
b. Net Electricity (Export minus Import) exported to the grid as recorded by the main or check meter installed on feeder i at the pooling sub-station end.
c. Electricity generation from WEG belonging to the PP and connected to feeder i as recorded by its controller meter

Details of the data collection and frequency of data recording and associated formats are described in PDD and found to be adequate /1/.

Quantity of net electricity generation supplied by the project activity to the grid: The net electricity supplied from the project activity is measured through the main and check meters installed at the substation at the gird interconnection point. During the site visit it was observed that wind turbines pertaining to the project activity along with the wind turbines

installed by other project owners will be connected to the same set of main and check meters. Hence the amount of electricity exported/imported to the north east west north eastern regional grid by individual project proponent are calculated based on the monthly joint energy meter readings taken from common meter at the substation end and monthly electricity readings recorded from the individual WEG controller and same is mentioned in the monthly electricity share certificates/note by the O&M contractor/ investors representatives and finally these share certificates/note are vetted by the state utility officials. Since energy generated from the all the WEGs in the entire wind farm is fed into a common substation, the electricity (import/export/transmission losses/incentives) by each individual WEGs/investor is also determined based on pro-rata approach. The electricity readings are measured on continuous basis & accumulated at both the end of measurement, i.e. the individual WEG controller panel and substation common meter. The hourly readings from the WEG controller panel are recorded (manual/ automatic at the respective energy meter) and consolidated monthly values are used for the calculation. Similarly, at the substation, the readings are recorded hourly (automatic at the energy meter) and monthly joint meter readings taken by the state electricity board in presence of the representative of the project proponent is used for the calculation and preparation of monthly share of electricity certificates/notes.

All data used for emission reduction calculation will be archived for 2 years after the end of crediting period. Since the project involves electricity generation from wind sources, no emission is envisaged under project emissions or leakages due to the project activity.

4.7.3 Management system and quality assurance

The monitoring involves the metering of the net electricity supplied to the grid. Details of the data collection and frequency of data recording and associated formats are described in PDD and found to be adequate. The export/import electricity metering system will comprise of a set of main and check meters. The meters installed as part of this project activity will be of 0.2 accuracy class. The meter reading of the electricity exported to the grid will be jointly taken by the representatives of the Project Participant and the state utility once in a month. Data collected can be cross-checked with invoices for the sold electricity.
The project developer and the O&M contractor will establish 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.

A quality management system covering the monitoring and training and QA/QC of the monitoring equipment has been defined. Training of the employees includes training on monitoring and measurement to ensure appropriate implementation of the monitoring programme, prior to commissioning of the project. This is followed by periodic training after commissioning of the power plant.

Electricity meters of 0.2 accuracy class will be used to measure the electricity export and import from the grid and the meters will be calibrated annually. The generation registered by the main meter will be used for the purpose of billing. If main meter is found to be beyond permissible limits of error, but the corresponding check meter is found to be within permissible limits of error, then the billing for the month up to the date and time of such test shall be as per the check meter.

The data monitored under the monitoring plan would be kept in electronic form and hard copy format for 2 years after the last issuance of the CERs or end of crediting period for this project activity, whichever occurs later.

The procedures drawn for providing training for the operation staff for monitoring and data collection are adequate. The responsibilities and authorities for project management, procedures for monitoring and reporting, and QA/QC procedures have been adequately defined.

4.8 Algorithms and/or formulae used to determine emission reductions

Baseline Emission (BE_y): baseline emissions (BE_y in tCO_2) are the product of the grid emission factor ($EF_{grid,CM,y}$ in tCO_2/MWh) times the electricity supplied by the project activity to the grid ($EG_{f,y}$ in MWh).

Project Emission ($PE_{FC,j,y}$): There are no emissions from the project which is a renewable wind energy project.

Leakage: No leakage has to be considered for the proposed project activity.

The grid emission factor is determined *ex-ante* as a combined margin, consisting of combination of the operating margin (OM) and build margin (BM) /1/.

The PDD version 1 was published for global stakeholders' comments on 5 April 2012 and the data for calculation of the grid emission factor indicated in the PDD is found to be the most recent data available at the commencement of validation. The data used in the EF calculation is in accordance with data published by the Central Electricity Authority (CEA) of the Ministry of Power, Government of India /37/. The assessment of the grid emission factor of the NEWNE grid is as follows:

As the project activity supplies electricity to the Maharastra state electricity grid which forms a part of north east west and north-eastern regional grid of India, the baseline for this project activity is a function of the generation mix of the north east west and north-eastern regional grid of India. The selection of the north east west and north-eastern regional 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 /32/.

Operating margin: Simple OM was chosen and this is justified since the low cost /must run resources in the most recent five years constitute less than 50% of total grid generation (19% in 2007-08, 17.4% in 2008-09, 15.9% in 2009-10 and 17.6% in 2010-11) /37/.

The three year generation-weighted OM for the most recent three years available at the time of webhosting the PDD i.e 2008-09, 2009-10 and 2010-11 has been used /37/. The OM is calculated to be 0.9842 tCO_2/MWh /1/. The sources and calculation has been verified by DNV.

Build margin: The generation-weighted average emission factor all power units during the most recent year i.e 2010-2011 has been calculated /37/. The BM is calculated as 0.8587 tCO_2 /MWh /1/ which was verified by DNV.

The resulting combined margin emission factor 0.9528 tCO_2/MWh is fixed *ex-ante* for the crediting period. In summary, the GHG calculations are complete and transparent, and their accuracy has been verified.

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 reductions conservatively calculated to be 48 590 tCO_2e per year for the selected crediting period /1/.

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 /1/. 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 /1/.

4.9 Environmental impacts

As per the Ministry of Environment and Forests (MoEF), India Environment Impact Notification dated 1 December 2009 /46/, wind power projects are not covered under any schedule and thus environmental impact assessment is not required for the project activity. The project is not likely to create any adverse environmental effects. The project complies with environmental regulations in India and the investors have received all the necessary clearances required for the project activity /20/.

4.10 Comments by local stakeholders

The local stakeholders were invited through advertisements in newspapers. The copies of the newspaper advertisements dated 26 January 2012 published in the newspapers Lokmat and Tarun Bharat were verified by DNV /10/. The local stakeholder meeting for the project activity was conducted at ReGen Powertech Private Limited's Office at Mayani, Maharashtra on 14 February 2012. Detailed minute of meeting, along with list of attendees with their signature and photographs have been verified by DNV /12/. A detailed description of stakeholder consultation has been provided in section E of PDD.

The questions rose during the stakeholder consultation shows that the proposed project received support from the local people /11//12/. DNV considers the local stakeholder consultation carried out adequately.

4.11 Comments by Parties, stakeholders and NGOs

The PDD, version 01 dated 29 March 2012 was made publicly available on the CDM website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 5 April 2012 to 4 May 2012.

http://cdm.unfccc.int/Projects/Validation/DB/FPVEVTB2Z4IIYRGKZ6CV0PQJN1QO62/view.html

One comment was received and is given (in unedited form) in the below text box.

Comment by: Fleming

☐ Accredited NGO ☐ Party ☒ Stakeholder

Comment:

1. Is the project equipment purchased second hand equipment or sourced from cheap foreign sources? If yes, the issue must be probed by DOE since invoices will invariably be inflated and forged. Total project costs mentioned by PP will not be the same as originals. Hence no additionality. These facts must be probed in full by DOE by checking all documents and money transactions along with bank statements and certified accounts by a legally acceptable financial analyst.
2. From DOE side which auditor has done marketing and business development for acquiring this business of validating this project? With whom he or she was co-ordinating at PP or CER buyer? The same person who has done the marketing and business development to acquire the business do validation or participate in any manner what so ever in the validation process? One cannot do like that. It is against the accreditation rules and norms followed since ages. DOE should send auditors from different offices or countries to do this validation audit. DOE must take care of impartiality and accreditation rules. Due to the targets set by the DOE managements auditors are doing marketing and meeting clients and giving promises that the project will be taken care. Is it acceptable and fair? This must be stopped. No auditor should do marketing. Only non-auditing staff should do marketing. DOE to ensure the same please.
3. If applicable only: Is these machines, equipment was a part of any bundle of CDM activity envisaged and developed earlier. DOE to check the same through independent sources also. Once some bundles are non-additional and getting negative validation from a DOE, PP is rolling out the same project as an individual project which is not a CDM project at all. DOE to verify the same from independent sources and also take undertaking in the form of an affidavit from the PP's that any misrepresentation or false statement with respect this would attract strict legal action from UNFCCC and DOE. Furthermore the registered project must be de-registered in case of any future findings contradicting the submissions made by the project owner.
4. DOE to ensure that the PDD values are consistent and ensure that the CDM project is a genuine project
5. DoE to check the Detailed Project Report and Feasibility Report which is submitted to the other agencies and Banks by Project owner and ensure that the values match with the DPR/FR submitted to DoE also.

5 Careful study must be done so that the DPR/FR is not in different versions made and submitted with different purposes to different agencies, which is totally unacceptable, illegal and unethical.

6 DPR/FR values must be probed fully. DOE must take a written undertaking from the PP/Consultant about the list of parties to whom this DPR/FR is submitted and for what purposes. Then DOE should cross check with all the parties and confirm that the same DPR/FR is submitted to all the parties correctly without any changes. DOE must not accept any reports and undertakings from PP/Consultant. DOE must make

independent evaluation and use totally different parties without informing the PP or Consultant to cross check the facts.

7 DOE to write to the party who prepared the DPR/FR which is submitted to the banks and other agencies and the same is verified against the one submitted to the DOE by PP/Consultant.

8 DOE must not entertain this project any more if found the DPR/FR is tamprered with at any point in time. PP can not give different DPR's and FR's. They must submit only the one given to Banks and other agencies while obtaining loans and decision making time.

9 How is the base line defined in this project? Is Base line hypothetically defined with no proper evidences and proper justification? In such case, DOE cannot take the base line as suggested by the PDD. Please check that there are real emission reductions beyond the real and factual base line. It may so happen that this project qualifies for no CER's. DOE cannot assume values and things as giving by this PP. Whatever values are considered throughout the project in all documents including the real DPR (not the one prepared for CDM, the one given to the banks and others), they must be validated, verified and double checked. Do not ask PP for DPR. Ask the parties who have been given DPR by the PP. Get directly from the bank and others by each page of the DPR and Feasibility report signed. Such document can be considered as a real DPR or FR. UNFCCC CDM process cannot be degraded by fabricating and misinterpreting the project base line and additionality.

10 DOE to be more careful so that this is a genuine CDM project. What is the exact project cost? The project cost is covering what? Each value considered must be validated with proof. The machinery is second hand purchased or fresh and new from an OEM? In either case DOE to check all the quotations, proposals, purchase orders, invoices, way bills, transport bills, proof of payments like bank statements. DOE to check with banks by way of written confirmation the amount transacted, to whom the money is paid, when the money is paid, is the party paid is the correct party as shown in the purchase orders. It may so happen that the values, party names, dates are fabricated and misrepresented in this project. DOE should terminate their contract for this project immediately. This is the only way out to protect the value of CDM process. If the PP is purchasing second hand or second quality equipment and inflating the purchase order values and invoices, this must be probed thoroughly and real values to taken for additionality calculation. Then I'm sure the additionality is not there at all in such a situation.

11 Project owner should show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE at face value, but must be checked independently. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE.

12 Has the PP considered the CDM revenues while envisaging the project? Without CDM the project was not viable, is it right? This project is having a debt component? Then how bankers or lenders gave the loan? Have the bankers or lenders considered the CDM revenues while agreeing to give loan to this projects? If not this project should be rejected right away by DOE by terminating the contract forthwith. If yes, where is the proof? What is the date of the evidence document from bank? Is this document printed now a days or earlier. DOE to independently check the same. If the document is available from Bank it must be checked from all angles so that it is genuine and not forged and date changed by putting back dated. This is normally done, DOE to be aware of this please. Please check the communication the PP had during that time with banks, emails and postal receipts and the weights and dates mentioned on the receipts. Do not believe in courier bills and receipts since these can be cooked up easily. Insist on government owned postal service receipts only. If the project is fully equity project then on what basis the PP has invested full equity in to the project while considering the CDM revenue? DOE to check the same in detail and bring out the facts. Is there any past record of this PP to invest or not to invest at returns what he is talking about in this project? Proper evidences must be reviewed and digged out by the DOE and take decision on the project based on established facts. Do not ask documents from PP, DOE to collect the same from different sources to do independent evaluation.

***How DNV has considered the comment received in its validation**:*

One comment with 17 sub-questions was received for the proposed project, and is available on the PDD publication page. DNV has verified that the same questions have been posted to many proposed CDM projects, and finds that the questions are not related specifically to the project in question, but represents general issues which shall be validated for proposed CDM projects. Some issues are also clearly not applicable to the project in question, such as issue 3 about the "Non- debundling nature of the project activity" which is not a relevant criteria for large scale CDM project activities.

The issues raised have been sufficiently covered in the validation process.

For example, issue 1 "Is the project equipment purchased second hand equipment or sourced from cheap foreign sources? If yes, the issue must be probed by DOE since invoices will invariably be inflated and forged. Total project costs mentioned by PP will not be the same as originals. Hence no additionality. These facts must be probed in full by DOE by checking all documents and money transactions along with bank statements and certified accounts by a legally acceptable financial analyst" is addressed in section 4.6.3 of this report 2011. The details of the original agreements for the supply of the WEGs /6/ and other agreement related to the development of the wind farm /7/, agreement related to the erection and commissioning of the WEGs /8/ have been verified and the details of the same and the conclusion of the evaluation have been elaborated under section 4.6.3 of this report.

Information regarding for example issue 11 "Project owner should show some undertaking letter from bank manager to DoE stating that both DPR's are same. These kinds of letters should not be accepted and entertained by DoE at face value, but must be checked

independently. While collecting the DPR/FR from banks and other agencies, all DPR/FR pages should be counter signed by Banks and other agencies so that the real DPR/FR given to other parties by the PP/Consultant is same as the one submitted to DOE" is addressed in section 4.6.3 of this report 2011. The details of the loan application submitted to the bank and the undertaking from the bank manager /18/, Credit arrangement letter /19/ have been verified and the details of the same have been elaborated under section 4.6.3 of this report.
Hence, it is DNV's opinion that all issues raised have been sufficiently covered in the validation process, as illustrated by the two examples above, and were addressed during the validation process as reflected in this validation report and validation protocol.

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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory requirements for Clean Development Mechanism (CDM) project activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	~~CAR 1~~ OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	~~CL 3~~ OK

Requirement	Reference	Conclusion
that would have occurred in the absence of the registered CDM project activity.		
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 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 (VVM para 55-57)**					
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. Section A.1. of the PDD clearly indicates all the required details.		OK
A.1.2	Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	☒ Yes		OK
A.2	**Description of the project activity (VVM para 58-64 and VVM para 135 and 136 (a) & (c) for small-scale project activities, as applicable)**					
A.2.1	How was the design of the project assessed?	/1/	DR	*What type is the project?* ☐ Project in existing facility or utilizing existing equipment(s) ☐ Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO_2e per year. In this case, a site visit must be performed. ☐ Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO_2e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical		OK

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

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			analysis. ☐ The project is an individual small scale project activity with emission reductions not exceeding 15 000 tCO_2e per year. In this case, DOE may not conduct a physical site visit as appropriate. ☒ Greenfield project The proposed project activity involves installation of 17 WEGs of 1.5 MW each capacity thereby installing a total capacity of 25.5 MW. The WEGs are installed in various villages of Satara and Sangli district of Maharastra, India. The generated electrical energy would then be supplied to the NEW&NE grid of India. *How was the design of the project assessed?* ☒ Physical site inspection ☒ Reviewing available designs and feasibility studies Site visit was performed on 10 May 2012 covering the commissioned WEGs forming part of the project activity. Site visit was carried out by G.Murali of DNV.		
A.2.2 If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR	The proposed project activity involves installation of 17 WEGs of 1.5 MW capacity each thereby installing a total capacity of 25.5 MW. Only two out of 17 WEGs have been commissioned at the time of carrying out the site visit. The WEGs are envisaged to be installed in various villages of Satara and Sangli district of Maharastra, India. The generated electrical energy would then be supplied to the		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				NEW&NE grid of India.		
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO_2e per year), justify the sampling through a statistical analysis:	/1/	DR	*NA*		
A.2.4	Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?	/1/	DR	Yes. The description of the proposed CDM project activity in the PDD sufficiently covers all relevant elements and is accurate. The proposed project activity involves installation of 17 WEGs of 1.5 MW capacity each thereby installing a total capacity of 25.5 MW. The WEGs are installed in various villages of Satara and Sangli district of Maharastra, India. The generated electrical energy would then be supplied to the NEW&NE grid of India.		OK
A.2.5	Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR	The project is a green field project activity and so this is not applicable		OK
A.2.6	Does the project design engineering reflect current good practices?	/1/	DR	Yes, power generation through wind turbines is proven technology in the host country India and reflect good practices. The selected WEG is based on the wind power potential of the location, thus the selection also reflects good practice in India.		OK
A.2.7	Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/	DR	Yes, the technology will result in a significantly better performance. The project will generate electrical energy using WTGs and supply this to the NEW& NE regional grid. The project activity will achieve GHG emission reductions by avoiding CO_2 emissions There is no technology transfer in the proposed		OK

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

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			project as the equipment is purchased within India.		
A.3 Participation requirements (VVM para 51-54, 125-127)	/1/				
A.3.1 Do all participating Parties fulfil the participation requirements as follows:	/1/	DR	The Letter of Approval (LOA) from the DNA of India (Host) has not been submitted for verification.	~~CAR 1~~	OK
	India (host)		County X	Country Y	
a) Party has ratified the Kyoto Protocol	☒ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
b) Party has designated a Designated National Authority	☒ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
c) The assigned amount has been determined	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
A.3.2 Do the letters of approval meet the following requirements?	/1/	DR	The Letter of Approval (LOA) from the DNA of India (Host) has not been submitted for verification.	~~CAR 1~~	OK
	India (host)		County X	Country Y	
a) LoA confirms that Party has ratified the Kyoto Protocol	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
b) LoA confirms that participation is voluntary	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
c) The LoA confirms that the project contributes to the sustainable development of the host country?	☐ Yes ☐ No		NA	NA	
d) The LoA refers to the precise project activity title in the PDD	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
e) The LoA is unconditional with respect to (a) to (d) above	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
f) The LoA is issued by the respective Party's DNA	☐ Yes ☐ No		☐ Yes ☐ No	☐ Yes ☐ No	
g) The LoA was received directly by the DNA or the PP	☐ DNA ☐ PP		☐ DNA ☐ PP	☐ DNA ☐ PP	
h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic					
A.3.3 Have all private/public project participants been authorized by an involved Party?	/1/	DR	The Letter of Approval (LOA) from the DNA of India (Host) has not been submitted for verification.	~~CAR 1~~	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A.4 Technical description of the project activity (VVM para 58-64)					
A.4.1 Is the project's location clearly defined?	/1/	DR	Yes, the project's spatial boundaries are defined. The Geo coordinates of the individual WEGs have been provided in the PDD.		OK
A.5 Public funding of the project activity					
A.5.1 In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/	DR	The project does not involve any public funding and hence, no diversion of funds from official development assistance is expected.		OK
B Application of a baseline and monitoring methodology					
B.1 Methodology applied (VVM para 65-76 and VVM para 136 (b) for small-scale project activities, as applicable)					
B.1.1 Does the project apply an approved methodology and the correct and valid version thereof?	/1/	DR	The project correctly applies the Consolidated baseline and monitoring methodology for "Grid-connected electricity generation from renewable sources", ACM0002 version 12.3 0.		OK
B.1.2 If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/	DR	Not applicable for the project activity.		NA
B.2 Applicability of methodology (and tools) (VVM para 65-76) *Insert a row for each applicability criteria of the applied methodology (and tools)*					
B.2.1 How was it validated that project complies with the following applicability criteria: The methodology is applicable to grid connected renewable power generation	/1/ /54/	DR/ I	The project activity involves installation of WEGs for generation of power from wind energy to supply to the grid and is a green field project.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	project activities that (a) install a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).					
B.2.2	How was it validated that project complies with the following applicability criteria: The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: • hydro power plant/unit (either with a run-of- river reservoir or an accumulation reservoir) • **wind power plant/unit** • geothermal power plant/unit • solar power plant/unit • wave power plant/unit • tidal power plant/unit	/1/ /54/	DR / I	The project activity involves installation of WEG for generation of power from wind energy to supply to the grid and is a green field project.		OK
B.2.3	How was it validated that project complies with the following applicability criteria: In the case of capacity additions, retrofits, replacements: the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.	/1/ /54/	DR/I	The project activity is wind based power generation. Hence, this condition is not applicable to the project activity.		OK
B.2.4	How was it validated that project complies with the following applicability criteria: In case of hydro power plants, one of the following conditions must apply:	/1/ /54/	DR /I	The project activity is wind based power generation. Hence, these conditions are not applicable to the project activity.		OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	• The project activity is implemented in an existing reservoir, with no change in the volume of reservoir. • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2. The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.					
B.2.5	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 selected baseline corresponds to "the baseline emissions are product of electrical energy baseline $EG_{BL,\,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor" as prescribed in the applied methodology. $BE_y = EG_{PJ,y} * EF_{grid,CM,y}$		OK
B.3	**Project boundary (VVM para 78-80)**					
B.3.1	What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/ /54/	DR/I	Yes, the project boundary includes: (i) The project activity is spread across Satara and Sangli Districts of Maharastra state in India. (ii) The spatial boundary of the project also includes transmission network for the evacuation of electricity to the NEW&NE gird of India to which the project activity is connected. The project boundary has been defined clearly in the PDD.		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	Baseline GHG sources identified for the project activity are CO_2 – Included as it is the main emission source		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	arrive at this conclusion.			CH_4 – Excluded N_2O – Excluded No project activity emission for Wind power plant. This is in line with the applicable methodology.		
B.3.3	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 activity is generation of electricity for supply to grid using wind energy and so does not involve any other emission source not foreseen by the methodology.		OK
B.4	**Baseline scenario determination (VVM para 81-88, 105-107)** *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.*					
B.4.1	Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/	DR	The baseline scenario has been chosen as per the methodology ACM0002 version 12.3.0. According to the methodology the baseline scenario is, electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.4.2	How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/	DR	The additionality of the project activity has been demonstrated as per Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activities.		OK
B.4.3	What is the baseline scenario?	/1/	DR	As per the methodology ACM0002 version 12.3.0, the baseline emissions are product of electrical energy baseline $EG_{BL,\ y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor". The same baseline scenario is used in the project activity which is in line with the applied methodology. The combined margin emission factor for the NEWNE regional grid of India has been sourced from CEA database version 07.		OK
B.4.4	Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/	DR	Yes the baseline scenario has been identified in line with applied methodology ACM0002 version 12.3.0, the baseline scenario identified is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".		OK
B.4.5	Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	In line with the applied methodology ACM0002 version 12.3.0, the baseline scenario identified is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as		OK

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

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system". The combined margin emission factor for the NEWNE regional grid of India has been sourced from CEA database version 07.		
B.4.6	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /54/	DR/I	Yes, national and sectoral policies have been taken into consideration for selecting the baseline scenario.		OK
B.4.7	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/ /54/	DR/I	The project is located in the state of Maharstra which forms a part of the NEWNE grid. Hence the baseline scenario has been appropriately considered to be the grid mix in the southern grid. The baseline determination is compatible with the available data. The combined margin emission factor value for the southern grid has been sourced from data by the Central Electricity Authority (CEA) of the Ministry of Power, Government of India. CEA 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 CO_2 baseline database provides information about the OM and BM factors of all the regional electricity grids in India. DNV confirms that the CEA database version 07 used for calculation of combined margin emission coefficient for the southern regional grid of India was the latest data available at the time of the commencement of validation (in line with the requirement of "Tool to calculate the emission factor for an electricity system") and same was used during the		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			webhosting of the PDD. The OM EF is calculated *ex-ante* using the simple OM approach based on the generation-weighted average emissions per electricity unit over a three year period of 2008-2009, 2009-2010 and 2010-2011, sourced from the CEA database, version 7. BM is calculated ex ante based on the 20% most recent capacity additions in the southern grid based on net generation for the year 2010-2011 as described in "Tool to calculate the emission factor for an electricity system". The BM EF has been determined to be 0.8587 tCO_2/MWh. Inline with the tool, the weights for OM and BM are 0.75 and 0.25 respectively and the same values have been used to arrive at the CM EF value.		
B.4.8 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 CDM project activity	/1/	DR	Inline with the applied methodology AMS-I.D version 17, the baseline scenario identified is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5 Additionality determination (VVM para 94-121 and VVM para 137 for small-scale project activities, as applicable)						
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/	DR	Yes, The tool to demonstrate additionality version 5.2 has been used. Yes this is in line with the methodology for new grid connected renewable energy project.		OK
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/	DR	Yes the regulatory requirements have been taken into account to evaluate the alternatives to the project activity.		OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Yes. The relevant approvals have been provided for verification and this has been verified and found to be in order by DNV.		OK
B.5.4	What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/	DR	The project additionality has been mainly based on investment analysis.		OK
Prior consideration of CDM (VVM para 98-103)						
B.5.5	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/	DR	The start date of the project activity (19 August 2011) is after 2 August 2008 (CDM EB guidelines on CDM consideration). The project proponent through an email communication has notified the DNA of India and the UNFCCC secretariat on 29 December 2011 regarding the commencement of the CDM project activity and received the acknowledgement from DNA India on 30 December 2011.		OK
B.5.6	If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/	DR	The start date of the project activity (19 August 2011) is after 2 August 2008 (CDM EB guidelines on CDM consideration). The project proponent through an email communication has notified the DNA of India		OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				and the UNFCCC secretariat on 29 December 2011 regarding the commencement of the CDM project activity and received the acknowledgement from DNA India on 30 December 2011.		
	Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.7	What initiatives where taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/ /54/	DR/I	The start date of the project activity (19 August 2011) is after 2 August 2008 (CDM EB guidelines on CDM consideration) and hence this is not applicable.		OK
	Investment analysis (VVM para 108-114) *The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation. All input parameters need to be assessed.*					
B.5.8	Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/	DR	Yes, the project activity generates revenue from sale of power to the grid and same is mentioned in the PDD.		OK
B.5.9	Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	No, the alternative to the project activity does not require any investment and this is indicated in the PDD.		OK
B.5.10	Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	The project participant has applied benchmark analysis to demonstrate the additionality of the project. The benchmark selected for the project activity is in line with CDM EB guideline on assessment of investment analysis which states that "if the alternative to the project activity is the supply of electricity from a grid this is not to be		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				considered as investment and a benchmark approach is considered appropriate".		
B.5.11	Is the benchmark/discount rate the latest available at the time of decision?	/1/	DR	The benchmark value has been arrived based on the default values for the expected return on equity, as provided in Appendix, "guidance on assessment of investment analysis" version 05, Annex 5, EB 62. The project activity falls under Host Country India, Group 1 (S. No. 1. Energy Industries) hence the real value for expected return on equity is 11.75%. The inflation rate of 5.5% has been added to the real value to arrive at the nominal value of the benchmark. The inflation rate has been arrived based on the RBI inflation forecast. However suitability of the benchmark at the time of decision making need to be clarified in light of nominal and real values used.	~~CL 1~~	OK
B.5.12	What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/	DR	The financial indicator chosen by the project proponent for the purpose of investment analysis is post tax equity IRR.		OK
B.5.13	Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/	DR	The appropriateness of input parameters has been evaluated in the subsequent sections.		OK
B.5.14	Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal accounting practice in the host country?	/1/	DR	Yes, the income tax calculation takes depreciation into account. The depreciation considered is as per the accounting practice allowable for such type of projects as per the Income tax act of India.		OK
B.5.15	Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/	DR	A salvage value of 10% of depreciable asset cost has been considered for investment analysis and has been added back in cash flow in the last year of operation of project activity.		

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				However the following needs clarification: 1. The suitability of using the 10% on the depreciable asset for arriving at the salvage value. 2. The details of accounting the working capital loan and the returning of the same in the cash flow statement as indicated.	~~CL 2~~	OK
B.5.16	When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/	DR	A detailed project report prepared internally has been used for the decision making purpose. However the following needs clarity: 1. The relevance of the inputs parameters at the time of decision making.	~~CL 3~~	OK
B.5.17	How was the amount of output (e.g. sales of electricity) assessed? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/ /54/	DR/ I	☒ The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval ☐ The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company) ☐ Other approach. The plant load factor has been assessed based on the credit facility arrangement and the letter from ICICI bank, the financiers of the project activity. Plant load factor used in investment analysis is as per the Guidelines on reporting and validation of PLF.		OK
B.5.18	How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in	/1/	DR	☒ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	accordance with VVM paragraph 95.			related to the project and the project participants The electricity tariff considered by the PP is based on the MERC tariff order dated 29 April 2011, the latest tariff order of MERC at the time of decision making.		
B.5.19	How were the investment costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants A detailed project report prepared internally has been used for the decision making purpose. However the following needs clarity: 1. The relevance of the inputs parameters at the time of decision making.	~~CL 3~~	OK
B.5.20	How were the O&M costs assessed? Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☒ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants A detailed project report prepared internally has been used for the decision making purpose. However the following needs clarity: 1. The relevance of the inputs parameters at the time of decision making.	~~CL 3~~	OK
B.5.21	Describe the assessment of the other input parameters. Were the data available and valid at the time of decision? Remember to include all the data sources used and list all the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/1/	DR	☐ Cross-check against third-party or publicly available sources (e.g. invoices or price indices) ☐ Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants A detailed project report prepared internally has	~~CL 3~~	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				been used for the decision making purpose. However the following needs clarity: The relevance of the inputs parameters at the time of decision making.		
B.5.22	Was the financial calculation spreadsheet verified and found to be correct?	/1/	DR	Found to be correct		OK
B.5.23	Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation between the parameters been considered?	/1/	DR	Key parameters of Project cost and O&M cost, have been considered for sensitivity analysis and these parameters contribute to more than 20% of the revenue and costs. However the parameters of Tariff and PLF have not been applied for the sensitivity analysis.	~~CAR 2~~	OK
B.5.24	Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/	DR	The PDD has considered +/-10% variation for the identified parameters.		OK
B.5.25	Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/	DR	No, the PDD do not indicate the results by varying the parameters till reaching the benchmark.	~~CAR 2~~	OK
	Barrier analysis (VVM para 115-118)					
B.5.26	Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/	DR	PP has not opted for barrier analysis to demonstrate the additionality of the project		OK
	Common practice analysis (VVM para 119-121)					
B.5.27	What is the geographical scope of the common practice analysis? Is this justified?	/1/ /54/	DR/I	The state of Maharastra has been considered for assessing the common practice. Since the policies and tariff regime is consistent throughout the state of Maharastra, DNV considers the selection of the region is appropriate. In the State of Maharastra all wind projects above 15 MW has been considered for common practice analysis. It was noted that all wind power project		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				from single investor above 15MW is under CDM pipeline. Hence it has been demonstrated that investment in large scale wind power project in Maharastra is not a common practice.		
B.5.28	What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has this been justified?	/1/	DR	All the wind projects installed in the state of Maharastra has been considered for the common practice analysis. Also all wind projects above 15 MW has been considered for common practice analysis. However the selection of 15 MW as lower limit applied for the common practice analysis need to be clarified.	~~CL 4~~	OK
B.5.29	What is the data source(s) used for the common practice analysis?	/1/	DR	Wind power Directory of India -2010 has been used as the data source.		OK
B.5.30	How many similar non-CDM-projects exist in the region within the scope?	/1/	DR	The details have been adequately presented in the PDD. The details to be evaluated on addressing the CL above.	~~CL 4~~	OK
B.5.31	How were possible essential distinctions between the project activity and similar activities assessed?	/1/	DR	The details have been adequately presented in the PDD. The details to be evaluated on addressing the CL above.	~~CL 4~~	OK
B.5.32	What is the conclusion of the common practice analysis?	/1/	DR	The conclusion of the common practice analysis calls for the responses to the clarifications raised for Common Practice analysis by the PP.	~~CL 4~~	OK
	Conclusion					
B.5.33	What is the conclusion with regard to the additionality of the project activity?	/1/	DR	The findings indicated above need to be addressed to draw any conclusion on the additionality of the project activity.	~~CL 4~~	OK
B.6	**Calculations of GHG emission reductions**					
	Data and parameters that are available at validation and that are not monitored (VVM para 199-203)					
B.6.1	How was the OM available at validation verified?	/1/	DR	The OM emission factor has been computed		OK

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				using the simple OM approach based on the generation-weighted average emissions per electricity unit over a three year period of 2008-2009, 2009-2010, 2010-2011, available in the CEA database version 7, for the NEW&NE regional grid, inline with approach prescribed in "Tool to calculate the emission factor for an electricity system".		
B.6.2	How was the BM available at validation verified?	/1/	DR	20% most recent capacity additions in the grid based on net generation for the year 2010-11, in accordance with "Tool to calculate the emission factor for an electricity system". This value is sourced from CEA database version 7 and is fixed ex-ante. The BM EF sourced from CEA database is 0. 8587 tCO_2/MWh		OK
B.6.3	How was the CM available at validation verified?	/1/	DR	The baseline emission factor for the project has been calculated as the weighted average of the operating margin (OM) and the build margin (BM) emission factor in the ratio of 75:25 as applicable for wind projects.		OK
	Baseline emissions (VVM para 89-93)					
B.6.4	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Yes. The baseline emission calculations are in accordance with the baseline methodology.		OK
B.6.5	Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Yes. Conservative assumptions have been used while calculating the baseline emissions.		OK
B.6.6	Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	There are no uncertainties in the baseline emissions.		OK
	Project emissions (VVM para 89-93)					
B.6.7	Are the calculations documented according to the approved	/1/	DR	Since the project activity is electricity generation		OK

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	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	methodology and in a complete and transparent manner?			from wind energy there is no project GHG emission and this complies with the methodology with respect to project emission computation.		
B.6.8	Have conservative assumptions been used when calculating the project emissions?	/1/	DR	*NA*		
B.6.9	Are uncertainties in the project emission estimates properly addressed?	/1/	DR	NA		
	Leakage (VVM para 89-93)					
B.6.10	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Since the project activity is electricity generation from wind energy there is no project GHG emission and this complies with the methodology with respect to project emission computation		OK
B.6.11	Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	*NA*		OK
B.6.12	Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	*NA*		OK
	Emission Reductions (VVM para 89-93)					
B.6.13	Algorithms and/or formulae used to determine emission 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.	/1/	DR	Yes. The monitoring described meets the requirement of the methodology. Yes. The monitoring plan contains all parameters that are to be monitored and are clearly described The only parameter to be measured is the net electricity exported to the grid and is done by metering through the main and check meters installed at the grid interconnection points.		OK

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.7	**Monitoring plan (VVM para 122-124)**					
	Data and parameters monitored					
B.7.1	Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/	DR	Yes. The monitoring described meets the requirement of the methodology.		OK
B.7.2	Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/	DR	Yes. The monitoring plan contains all parameters that are to be monitored and are clearly described		OK
B.7.3	In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/	DR	The accuracy of the measuring equipment has been indicated in the PDD.		OK
B.7.4	In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/	DR	The accuracy of the measuring equipment has been indicated in the PDD.		OK
B.7.5	In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/	DR	The net electricity exported to the gird is the only parameter to be measured. The electricity meters installed at the grid interconnection points to which the project activity is connected will be calibrated annually. The meters are under the purview of the state utility.		OK
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	The net electricity exported to the gird is the only parameter to be measured. The readings will be measured continuously and recorded monthly through Joint meter readings. The monitoring frequency indicated in the PDD is adequate.		OK
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	The net electricity exported to the gird is the only parameter to be measured. The readings will be measured continuously and recorded monthly through Joint meter readings. The monitoring frequency indicated in the PDD is adequate.		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	Ability of project participants to implement monitoring plan					
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/ /54/	DR/I	As per DNA of India website for large scale CDM projects activities PP shall commit a certain percentage of the CERs revenue every year (subject to a minimum of 2%) for Sustainable Development and shall make action plan for the same and these needs to be included in the PCN and PDD. This being a small scale project activity this is not applicable for the project activity.		OK
B.7.9	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/ /54/	DR/I	The procedures for record handling have been indicated in the PDD.		OK
B.7.10	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/ /54/	DR/I	The procedures for QA/QC of the data collected have been indicated in the PDD.		OK
B.7.11	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/ /54/	DR/I	Yes, 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 has been included for data recording, storage & retrieval plan in the PDD.		OK
	Monitoring of sustainable development indicators/ environmental impacts					
B.7.12	Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/ /54/	DR/I	The start date of the project activity is stated to be 19 August 2011, date of signing the supply agreement with ReGen for the wind turbines of the project activity.		OK
B.7.13	Does the monitoring plan provide for the collection and	/1/	DR/I	The operational lifetime of the project activity		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	archiving of relevant data concerning environmental, social and economic impacts?	/54/		has been mentioned as 20 years. This has been checked based on the technical specification of the turbines issued by the Manufacturer.		
B.7.14	Are the sustainable development indicators in line with stated national priorities in the host country?	/1/ /54/	DR/I	The PP has selected seven year renewable crediting period starting from 1 August 2012.		OK
C Duration of the project activity / crediting period						
C.1.1	**Start date of project activity (VVM para 99-100, 104)**					
C.1.2	How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/	DR	The starting date of the project activity has been identified as 19 August 2011, which is the date of signing the supply agreement with ReGen for the wind turbines of the project activity.		OK
C.1.3	Is the stated expected operational lifetime of the project activity reasonable?	/1/	DR	As per the technical specification sheet provided by ReGen (manufacturer of WEGs) the lifetime of the project is 20 years.		OK
C.1.4	Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/	DR	The project has selected a renwable crediting period of 7 years with the start date of the crediting period to be 1 August 2012 (or on the date of registration of the CDM project activity, whichever is later). The project is expected to result in 48 590 tCO_2e emission reductions per annum over the crediting period.		OK
D Environmental Impacts (VVM para 131-133 and VVM para 136 (d) for small-scale project activities, as applicable))						
D.1.1	Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions	/1/	DR	There are no host country requirements for an Environmental Impact Assessment (EIA), for a wind power plant project activity. The No		OK

	Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	that need monitoring?			Objection certificate issued by Mahadiscom were verified.		
D.1.2	Does the project comply with environmental legislation in the host country?	/1/	DR	As per the Ministry of Environment and Forests (MoEF), India Environment Impact Notification S.O. 1533 dated 14 September 2006, wind power projects are not covered under any schedule and thus environmental impact assessment is not required for the project activity.		OK
D.1.3	Will the project create any adverse environmental effects?	/1/	DR	Being wind energy based power project, the project is not expected to have any significant impact on the environment.		OK
D.1.4	Have identified environmental impacts been addressed in the project design?	/1/	DR	Being wind energy based power project, the project is not expected to have any significant impact on the environment.		OK
D.1.5	Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Being wind energy based power project, the project is not expected to have any significant impact on the environment.		OK
D.1.6	Are transboundary environmental impacts considered in the analysis?	/1/	DR	Being wind energy based power project, the project is not expected to have any significant impact on the environment.		OK
E Stakeholder Comments (VVM para 128-130)						
E.1.1	Have relevant stakeholders been consulted?	/1/ /54/	DR/I	Yes. The stake holders meeting was conducted on 14 February 2012. The minutes of the meeting has been verified by DNV.		OK
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/ /54/	DR/I	Project participants by organizing meetings and giving newspaper notice thereby seeking public inputs relating to each project activity in the bundle is as per the requirements for conducting the local stakeholder meeting thus deemed to be		OK

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				adequate.		
E.1.3	If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/ /54/	DR/I	This is not specifically required for wind power projects as per current Indian legislation.		OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/ /54/	DR/I	No negative comments were received by the stakeholders.		OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/ /54/	DR/I	No adverse comments have been received		OK

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CAR 1 The Letter of Approval (LoA) from the DNA of India (Host) has not been submitted for verification.	A.3.1 A.3.2 A.3.3	The LoA from the DNA of India dated 22 November 2012 has been submitted to DoE.	The LoA from the DNA of India dated 22 November 2012 has been verified. CAR Closed.
CAR 2: Key parameters of Project cost and O&M cost, have been considered for sensitivity analysis and these parameters contribute to more than 20% of the revenue and costs. However, sensitivity analysis has not been performed for the parameters of Tariff and PLF. Also the PDD do not indicate the results by varying the parameters till reaching the benchmark and their probability of accurance.	B.5.25	The sensitivity analysis for tariff and PLF has been carried out in the revised PDD. The revised PDD also includes the values of the parameters subject to sensitivity at which the IRR crosses the benchmark. The probability of occurrence of such events has also been discussed.	The sensitivity analysis for the parameters of Tariff and PLF has been performed and the results of the analysis have been included in the revised PDD. The results by varying the parameters till reaching the benchmark have been included in the revised PDD. The revised PDD has been verified by DNV and the details included in the PDD are found to be adequate. CAR Closed.
CL 1 The benchmark value has been arrived based on the default values for the expected return on equity, as provided in Appendix, "guidance on assessment of investment analysis" version 05, Annex 5, EB 62. The project activity falls under Host Country India, Group 1 (S. No. 1. Energy Industries) hence the real value for expected return on equity is 11.75%. The inflation rate of 5.5% has been added to the real value to arrive at the nominal value of the benchmark. The inflation rate has been arrived based on the RBI inflation	B.5.11	The cash flow analysis and the individual components therein are nominal in nature. They are referred to as nominal because regardless of future inflation, these values are fixed. However, the real value of the cash flows can only be estimated after adjusting these nominal values expected future inflation. For example, let us take a hypothetical scenario that the project proponent's inflow in year 5 is nominal INR 5 million. With an initial capital investment of INR 10 million, this yields a	The suitability of the values adopted for arriving at the benchmark has been detailed in the revised PDD. The dates of the decision making the relevance of the data at the time of decision making have been verified and the same has been elaborated under section 4.6.3 of this report. CL Closed.

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
forecast. However suitability of the benchmark at the time of decision making need to be clarified inlight of nominal and real values used.		compounded annual growth rate of 8.44%. However the real value of this value in year 5 is only INR 15 million / (1+ inflation%) ^ 5 = 15 / (1 + 4%) ^ 5 = INR 12.32 million. This translates to a real growth rate of only 4.27%. Inflation impacts the "real" value of cash flow, diminishing the value by the extent of inflation All cash flows considered in the investment analysis including O&M, incremental O&M, tariff, admin expenses and incremental admin expenses are fixed rupee costs/revenue to be paid or received by the project proponent(s) and therefore by definition these cash flows are nominal[1]. Therefore, the resulting IRR calculated using nominal cash flows is also nominal. Hence, the appropriate benchmark for the same is a nominal benchmark that incorporates inflation component. Accordingly, as per investment guidelines[2], a nominal benchmark has been used by adjusting the real benchmark of 11.75% specified for renewable energy projects in India.	

[1] http://financial-dictionary.thefreedictionary.com/Nominal+Cash+Flow

[2] According to para 7, appendix, "Guidelines on the Assessment of Investment Analysis" (EB 62, Annex 5):

"*In situations where an investment analysis is carried out in nominal terms, project participants can convert the real term values provided in the table below to nominal values by adding the inflation rate.*

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		The increment rates applied to the input parameters admin expenses and O&M cost are not inflation rates but projections of increase in the nominal value of these inputs by the respective agencies. In case of O&M, the projected increase is by the EPC contractor (contractual obligation). In case of admin expenses, the projected increase is in-line with the annual escalation in the overheads cost of group companies.	
CL 2: A salvage value of 10% of depreciable asset cost has been considered for investment analysis and has been added back in cash flow in the last year of operation of project activity. However the following needs clarification: 1. The suitability of using the 10% on the depreciable asset for arriving at the salvage value. 2. The details of accounting the working capital loan and the returning of the same in the cash flow statement as indicated.	B.5.15	1. As per para 3.7 of the MERC tariff order 2011, depreciation is allowed up to a maximum of 90% of the Capital Cost of the asset. Thus, the remaining 10% of the project cost, excluding land, and the cost of land has been taken as salvage value. This value was available at the time of decision making of the project activity 2. The total working capital at the end of 20 years has been added back to the cash flow. The financial calculations have been revised accordingly.	1. MERC tariff order dated 29 April 2011 has been reviewed and it has been verified that 10% on depreciable asset has been indicated for working the tariff and thus accepted. 2. The revised details have been verified and accepted. CL Closed.
CL 3: A detailed project report prepared internally has been used for the decision making purpose. However the following needs clarity: The relevance of the inputs parameters at the time of decision making.	B.5.16	The table of financial parameters in Section B.5 has been revised to demonstrate relevance of the parameters during decision making. Other supporting documents for the preparation of the DPR have been	The proposal received from the WEG supplier has been presented and the details have been verified /4/. The correspondence with other WEG manufacturers for the supply of the WEG has been evaluated. Also the loan application and the Credit arrangement letter were evaluated and the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		submitted to DoE.	input parameters at the time of decision making have been found to be appropriate. CL Closed.
CL 4: All the wind projects installed in the state of Maharastra have been considered for the common practice analysis. Also, all wind projects above 15 MW has been considered for common practice analysis. However the selection of 15 MW as lower limit applied for the common practice analysis need to be clarified. Also the applicability of Common practice analysis as indicated in version 6 of the "Tool for demonstration and assessment of additionality" need to be clarified.	B.5.28	The analysis has been revised to include project activities between +/- 50% range of the project capacity. The additonality of the project activity has been demonstrated by applying version 6 of the tool.	Additionality of the project activity has been demonstrated using version 6 of the "Tool for demonstration and assessment of additionality". The revisions were found to be appropriate and the details of evaluation has been presented under section 4.6 of this report. CL Closed.

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
No FAR Identified.		

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Murali Govindarajulu holds a Bachelor's Degree in Chemical Engineering and has done a Short term diploma course in Management. Having an overall experience of around thirteen years. Prior to joining DNV having around seven years experience in Chemical process industry covering production, energy efficiency improvement and equipment design erection and commissioning. His experience also covers the fields of environmental management and resource conservation including identification of alternative fuels. He has also been actively involved in implementation of Management Systems such as ISO 14001 and OHSAS 18001 standards in chemical process industry for more than three years.

He has experience of around 6 years in validation and verification of numerous CDM projects in DNV, both in India & abroad. He has completed national training on "Wind Energy Technology" conducted by Center for Wind Energy Technology, Ministry of New and Renewable Energy. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.

Nitin Kapoor holds a Bachelor in Chemical Engineering from BITS-Pilani and is also a qualified Chartered Finanacial Analyst (CFA). He has an overall experience of 15 years and 4 months as on date (October 2010). Prior to joining DNV he had experince of 10 years and 5 months in Oil & Gas as well as manufacturing sector (food) with leading MNC's like ITC, Coca Cola and Enron Oil and Gas. During his stint in industry part his responsibilities included carrying out energy audits and to identify potential areas of improvement. His experience includes analysis of specific consumptions (primarily on energy, raw materiasl and utilities) of processes based on historical data, carrying out material balances (heat and mass), analysis of equipment performance and identification and measurement of energy saving opportunities. He has also been responsible for the operations of the complete Crude Distillation Unit in the refinery, complete platform operations in Oil and Gas sector as well as for the utilities like steam, AHU while at ITC. He also has been responsible of the ETP operations in Coca Cola and ITC as well as Water and Sewage treatment plants while working offshore. He has been responsible for EMS and QMS at ITC and Coca Cola.
He has experience of around 3.5 years in validation and verification of numerous CDM projects within DNV. He is also a Lead Auditor for QMS, auditor for EMS and Safety. His qualification, industrial experience and project experience in CDM demonstrate his sufficient sectoral competence in Energy Generation from renewable energy sources, energy efficiency, heat distribution energy demand as well as waste handling and disposal and financial analysis. His direct work experience in Oil and Gas and food sector demonstrates his sectoral competence in these industries as well.

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 Lead Auditor course. Her qualification and experience in CDM demonstrate her sufficient sectoral competence in renewable energy sector