



VALIDATION REPORT

“VAAYU INDIA WIND POWER PROJECT IN GUJARAT” IN INDIA

REPORT No. 2010-9338

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VALIDATIONREPORT

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Recommended for approval K.V.Raman	Approved by Michael Lehmann	Organisational unit: DNV Climate Change and Environmental Services	
Client: Vaayu (India) Power Corporation Private Limited		Client ref.: Mr. Yogesh Mehra	
Summary: Project Name: Vaayu India Wind Power Project in Gujarat Country: India Methodology: ACM0002 Version: 11 GHG reducing Measure/Technology: Grid connected electricity generation from renewable energy sources (wind energy) ER estimate: 106 378 tCO ₂ e per year (average) Size <input checked="" type="checkbox"/> Large Scale <input type="checkbox"/> Small Scale Validation Phases: <input checked="" type="checkbox"/> Desk Review <input checked="" type="checkbox"/> Follow up interviews <input checked="" type="checkbox"/> Resolution of outstanding issues Validation Status <input type="checkbox"/> Corrective Actions Requested <input type="checkbox"/> Clarifications Requested <input checked="" type="checkbox"/> Full Approval and submission for registration <input type="checkbox"/> Rejected In summary, it is DNV's opinion that the project activity "Vaayu India Wind Power Project in Gujarat" in India, as described in the PDD, version 3 of 19 January 2011, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002, version 11. Hence DNV requests the registration of the project as a CDM project activity.			

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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction(s)
CL	Clarification request
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
C-WET	Centre for Wind Energy Technology
DNV	Det Norske Veritas
DNA	Designated National Authority
EIL	Enercon India Limited
FAR	Forward Action Request
GEDA	Gujarat Energy Development Agency
GERC	Gujarat Electricity Regulatory Commission
GHG	Greenhouse gas(es)
GETCO	Gujarat Electricity Transmission Company
GUVNL	Gujarat Urja Vikas Nigam Limited
GWP	Global Warming Potential
IDFC	Infrastructure Development Finance Company Limited
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
LoA	Letter of approval
MoEF	Ministry of Environment and Forestry
NEWNE	North East West North-Eastern Regional Grid of India
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
O & M	Operation and Maintenance
PDD	Project Design Document
PLF	Plant Load Factor
PO	Purchase Order
PPA	Power Purchase Agreement
PwC	Price Waterhouse Coopers
RBI	Reserve Bank of India
tCO ₂ e	Tonnes of CO ₂ equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
VIPCL	Vaayu (India) Power Corporation Private Limited
WEG	Wind Energy Generator



1 EXECUTIVE SUMMARY – VALIDATION OPINION

DNV Climate Change Services AS (DNV) has performed a validation of the project activity “Vaayu India Wind Power Project in Gujarat” 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 project participant is Vaayu (India) Power Corporation Private Limited from host Party, India. The host Party India meets all participation requirements and the DNA of India has approved the project on 15 November 2010 and authorized the project participant. The DNA of India also confirmed via the letter of approval that the project assists in achieving sustainable development /27/.

The project correctly applies the baseline and monitoring methodology ACM0002 , version 11 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” /29/.

By generating electricity from wind energy sources and exporting to the NEWNE grid of India, the project activity displaces an equivalent amount of grid power, which is pre-dominantly fossil fuel based. Hence the project results in reductions of CO₂ 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 106 378 tCO₂e per year over the selected 10 year fixed 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 “Vaayu India Wind Power Project in Gujarat” in India, as described in the PDD, version 3 dated 19 January 2011, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0002 , version 11 /29/. Hence, DNV requests the registration of the project as a CDM project activity.

Bangalore and Oslo, 9 April 2011

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2 INTRODUCTION

Vaayu (India) Power Corporation Private Limited has commissioned DNV Climate Change Services AS (DNV) to perform a validation of the Vaayu India Wind Power Project in Gujarat 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 11) /29/. The validation was based on the recommendations in the Validation and Verification Manual /28/.

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/ VIPCPL: CDM-PDD for project activity “Vaayu India Wind Power Project in Gujarat” in India, Version 1 dated 17 July 2010, version 2 dated 30 November 2010 and final version 3 dated 19 January 2011.
- /2/ VIPCPL: CER Calculation Sheet.xls, version 1, dated 17 July 2010 and final version dated 19 January 2011.
- /3/ VIPCPL: Investment Analysis.xls, version 1 dated 17 July 2010 and final version dated 19 January 2011.
- /4/ VIPCPL: Benchmark Sheet.xls, version 1 dated 17 July 2010 and final version dated 19 January 2011.
- /5/ VIPCPL: Board resolution passed at the meeting of the Board of Directors of VIPCPL, dated 28 November 2009
- /6/ VIPCPL: Copy of email with intention to seek CDM status for the project activity sent to MoEF, India, dated 11 March 2010
- /7/ VIPCPL: Copy of email with intention to seek CDM status for the project activity sent to UNFCCC, dated 7 April 2010.
- /8/ EIL: Copy of budgetary offer for 51.2 MW Wind Power Project in Gujarat, dated 20 November 2009.
- /9/ VIPCPL: Copy of Detailed Project Report of the project activity, dated 25 November 2009.
- /10/ VIPCPL: Copy of purchase order for 51.2 MW Wind Farm Project in Gujarat, dated 5 December 2009.
- /11/ VIPCPL: Copy of loan application to IDFC for the project activity, dated 16 March 2010
- /12/ IDFC: Copy of loan sanction letter for the project activity to VIPCPL, dated 30 April 2010.
- /13/ VIPCPL: Land sub lease documents for 3 WEGs dated 13 May 2010, 5 WEGs dated 13 May 2010 and 1 WEG dated 21 August 2010.
- /14/ C-WET: Copy of Plant Load Factor estimation report for the project activity dated 26 April 2010.



- /15/ GEDA: commissioning certificate of 5 X 800 kW WEGs at Padavala Village, Rajkot, Gujarat dated 6 July 2010.
- /16/ GEDA: commissioning certificate of 3 X 800 kW WEGs at Machharda Village, Jamnagar, Gujarat dated 17 July 2010.
- /17/ GUVNL: Copy of Power Purchase Agreement for 4 MW, 2.4 MW and 44.8 MW dated 10 June 2010, 7 July 2010 respectively and 06 January 2011.
- /18/ VIPCPL: Copy of local stakeholder invitation published in the newspaper and personal invitation.
- /19/ VIPCPL: Minutes of meeting, list of attendees with their signature and photographs of local stakeholder meeting conducted for project activity held at Jamnagar dated 9 February 2010.
- /20/ Jamnagar Forest Department: Diversion of 68.82 hectare of forest land for construction of 58.40 MW wind power project dated 28 July 2010.
- /21/ GEDA: Copy of permission letter for setting up 48 MW, 2.4 MW and 0.8 MW in District Jamnagar and Rajkot dated 26 March 2010, 2 July 2010 and 1 September 2010 respectively.
- /22/ EIL: Technical specifications of E-53 WEG dated 20 November 2009.
- /23/ IPCC 2006: Chapter 1 and 2 of Guidelines for National Greenhouse Gas Inventories.
- /24/ VIPCPL: Certificate of Incorporation of Vaayu (India) Power Corporation Private Limited, dated 12 November 2009.
- /25/ Income Tax Act: Rates of depreciation applicable from Assessment year 2006-07 onwards: Appendix I (rule 5).
- /26/ DNA of India: Email acknowledgement sent to project proponent regarding CDM consideration for the project activity dated 15 March 2010.

3.1.2 Letters of approval

- /27/ Name of DNA (DNA of India): Letter of approval dated 15 November 2010.

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

- /28/ CDM Executive Board: Validation and Verification Manual, version 1.2
- /29/ CDM Executive Board: ACM0002, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 11.
- /30/ CDM Executive Board: Tool for the demonstration and assessment of additionality, version 05.2
- /31/ CDM Executive Board: Tool to calculate the emission factor for an electricity system, version 02
- /32/ CDM Executive Board: Guidelines for the reporting and validation of plant load factors version 01.
- /33/ CDM Executive Board: Guidelines on assessment of investment analysis version 03.1
- /34/ CDM Executive Board: Guidelines on the demonstration and assessment of prior consideration of the CDM version 03.
- /35/ CDM Executive Board: Glossary of CDM terms Version 05.



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

- /36/ CEA: CO₂ Baseline Database for the Indian Power Sector. Version 5, Date: November 2009.
<http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>
- /37/ MoEF: The Ministry of Environment and Forests (MoEF), Government of India notification, regarding the requirement of Environment Impact Assessment (EIA) studies, dated 14 September 2006.
- /38/ GERC: Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues dated 30 January 2010.
<http://www.gercin.org/docs/Orders/Nonconv%20orders/Year%202010/Order%201-2010.pdf>
- /39/ Ministry of Environment and Forest (DNA of India): Reference used to cross check the authenticity of Letter of Approval issued for the project activity.
http://cdmindia.in/project_details_view.php?id=191&oid=1&page=2&reporttype=1
- /40/ UNFCCC secretariat: Email acknowledgement sent to project proponent regarding CDM consideration for the project activity dated 12 May 2010.
- /41/ Financial Management: Theory and Practice book written by Professor Prasanna Chandra (Director, Centre for Financial Management and ex professor of finance at IIM- Bangalore)
- /42/ Risk free rate proposed by Reserve Bank of India for the month of November 2009.
http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/27CT_BUNOV09.pdf
- /43/ Historical Risk free rate form the Reserve Bank of India
http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/119T_HBSE200910.pdf
- /44/ BSE-200 data from 1 April 1989 to 30 October 2009 available at www.bseindia.com
- /45/ CRISIL Advisory Services: Report on Cost of Capital calculation method for Central Sector Utilities dated 13 April 2000.
- /46/ GERC: draft order on Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues dated 17 June 2009.
<http://www.gercin.org/docs/Discussion%20Papers/Papers/Draft%202%20of%202009/Draft%20Wind%20Order.pdf>
- /47/ United India Insurance Company Limited: insurance quotation received for the project activity dated 27 October 2009.
- /48/ VIPCPL: Sales invoices raised to GUVNL by project proponent for the project activity for the month from July 2010 to December 2010.
- /49/ Ministry of new and renewable energy sources: Generation Based Incentives for wind power projects in India:
<http://www.cwet.tn.nic.in/Docu/Grid%20Interactive%20Wind%20Power%20Projects.pdf>
- /50/ Ministry of new and renewable energy sources: Accelerated depreciation policy for wind power projects in India:
<http://www.pressnote.in/MNRE-incentives-for-independent-power-producers->



- [_62111.html](#)
- /51/ RBI: Prime lending rate proposed by reserve bank of India in weekly statistical supplement dated 13 November 2009 (latest applicable at the time of investment decision):
http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/WSS131109_F.pdf
- /52/ Income Tax Act 1961, sourced from Income Tax Department, Ministry of Finance.
<http://law.incometaxindia.gov.in/DIT/Income-tax-acts.aspx>
- /53/ Wind Power Directory 2009: detailed list of wind power projects commissioned in all states of India.
- /54/ VIPCPL: Undertaking submitted by project proponent to DNA of India for commitments and monitor-able action plan towards sustainable development dated 20 July 2010.
- /55/ GETCO: Monthly Share Certificate issued by prepared by GETCO for the month from July 2010 to December 2010.
- /56/ Vish Wind Infrastructure LLP: Undertaking submitted to Ministry of Environment and Forest (DNA of India) that all the formalities to ensure transfer of lease pertaining to “Vaayu India power project in Gujarat” in favor of VIPCPL will be completed as per prevailing norms.

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

- Correction in post tax equity IRR calculation inline with the requirement of Guidelines on assessment of investment analysis version 03.1.
- Provision for monitoring the net electricity generation in order to calculate baseline emission has been formalized.
- Revision in sensitivity analysis inline with the requirement of Tool for the demonstration and assessment of additionality, version 05.2
- Detailed chronology for CDM consideration inline with the requirement of Guidelines on the demonstration and assessment of prior consideration of the CDM version 03.
- Inclusion of generation based incentive in post tax equity IRR calculation.



3.2 Follow-up interviews with project stakeholders

On 1 October 2010, DNV conducted the site visit of the project at project site. Representative of the project participant (VIPCPL) and project consultant (PwC) were interviewed to confirm the stated information and to resolve issues identified in the document review. The main topics of the interviews are summarized in the table below.

Date	Name	Organization	Topic
2010-10-01	Mr. Puneet Katyal Ms. Anushree Mishra Mr. Rohit Joshi	Vaayu (India) Power Corporation Private Limited	<ul style="list-style-type: none"> ➤ Proof of CDM consideration ➤ Applicability of methodology ➤ Review of project design and technology used. ➤ Review of monitoring and verification procedure, management structure of the organization. ➤ Environmental consents and permits. ➤ Review of the stakeholder consultation process. ➤ Operation & maintenance procedures. ➤ Determination of baseline. ➤ Third party assessment of PLF ➤ Emission reduction calculations and data used therein. ➤ Financial of the project activity. ➤ Benchmark analysis ➤ Common practice analysis
	Mr. Swarup Mohanti Mr. Neeraj Gupta	Price Waterhouse Coopers	

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



“Vaayu India Wind Power Project in Gujarat” in India is enclosed in Appendix A to this report.

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.

**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

<i>Role</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>						
				Administrative	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	TA 1.2 competence
Team leader (Validator)	Govindarajulu	Murali	India		✓	✓	✓	✓		✓
Validator	Srivastava	Gaurav	India	✓	✓		✓			✓
Assessor under training	Kaliaperumal	Thamizharasi	India		✓		✓			
Expert	Parthasarathy	Kannan	India		✓					✓
Technical reviewer	Tang	Zhiang	China						✓	✓

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 relate to the project design as documented and described in the PDD, version 3 dated 19 January 2011 /1/.

4.1 Participation requirements

The project is developed by Vaayu (India) Power Corporation Private Limited, a special vehicle incorporated by Enercon (India) Limited to set up wind power project in various states of India as verified by DNV from the Certificate of Incorporation dated 12 November 2009 /24/. The project is proposed as a unilateral project and no project proponent from Annex I Party has yet been identified. The host Party India meets all the requirements for participating in a CDM project. The Ministry of Environment and Forests, the DNA of India, has approved the project with a letter of approval dated 15 November 2010, which also confirms that the project assists in achieving sustainable development in India /27/. It has been cross checked from the CDM India website that the project has been approved by the DNA of India /39/.

No public funding from an Annex I Party is involved in the project and the validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards India.

4.2 Project design

The project activity envisages implementation of a 51.2 MW wind power project consisting of 64 WEGs of individual capacity 0.8 MW at Chattar, Narmana, Seth Wadala, Jam Ambardi, Mevasa, Dhun Dhoraji, Sadodar, Bodi, Padavala and Machharda villages in Jamnagar and Rajkot Districts of Gujarat state in India. Out of 64 wind energy generators (WEGs), 8 WEGs have been already commissioned /15/ /16/ and the remaining 56 WEGs are expected to be commissioned by 20 April 2011. All the WEGs in the project have been supplied by Enercon (India) Ltd /10/, which is also responsible for the operation, maintenance and management of the project. The technology used in the project activity is indigenously available in India and no transfer of technology is envisaged.

The geographical coordinates of project extends between latitude 21° 55' and 22° 08' N and longitude 70° 05' and 70° 19' E.

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 Gujarat. Proposed project is expected to export 115.312 GWh per year at a plant load factor (PLF) of 25.71% /14/. The plant load factor has been verified by DNV against independent third party generation estimation report prepared by Centre for Wind Energy Technology (an autonomous research and development institution under Ministry of New and Renewable Energy) dated 16 April 2010 /14/. DNV can confirm that the PLF assumed by project proponent is reasonable and is inline with the requirement of CDM EB Guidelines for the reporting and validation of plant load factors /32/.



The starting date of the project activity has been identified as 5 December 2009, which is the date of purchase order placed to Enercon India Limited for the wind turbines of the project activity /10/. As per the technical specification sheet provided by Enercon India Limited (manufacturer of WEGs) the lifetime of the project is 20 years /22/, which is reasonable for a WEG and has been cross checked by DNV against GERC tariff order dated 30 January 2010 /38/. The project has selected a fixed crediting period of 10 years with the start date of the crediting period to be 1 June 2011 (or on the date of registration of the CDM project activity, whichever is later). The project is expected to result in 106 378 tCO₂e emission reductions per annum over the 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 11 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” /29/. 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 of India and has been verified from (i) purchase order placed for the project activity dated 5 December 2009 /10/ and permission from Gujarat Energy Development Agency dated 26 March 2010, 2 July 2010 and 1 September 2010 /21/.
- 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 /36/.
- The project does not involve an on-site switch from fossil fuels to a renewable source.

The project activity being a renewable energy generation project, the rest of the applicability conditions as mentioned in the applied methodology ACM0002 version 11 do not apply to this project activity.

The assessment of the project’s compliance with the applicability criteria of ACM0002 version 11 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 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 /36/.

The selected sources and gases are justified for the project activity.

	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 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 11) /29/.

4.5 Baseline identification

Baseline Scenario: 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, as discussed later (in section B.4.4), the implementation of the project activity without CDM benefits faces investment barriers and hence the selected baseline scenario is that 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.

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 Gujarat 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”/31/, 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 at 0.92252 tCO₂e/MWh and is fixed *ex ante* for the entire fixed crediting period /36/. The CM emission factor value has been sourced from data by the Central Electricity Authority (CEA) of the Ministry of Power, Government of India /36/. CEA has published a database of carbon dioxide emission factors for the power sector in India based on detailed authentic information obtained from all operating power stations in the country. This CO₂ baseline database provides information about the OM and BM factors of all the regional electricity grids in India. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM baselines/36/. 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). 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 /23/. The OM in the CEA database is



calculated *ex-ante* using the simple OM approach based on the generation-weighted average emissions per electricity unit over a three year period of 2006-07, 2007-08 and 2008-09 /36/. BM is calculated *ex-ante* based on the 20% most recent capacity additions in the north east west and north-eastern regional grid of India based on net generation for the year 2008-09 /36/. The operating margin has been determined to be 1.00498 tCO₂e/MWh and the build margin to be 0.6752 tCO₂e/MWh /36/. DNV confirms that the database version 5 used to calculate the combined margin emission factor was the latest database available at the time of start of validation and the combined margin emission factor for the north east west and north-eastern regional grid of India is fixed *ex-ante* for the entire crediting period.

DNV confirms that the approved baseline methodology ACM0002 (version 11) 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 is demonstrated by applying the “Tool for demonstration and assessment of additionality”, version 5.2 /30/, and primarily through a financial analysis.

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

The starting date of the project activity has been identified as 5 December 2009, which is the date of purchase order placed to Enercon India Limited for the wind turbines of the project activity /10/. The wind farm is operated and maintained by the WEG supplier and any civil work or transmission network can only be started after the placement of purchase order project for the wind turbines. Hence the start date defined for the project activity is appropriate and in line with the EB guidance on start date of project activity /35/.

Since the start date of the project activity is after 2 August 2008, the project proponent through an email communication has notified the DNA of India on 11 March 2010 /6/ and UNFCCC secretariat on 7 April 2010 /7/, regarding their intentions to apply for CDM for the project activity. On 15 March 2010 project proponent had received the acknowledgement email from DNA of India /26/ and on 12 May 2010 the acknowledgement from UNFCCC secretariat /40/. DNV has also evidenced the CDM consideration from the board approval dated 28 November 2009 /5/ for the project activity, which is before the starting date of the project activity which clearly states that *“project would not be financially viable on a stand alone basis by sale of electricity and the director informed the board that the risk posed to the project activity could be mitigated through Clean Development Mechanism of UNFCCC, which provides additional revenue stream to clean energy projects through the sale of certified emission reductions and the project could still be a viable investment if the benefits of CDM can be availed”*. CDM was therefore found to be seriously considered in the decision to proceed with the project activity.



The PDD was web hosted on UNFCCC site for global stakeholder commenting process on 12 August 2010, which is within four months of informing to UNFCCC. Sufficient actions to secure CDM status were 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 considered as the baseline scenario. These are i) the project activity without CDM benefits and ii) continuation of current scenario, in this case that 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 alternatives are in compliance with the laws and regulations of India and might be considered as baseline scenarios.

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 is considered justified for demonstrating the additionality of the project.

Benchmark selection

The benchmark selected for the project activity is as per the CDM EB guidance on assessment of investment analysis /33/. The project activity is electricity generation based on wind energy which could be developed by an entity other than project participant. The benchmark should thus be based on publicly available data sources. The financial indicator applied for the project activity is equity IRR and the benchmark used for the project activity is required rate of return on equity for the project calculated using the Capital Asset Pricing Model (CAPM). As per CAPM, the required return on equity investment is the return of a risk-free security plus beta times the difference between the market return and the risk-free return. The Government Securities have been taken to represent the risk free return. Stock index has been used to represent the market return. Power Industry specific beta value is applied to represent the market returns relevant to the risk of the project activity sector. The suitability of the benchmark and the appropriateness of the calculations adopted has been verified and accepted based on Financial Management: *Theory and Practice* book written by Professor Prasanna Chandra (Director, Centre for Financial Management and ex professor of finance at IIM-Bangalore) /41/. The key parameters of the CAPM model have been calculated as follows:

- An average government bond rate (risk free rate) applicable at the time of investment decision (in November 2009) for long term investment (for 20 years) has been considered. The project participant has sourced this value ($R_f = 7.98\%$ for the period from June 2009 to September 2009) from the monthly bulletin on government securities market published by Reserve Bank of India. Reserve Bank of India is the central controlling bank and its database is an official source of information in India. DNV accepted this value as it has been sourced directly from the RBI report and was latest at the time of investment decision. DNV has further cross checked historical



- value for average risk free rates in India for the 5 years preceding the project investment decision /43/ confirming that the chosen value is reasonable.
- The time period of five year considered for equity beta value calculation is justified as per Credit Rating Information Services of India limited (CRISIL) recommendations to CERC /45/ and it was recommended by financial experts in the report that, for such economies, and for companies whose capital structure and operating environment has been changing, the time period over which equity beta is calculated should be small, as in case of power sector in India which went significant restructuring after electricity act 2003. This ensures that the risk profile of the company vis-à-vis the market is relatively stable over the term over which equity beta is being calculated.
 - Market return ($R_m = 15.55\%$) or Compound Accumulated Growth Rate (CAGR): In India the market return can be calculated from the following available indices: (i) BSE-Sensex, (ii) BSE-200 (iii) BSE-500 and (iv) BSE 100. Hence the project proponent has calculated the market return from all these indices from the start date of the indices till date of investment and the minimum market return indices has been used for the market return calculation /44/. The minimum market return was offered by BSE 200 (15.5%) /44/ and hence conservatively same has been applied for the benchmark calculation.
 - The average raw equity beta value of 1.17 (coefficient reflecting the volatility of the stock relative to the market) is calculated over the period of five year (31 October 2004 to 25 October 2009) using BSE index of the market portfolio for the companies in the power sector that were listed at the time of decision making: Tata Power (1.029), CESC limited (1.105), Reliance Energy (1.569), Gujarat Industries (0.961) and Energy Development (1.187). These values were sourced from Bloomberg web site and screenshots of the same are provided in Appendix 3 of PDD /1/.
 - Though the principles of corporate finance require that equity Beta need to be adjusted to reflect the change in financing mix between the project and the listed power companies, since the debt equity ratios of the power company's listed at the stock exchanges were lower than that of the project activity, any adjustment on account of change in debt equity ratio will result in a higher equity beta value (2.13) which in turn will result in higher benchmark (24.11%) /4/, DNV has accepted the use of average raw equity beta value instead of adjusted equity beta values.

Based on Capital Asset Pricing Model expected cost of equity works out to be 16.84% /4/. The expected cost of equity calculation has been verified by DNV and was found to be correct.



Input parameters

The input parameters used in the financial analysis of the project activity have been sourced from the detailed project report prepared by project proponent dated 25 November 2009 /9/. The input parameters used in detailed project report were either sourced from budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/ or Gujarat Electricity Regulatory Commission draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue” dated 17 June 2009 /46/. All the input parameters used for investment analysis except plant load factor, which is sourced from independent third party electricity generation estimation report, prepared by Centre for Wind Energy Technology (an autonomous research and development institution under Ministry of New and Renewable Energy) dated 16 April 2010, have been sourced from detailed project report of 25 November 2009 /9/.

DNV has accepted the application of plant load factor of 25.71% as provided in independent third party generation estimation report, prepared by Centre for Wind Energy Technology (an autonomous research and development institution under Ministry of New and Renewable Energy) as:

- a) Application of this value for investment analysis is more conservative.
- b) This is based on the generation estimate provided by independent third party Centre for Wind Energy Technology (an autonomous research and development institution under Ministry of New and Renewable Energy), inline with Para 3 (b) of UNFCCC guidelines for the reporting and validation of plant load factors version 01 /32/.

Inline with the requirement of VVM Para 111, a detailed assessment of input parameters used for input parameters is provided below:

Input parameter	Values provided in DPR	Source for DPR Value	Reference used by DNV for cross checking
Technical Parameters			
Capacity of machine in kW	800 kW	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	The capacity of individual machine has been verified against the purchase order placed to Enercon India Limited for the project activity dated 5 December 2009 /10/ and the technical specification sheet for the E 53 model /22/.
Number of Machines	64	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	The total number of machine has been verified against the purchase order placed to Enercon India Limited for the project activity dated 5 December 2009 /10/.
Capacity of the project in MW	51.2 MW	Calculated as a product of number of machines and capacity of individual machine (WEG).	Calculated as a product of number of machines and capacity of individual machine (WEG).
Operational Parameters:			



Plant Load Factor	25.71%	<p>The plant load factor provided in the detailed project report is 25.40%, which was based on the Electricity generation guarantee provided in budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.</p>	<p>The plant load factor provided in the detailed project report is 25.40%, which was based on the Electricity generation guarantee provided in budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.</p> <p>However the investment analysis is conducted based on the plant load factor of 25.71% as provided in independent third party generation estimation report, prepared by Centre for Wind Energy Technology (an autonomous research and development institution under Ministry of New and Renewable Energy). This is inline with Para 3 (b) of UNFCCC guidelines for the reporting and validation of plant load factors version 01 “plant load factor determined by a third party (engineering company) contracted by the project participants” /32/.</p> <p>DNV has accepted the application of plant load factor of 25.71% as provided in independent third party generation estimation report as</p> <p>a) Application of this value for investment analysis is more conservative.</p> <p>b) This is based on the generation estimate provided by independent third party.</p>
Insurance charges (% of project cost)	0.12%	<p>The insurance cost considered is detailed project report was considered based on the insurance quotation received from United India Insurance Company Limited dated 27 October 2009 /47/.</p>	<p>The GERC tariff order does not provide separate value for insurance charges. GERC tariff order considers insurance charges as a part of O & M cost and provides 1.5% of the total project cost as O & M cost /38/. DNV has cross checked that after considering insurance charges with operation and maintenance cost the total cost is 1.42% of the project cost which is below than the O & M cost provided in GERC order (1.5% of the project cost).</p> <p>DNV has also cross-checked the insurance cost considered for the project activity against the insurance cost considered by various other CDM projects (UNFCCC Ref No: 3611, 3142, 2819 & 3854 and the value found to be</p>



			0.18% of the project cost, hence the value considered in the DPR was found to be reasonable.
O & M cost (% of project cost)	1.30%	The O & M cost considered in the detailed project report was based on the offer received from Enercon India limited (O & M contractor for the project) dated 20 November 2009 /8/.	GERC tariff order considers insurance charges also as a part of O & M cost and provides 1.5% of the total project cost as O & M cost /38/. DNV has cross checked that after considering this value with operation and maintenance cost the total cost is 1.42% of the project cost which is below than the O &M cost provided in GERC order (1.5% of the project cost). Hence the value considered in the DPR was found to be reasonable.
Annual escalation in O & M cost (in %)	6%	The annual escalation in operation and maintenance cost considered in the detailed project report was based on the offer received from Enercon India limited (O & M contractor for the project) 20 November 2009 /8/.	GERC tariff order recommends 5% annual escalation in operation and maintenance costs /38/. However, DNV has assessed that even after considering 0% annual escalation in operation and maintenance costs the equity IRR for the project activity (9.24%) remains below that the benchmark applied for the project /3/.
Project Revenue			
Electricity tariff (in INR/kWh)	3.55 INR/kWh fixed for 20 years without any escalation	The electricity tariff considered in detailed project report was based on the GERC draft tariff regulation of 17 June 2009 /46/.	The electricity tariff considered in detailed project report was based on the GERC draft tariff regulation of 17 June 2009 /46/. However this tariff was revised to 3.56 INR/kWh in GERC final tariff order dated 30 January 2010 /38/. DNV has cross-checked the electricity tariff applicable for the project activity against the power purchase agreement signed on 10 June 2010, 7 July 2010 respectively and 06 January 2011 /17/ and sales invoices raised to Gujarat Urja Vikas Nigam Limited /48/ and found that the applicable tariff rate for the project activity is 3.56 INR/kWh (VAT is not applicable for sale of electricity as can be verified from recent sales invoice raised to Gujarat Urja Vikas Nigam Limited that no tax has been included in the invoice). DNV has cross checked from the GERC final tariff order dated 30 January 2010 /38/ and power purchase agreement dated



			<p>10 June 2010, 7 July 2010 respectively and 06 January 2011/17/ that this electricity is fixed for 20 years without any escalation.</p> <p>DNV has assessed that even after considering revised tariff of 3.56 INR/kWh the equity IRR for the project activity (8.14%) remains below that the benchmark applied for the project /3/.</p>
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.	<p>Ministry of new and renewable energy sources, government of India offers two types of incentives for wind power projects /49/, project activity can claim any one out of these two:</p> <p>a) 80% accelerated depreciation under the Income Tax Act /50/.</p> <p>b) Generation based incentives (GBI) of 0.5 INR/kWh with cap of 6.2 Million INR/MW of installed capacity. This 6.2 Million INR/MW can be claimed in a period not less than 4 years and a maximum period of 10 years /49/.</p> <p>The project activity has applied for generation based incentives and it has been verified by DNV that project proponent can avail only under one scheme as project proponent have to intimate first to Ministry about the option opted and ministry have procedure in place to track that project can avail benefit under one scheme only.</p>
Project Cost for 64 Wind Energy Generators:			
Machine cost in million INR (for 64 WEGs cost)	2105.60	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	<p>The total machine cost (for 64 WEGs) considered in the detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/, however the total machine cost was only found to be 1952 million INR and has been verified by DNV from the actual purchase order placed to Enercon India limited dated 5 December 2009 /10/.</p> <p>The effect of reduction of this cost has been considered in sensitivity analysis (while cross checking the equity IRR based on the actual project cost).</p>
Concrete tower	379.52	Budgetary offer received	The total concrete tower cost (for 64



cost in million INR (for 64 WEGs)		from Enercon (India) Limited dated 20 November 2009 /8/.	WEGs) considered in the detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/, however the total concrete tower cost was only found to be 352 million INR and has been verified by DNV from the actual purchase order placed to Enercon India limited dated 5 December 2009/10/. The effect of reduction of this cost has been considered in sensitivity analysis (while cross checking the equity IRR based on the actual project cost).
Distribution transformer cost in million INR (for 64 WEGs)	158.72	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	The total distribution transformer cost (for 64 WEGs) considered in the detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/, however the total distribution transformer cost was only found to be 147.20 million INR and has been verified by DNV from the actual purchase order placed to Enercon India limited dated 5 December 2009 /10/. The effect of reduction of this cost has been considered in sensitivity analysis (while cross checking the equity IRR based on the actual project cost).
Civil works, foundation and electrical lines cost in million INR (for 64 WEGs)	103.68	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	The total civil works, foundation and electrical lines cost (for 64 WEGs) considered in the detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/, however the total civil works, foundation and electrical lines cost was only found to be 96 million INR and has been verified by DNV from the actual purchase order placed to Enercon India limited dated 5 December 2009/10/. The effect of reduction of this cost has been considered in sensitivity analysis (while cross checking the equity IRR based on the actual project cost).
Erection, commissioning, insurance and	103.68	Budgetary offer received from Enercon (India) Limited dated 20	The total erection, commissioning, insurance and other works cost (for 64 WEGs) considered in the detailed project



other works cost in million INR (for 64 WEGs)		November 2009 /8/.	report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/, however the total erection, commissioning, insurance and other works cost was only found to be 96 million INR and has been verified by DNV from the actual purchase order placed to Enercon India limited dated 5 December 2009/10/. The effect of reduction of this cost has been considered in sensitivity analysis (while cross checking the equity IRR based on the actual project cost).
Land and Transportation charges cost in million INR (for 64 WEGs)	76.16	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	The total land and transportation cost (for 64 WEGs) considered in the detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/, however the total land and transportation cost was only found to be 70.4 million INR and has been verified by DNV from the actual purchase order placed to Enercon India limited dated 5 December 2009/10/. The effect of reduction of this cost has been considered in sensitivity analysis (while cross checking the equity IRR based on the actual project cost).
Transfer of Development right charges in million INR (for 64 WEGs)	110.72	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	The total transfer of development right charges (for 64 WEGs) considered in the detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/, however the total Transfer of Development right charges was only found to be 102.4 million INR and has been verified by DNV from the actual purchase order placed to Enercon India limited dated 5 December 2009/10/. The effect of reduction of this cost has been considered in sensitivity analysis (while cross checking the equity IRR based on the actual project cost).
Total project cost in million INR (for 64 WEGs)	3038.08	Budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.	The total project cost of 3038.08 million INR considered in DPR was calculated based on the summation of machine cost, concrete tower cost, distribution



			<p>transformer cost, Civil works, foundation and electrical lines cost, Erection, commissioning, insurance and other works cost, land and transportation charges cost and transfer of development right charges for 64 WEGs provided in budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/.</p> <p>However based on the actual purchase order placed to Enercon India limited dated 5 December 2009 the total project cost was verified to be 2 816 million INR (summation of actual machine cost, concrete tower cost, distribution transformer cost, Civil works, foundation and electrical lines cost, Erection, commissioning, insurance and other works cost, land and transportation charges cost and transfer of development right charges for 64 WEGs) /10/.</p> <p>However, DNV has assessed that even after considering the actual project cost of 2 816 million INR, the equity IRR for the project activity (10.03%) remains below that the benchmark applied for the project /3/.</p>
Means of Finance:			
Equity in %	30%	The debt equity ratio of 70:30 considered in detailed project report was based on the debt equity ratio recommended by in its GERC draft order on "Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue" dated 17 June 2009 /46/.	DNV has cross-checked the debt equity ratio of 70:30 considered in detailed project report with actual debt equity ratio provided in the loan agreement signed with IDFC dated 30 April 2010 /12/ and the value was found to be consistent.
Debt in %	70%	The debt equity ratio of 70:30 considered in detailed project report was based on the debt equity ratio recommended by in its GERC draft order on	DNV has cross-checked the debt equity ratio of 70:30 considered in detailed project report with actual debt equity ratio provided in the loan agreement signed with IDFC dated 30 April 2010 /12/ and the value was found to be



		“Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue” dated 17 June 2009 /46/.	consistent.
Terms of loan			
Interest rate	11.5%	The interest rate considered in detailed project report was based on the average prime lending rate (11%-12%) proposed by reserve bank of India (applicable at the time of investment decision) /51/.	DNV has cross checked the interest rate considered in detailed project report against the interest rate applicable to the project, provided in the loan agreement signed with IDFC dated 30 April 2010 and the actual value was found to be 11.11% /12/. However, DNV has assessed that even after considering the actual interest rate applicable to the project, the equity IRR for the project activity (8.27%) remains below that the benchmark applied for the project /3/.
Loan tenure	10	The loan tenure considered in detailed project report was based on the GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue” dated 17 June 2009 /46/.	The actual loan tenure was found to be 12 years and has been verified by DNV from the loan agreement signed with IDFC dated 30 April 2010 /12/. The effect of reduction of interest rate has been considered in sensitivity analysis. However, DNV has assessed that even after considering actual loan tenure of 12 years applicable to the project, the equity IRR for the project activity (7.92%) remains below that the benchmark applied for the project /3/.
Depreciation Rate			
Depreciation rate (based on written down value as per Income Tax Act)	15%	The Depreciation rate (based on written down value) considered in DPR was based on the Income Tax act.	DNV has verified from the income tax act that the Depreciation rate (based on written down value) applied is inline with Income Tax Act 1961 of India /15/.
Book depreciation rate (as per straight line method) on all assets	4.5%	As per GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and	DNV has verified from the GERC final order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues dated 30 January 2010” /38/ the lifetime of WEGs



		other commercial issue” dated 17 June 2009 /46/, the lifetime of WEGs is 20 years and depreciation can be claimed for 90% of the asset.	is 20 years and depreciation can be claimed for 90% of the asset. Hence Book depreciation rate of 4.5% (as per straight line method) has been calculated considering 20 years lifetime of WEGs and depreciation of 90% of the asset (except land).
Book depreciation up to (% of asset value)	90%	As per GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue” dated 17 June 2009 /46/, depreciation can be claimed for 90% of the asset (except land).	DNV has verified from the GERC final order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues dated 30 January 2010” /38/ that depreciation can be claimed for 90% of the asset (except land).
Salvage Value	10%	A salvage of 10% has been considered in investment analysis and same has been added back in last year cash flow this is inline with the guidance provided by GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue” dated 17 June 2009 /46/.	A salvage of 10% has been considered in investment analysis and same has been added back in last year cash flow this is inline with the guidance provided by GERC final order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues dated 30 January 2010” /38/.
Income Tax Rates:			
Corporate Tax	33%	As per Indian Income Tax Act 1961/52/.	As per Indian Income Tax Act 1961/52/.
Minimum Alternative Tax	17%	As per Indian Income Tax Act 1961/52/.	As per Indian Income Tax Act 1961/52/.
Working Capital			
Receivables (no of days)	30	As per GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue” dated 17 June 2009 /46/.	DNV confirms that the value applied is consistent with GERC final order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues dated 30 January 2010” /38/.
O & m	90	As per GERC draft order	DNV confirms that the value applied is



expenses (no of days)		on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issue” dated 17 June 2009 /46/.	consistent with GERC final order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues dated 30 January 2010” /38/.
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DNV has also checked that even after considering the actual project cost, actual tariff as provided in PPA, actual interest rate and loan tenure, the equity IRR for the project works out to be 10.38% which is still below than the benchmark adopted by the project proponent.

Calculation and conclusion

The equity IRR calculations and assumptions provided in a spreadsheet are consistent with the values provided in the detailed project report and have been cross checked by DNV. The calculations were verified and found to be in line with CDM EB’s guidance on assessment of investment analysis /33/. For the purpose of tax computation the project participant has considered the tax benefits from interest payments /3/. The assumptions used in the calculations are appropriate and have been verified by DNV. The equity IRR of the project over 20 years is 8.07% without the income from CERs /3/. The project is therefore not financially attractive compared to the benchmark of 16.84% in the absence of CDM benefits. CDM revenues, improves the financial viability of project (15.78% equity IRR).

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 project cost, annual operation & maintenance costs, annual electricity generation, electricity tariff, debt equity ratio and loan tenure were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen.

Decrease in capital cost: the total project cost considered in detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009 /8/. However the total project cost for the project activity was verified to be only 2816 million INR and has been verified by DNV from the actual purchase order placed to Enercon India Limited dated 5 December 2009 /10/. Even after considering the actual project cost, the equity IRR for the project works out to be 10.03% which is still below than the benchmark. With a decrease in investment cost by 25.9% (from the cost considered in DPR, available at the time of investment decision) the equity IRR becomes 16.85% thus exceeds the benchmark. However in DNV’s opinion a decrease of 25.9% in project cost is unrealistic as the purchase order is already placed; hence any decrease in project cost is not realistic.

Increase in electricity tariff: The electricity tariff considered in detailed project report was based on the GERC draft tariff regulation of 17 June 2009 /46/, applicable at the time of investment decision. However DNV has verified from the actual power purchase agreement signed dated 10 June 2010, 7 July 2010 respectively and 06 January 2011 /17/ and recent sales invoices raised to Gujarat Urja Vikas Nigam Limited /48/ that the applicable tariff rate for the project activity is 3.56 INR/kWh without any escalation and is fixed for 20 years (kWh (VAT is not applicable for sale of electricity as can be verified from recent sales invoice



raised to Gujarat Urja Vikas Nigam Limited that no tax has been included in the invoice). This was based on the GERC final tariff order dated 30 January 2010 /38/. Even after considering the electricity tariff of 3.56 INR/kWh the equity IRR for the project works out to be 8.14% which is still below than the benchmark /3/. With an increase of 38% in electricity tariff the equity IRR becomes 16.85% thus exceeds the benchmark. However in DNV's opinion an increase of 38% in electricity tariff is highly unlikely as the power purchase agreement for the project activity is already signed for the project and the tariff is fixed for 20 years without any escalation /17/.

Increase in plant load factor: With an increase in generation by 37.1% (at 35.25% PLF) the equity IRR becomes 16.86% and thus exceeds the benchmark. The PLF of 25.71% considered in the financial analysis is based on the electricity generation estimates for the project activity provided by an independent third party (entre for Wind Energy Technology) report for Enercon India Limited make WEGs (E-53, 800 kW) dated 16 April 2010 /14/.

Enercon India Limited, supplier of WEGs has only provided the generation guarantee based on the 25.4% PLF in its budgetary offer dated 20 November 2009 /8/. Moreover the Gujarat Electricity Regulatory Commission (GERC) has considered an average PLF of 23% in its final tariff order dated 30 January 2010 /38/ for the purposes of tariff working. Hence an increase of 37.1% in electricity generation to achieve a PLF of 35.25% is highly unlikely.

Decrease in O&M cost: Even with no O&M costs the equity IRR for the project activity is 11.44%, which is lower than the benchmark return. Hence this parameter is not sensitive for the project activity.

Increase in debt equity Ratio: the debt equity ratio of 70:30 considered in detailed project report was based on the GERC draft order on "Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues" dated 17 June 2009 /46/. Even after considering the scenario of project activity could have been financed 100% from equity (7.85%) or 100% loan (8.16%) the equity IRR from the project activity is below benchmark. Hence this parameter is not sensitive for the project activity.

Loan tenure: The loan tenure considered in detailed project report was based on the GERC draft order on "Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues" dated 17 June 2009 /46/. However the actual loan tenure was found to be 12 years and has been verified by DNV from the loan agreement signed with IDFC dated 30 April 2010 /12/. Even after considering the actual loan tenure, the equity IRR for the project works out to be 7.92% which is below than the benchmark. Hence this parameter is not sensitive for the project activity.

Hence the project activity is financially not viable without the benefits from CDM.

4.6.4 Common practice analysis

In India, the regulatory environment for the power sector in general and renewable energy in particular is governed by the policies, regulations and tariff orders implemented at the state level, albeit derived from those by the central government. The geographical scope of common practice analysis should be at the state level. The state of Gujarat has been considered for assessing the common practice. DNV considers the selection of the region is appropriate. All the wind power projects with capacity more than 15 MW size (comparable size) in state of Gujarat were considered for common practice analysis, and it has been



verified by DNV from the wind power directory 2009 /53/, that in state of Gujarat 697.815 MW capacity is added by wind power projects with capacity more than 15 MW size (comparable size) and this entire 697.815 MW capacity is under CDM pipeline and has been verified by DNV from the UNFCCC website (web-links for all these projects are included in PDD under common practice analysis section). A list of these projects with CDM links has been included in section B.5 of the PDD and same has been verified by DNV /1/.

In conclusion, it is DNV's opinion that it has been correctly demonstrated that the project activity does not represent a common practice and thus the emission reductions achieved by the project are additional to any would happen in absence of the project.

4.7 Monitoring

The project monitoring plan is in compliance with the monitoring methodology ACM0002 (version 11) /29/. The monitoring plan will give opportunity for real measurement of emission reductions achieved. Since the project is a wind energy generation activity, no indicators have been defined regarding project emissions. Leakage accounting has not been considered for the project since the renewable energy technology equipment used is new equipment and not transferred from another activity.

It is DNV's opinion, that the project participant is able to implement the monitoring plan.

As required by DNA of India project proponent has committed to spend 2% percentage of the CERs revenue every year for Sustainable Development including society/community development. The monitor-able action plan for the same has been included in section B.7.1 of the PDD. DNV has verified from the commitment and monitor-able action plan made by project proponent from the undertaking submitted to DNA of India by project proponent dated 20 July 2010 /54/.

4.7.1 Parameters determined ex-ante

The combined margin emission coefficient for the north east west north eastern grid of India has been calculated at 0.92252 tCO₂e/MWh (considering OM and BM at a weight of 75:25), and is fixed *ex-ante* for the entire crediting period. The CM emission factor value has been sourced from data by the Central Electricity Authority (CEA) of the Ministry of Power, Government of India /36/. CEA has published a database of carbon dioxide emission factors for the power sector in India based on detailed authenticated information obtained from all operating power stations in the country /36/. This CO₂ baseline database provides information about the OM and BM factors of electricity grids in India, which has been established as per the "Tool to calculate the emission factor for an electricity system" /31/. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM baselines and the OM in the CEA database is calculated *ex-ante* using the simple OM approach based on the generation-weighted average emissions per electricity unit over a three year period of 2007-08, 2007-08 and 2008-09 /31/. BM is calculated *ex-ante* based on the 20% most recent capacity additions in the grid based on net generation for the year 2008-09 /31/. The operating margin has been determined to be 1.00498 tCO₂e/MWh and the build margin to be 0.6752 tCO₂e/MWh /31/. DNV confirms that the database version 5 used to calculate the combined margin emission factor was the latest database available at the time of start of validation and the combined margin emission factor for the north east west north eastern grid of India is fixed *ex-ante* for the entire crediting period.



4.7.2 Parameters monitored ex-post

The net electricity generated will be calculated from the readings of export and import indicated by the main GETCO meter (also known as revenue meter) at the Sadodar substation maintained by Enercon (India) Limited. During the site visit interview it was observed that wind turbines installed by the project proponent and wind turbines installed by other project owners will be connected to the same main meter. However the WEGs of a single customer (VIPCPL in this case) are divided into clusters and each cluster has dedicated metering system. Different clusters are connected to different Vacuum Circuit Breaker metering yards (VCB) which ultimately lead to the shared main GETCO meter (also known as revenue meter) at the Sadodar substation maintained by Enercon (India) Limited. The meter reading at these metering points will be taken jointly by the representatives of Enercon and GETCO in the form of Joint Meter Reading and Gujarat Electricity Development Authority (GEDA) will apportion the net electricity supplied to the grid at the Enercon substation to all the project owners after adjusting the transmission losses to the meter readings taken at dedicated cluster meters of different project owners. Based on which GETCO will issue a share certificate to each project owner for net electricity exported to the grid and each project owner raises sales invoices to the state electricity board based on the net electricity figures provided in the share certificates /55/. Hence net electricity generation figures provided in the share certificate will be used for emission reduction calculation and same will be cross checked against the sales invoices raised to SEB. The procedures for metering defined above are inline with the provisions of the power purchase agreement /17/.

Hence the net electricity supplied by the project activity (by all WEGs of project activity) to the north east west north eastern grid will be calculated as:

Net Electricity Exported to the grid by the project activity will be calculated as:

$$EGPJ_y = EGPJ_{\text{export},y} - EGPJ_{\text{Import},y}$$

Where,

$EGPJ_y$ = Net Electricity exported by the project activity to the grid (by all the WEGs of the project activity)

$EGPJ_{\text{export},y}$ = Electricity exported by the project activity to the grid (by all the WEGs of the project activity)

$EGPJ_{\text{import},y}$ = Electricity imported from the project activity to the grid (by all the WEGs of the project activity)

Electricity Exported to the Grid by the project activity will be calculated as:

$$EGPJ_{\text{export},y} = EG_{\text{GETCO, Export}} \times EG_{\text{Cluster, Export}} / EG_{\text{Cluster, WF, Export}}$$

Where,

$EG_{\text{GETCO, Export}}$ = Electricity exported, as recorded by the main meter at Enercon substation



$EG_{\text{Cluster, Export}}$ = Electricity exported by the project activity, as measured at Cluster Meter

$EG_{\text{Cluster, WF, Export}}$ = Electricity exported by all the project owners connected to Enercon substation, as provided in shared certificate issued by GETCO.

Electricity Imported to the Grid by the project activity will be calculated as:

$$EG_{\text{PJ, Import, y}} = EG_{\text{GETCO, Import}} \times EG_{\text{Cluster, Import}} / EG_{\text{Cluster, WF, Import}}$$

Where,

$EG_{\text{GETCO, Import}}$ = Electricity imported, as recorded by the main meter at Enercon substation

$EG_{\text{Cluster, Import}}$ = Electricity imported by the project activity, as measured at Cluster Meter

$EG_{\text{Cluster, WF, Import}}$ = Electricity imported by all the project owners connected to Enercon substation, as provided in shared certificate issued by GETCO.

The main meters installed at the Enercon substation will be sealed by GEDA and will be calibrated annually. If during meter calibration the main meter at the Enercon substation is found beyond the permissible limit of error, the meter reading will be taken from the main meter located at the utility (GETCO) substation at Moti Panelli after addition of average historical transmission losses.

If during meter testing the cluster meters are found beyond the permissible limit of error, the sum of panel meter (LCS meter) readings located at each wind turbine of the project activity will be provided to GEDA for purpose of apportioning net electricity supplied to the grid. The LCS meters do not require calibration as the energy readings of electricity generated at the LCS meter is cross verified by the energy calculated by inverting system installed in the WEGs. In case there is any mismatch in the energy values recorded by the LCS meter and the energy values calculated by the inverting system; the machine will stop working and generate the error report. The WEG can be restarted only after the defective LCS meter is replaced with a new one by the operations and maintenance staff.

The QA/QC responsibility of individual tower reading lies with Enercon India Limited (O and M contractor for the wind farm). Enercon India Limited is an ISO 9001:2000 certified company and follows documentation practices to ensure the reliability and availability of data for all the activities as required from the site identification, logistic, construction commissioning, operation, maintenance of the wind farm and have well established monitoring, recording and archiving system in place. 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 monitoring is required for project emissions or leakages due to the project activity.



4.7.3 Management system and quality assurance

The responsibility of overall project management lies with is Vaayu (India) Power Corporation Private Limited. The main and check meters at the uploading station are two way meters with an accuracy class of 0.2% and are in custody of State Electricity Board. The readings in these meters are taken by State Electricity Board officials and used for billing purposes and will be used for calculation for the emission reductions from the project activity. These meters are annually tested and calibrated by officials of State Electricity Board. The monthly electricity sales receipts will also be archived until 2 years after the crediting period to facilitate cross-checking during the crediting period.

4.8 Algorithms and/or formulae used to determine emission reductions

The GHG emission calculations are well documented in line with the consolidated baseline and monitoring methodology ACM0002, version 11 /29/. The project is electricity generation from the wind power and no project emissions and leakage is associated with the project activity. As the project activity supplies electricity to the north east west north eastern grid of India, the baseline emissions have been estimated based on net electricity supplied to the grid by the project activity and the combined margin emission factor of north east west north eastern grid of India. In line with the guidance provided in the Tool to calculate the emission factor for an electricity system /31/, the weights for OM and BM have been taken as 75:25. The CM for the north east west north eastern grid of India has been calculated at 0.92252 tCO₂e/MWh in section 4.5.1 and is fixed *ex-ante* for the entire fixed crediting period.

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average *ex-ante* estimation of emission reduction conservatively calculated to be 106 378 tCO₂e per year for the selected crediting period.

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

No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

4.9 Environmental impacts

As per the Ministry of Environment and Forests (MoEF), India Environment Impact Notification S.O. 1533 dated 14 September 2006 /37/, 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 /37/.

4.10 Comments by local stakeholders

The local stakeholders were invited through local newspaper advertisement in Naubat on 23 January 2010 by Vaayu (India) Power Corporation Private Limited, the project proponent for



the project activity /18/. The local stakeholder meeting for the project activity was conducted at Jamnagar District in Gujarat on 9 February 2010 /19/. The authorities of the local administration, local communities, farmers, officials of Gram Panchayat and contractors were invited to comment on the project activity. Detailed minute of meeting, along with list of attendees with their signature and photographs have been verified by DNV /19/. A detailed description of stakeholder consultation has been provided in section E of PDD.

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

4.11 Comments by Parties, stakeholders and NGOs

The PDD, version 1 dated 17 July 2010 /1/ 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 12 August 2010 to 10 September 2010.

No comment was received during the 30 days period.

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* <http://cdm.unfccc.int/Projects/Validation/DB/PD9Y4V34BLRUET5SMJD5FTAMYXPD92/view.html>

APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion
About Parties		
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC. 	Kyoto Protocol Art.12.2.	CAR1 OK
<ul style="list-style-type: none"> 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	CAR1 OK
<ul style="list-style-type: none"> 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	CAR1 OK
<ul style="list-style-type: none"> 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	No Public Funding is involved in project.
<ul style="list-style-type: none"> Parties participating in the CDM shall designate a national authority for the CDM. 	CDM Modalities and Procedures §29	OK
<ul style="list-style-type: none"> The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol. 	CDM Modalities §30/31a	OK
<ul style="list-style-type: none"> The participating Annex I Party's assigned amount shall have been calculated and recorded. 	CDM Modalities and Procedures §31b	OK
<ul style="list-style-type: none"> 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		
<ul style="list-style-type: none"> 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 that would have occurred in the absence of the registered CDM project activity. 	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	CL1 to CL5, CAR3 CAR4 CAR5 OK

Requirement	Reference	Conclusion
About forecast emission reductions and environmental impacts		
<ul style="list-style-type: none"> 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		
<ul style="list-style-type: none"> 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		
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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		
<ul style="list-style-type: none"> The baseline and monitoring methodology shall be previously approved by the CDM Executive Board. 	CDM Modalities and Procedures §37e	OK
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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
<ul style="list-style-type: none"> 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	<input checked="" type="checkbox"/> Clearly identifiable title of the project activity <input checked="" type="checkbox"/> Version number of the PDD is included <input checked="" type="checkbox"/> Date of the PDD is included.		OK
A.1.2 Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	<input checked="" type="checkbox"/> Yes		OK
A.2 Description of the project activity (VVM Para 58-64)					
A.2.1 How was the design of the project assessed?	/1/ /8/ /9/ /10/ /12/ /14/ /15/ /16/ /17/ /22/	DR/I	<i>What type is the project?</i> <input type="checkbox"/> Project in existing facility or utilizing existing equipment(s) <input type="checkbox"/> Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO ₂ e per year. In this case, a site visit must be performed. <input type="checkbox"/> Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO ₂ e 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 analysis. <input type="checkbox"/> The project is an individual small scale project activity with emission reductions		OK

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

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>not exceeding 15 000 tCO₂e per year. In this case, DOE may not conduct a physical site visit as appropriate.</p> <p><input checked="" type="checkbox"/> Greenfield project</p> <p><i>How was the design of the project assessed?</i></p> <p><input checked="" type="checkbox"/> Physical site inspection</p> <p><input checked="" type="checkbox"/> Reviewing available designs and feasibility studies</p> <p>The proposed CDM project activity is installation of 64 numbers of Wind Energy Generators (51.2 MW) each of 800 kW capacities (E-53). At the time of validation visit, out of 64 WEGs only 8 WEGs were commissioned.</p> <p>The E 53 type of WEG to be installed as part of this project has been designed by Enercon India Limited.</p> <p>Enercon India Limited will also be responsible commissioning, operation and maintenance of the project activity.</p> <p>The electricity generated will be exported to the NEW & NE grid of India.</p>		
A.2.2 If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/ /15/ /16/ /17/ /20/ /21/	DR/I	<p>The project is a Greenfield project and at the time of validation visit, out of 64 WEGs only 8 WEGs were commissioned.</p> <p>The project activity is installation of 64 numbers of Wind Energy Generators (51.2 MW) each of 800 kW capacities (E-53 model).</p> <p>PP has started commissioning of WEGs on 6 July 2010 onwards and as on 01 October 2010, only 8 WEGs have been commissioned out of 64 WEGs.</p>		OK

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

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>However the following needs to be included in the PDD</p> <ul style="list-style-type: none"> ➤ The unique identification number of all 64 WEGs and their geographical co-ordinates. ➤ Name of the substations to which the WEGs of the project activity will be connected. ➤ Commissioning dates and geo co-ordinates of the WEGs which are already commissioned Expected date of commissioning for the remaining 56 WEGs. 	CAR2	
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 ₂ e per year), justify the sampling through a statistical analysis:	/1/	DR	Not applicable for the project activity.		OK
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/ /9/ /10/ /14/ /15/ /16/ /17/ /22/	DR/I	<p>The proposed CDM project activity is installation of 64 numbers of Wind Energy Generators (51.2 MW) each of 800 kW capacities (E-53). The WEGs to be installed under the project is designed by Enercon India Limited and will also be commissioned by Enercon India Limited.</p> <p>The electricity generated will be exported to the NEW & NE grid of India.</p> <p>However the following needs to be included in the PDD</p> <ol style="list-style-type: none"> The unique identification number of all 64 WEGs and their geographical co-ordinates. Name of the substations to which the WEGs of the project activity will be connected. 	CAR2	OK

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

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.	
				c. Commissioning dates and geo co-ordinates of the WEGs which are already commissioned. d. Expected date of commissioning for the remaining 56 WEGs.			
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 activity is a Greenfield project and does not involve alteration of any existing installation.		OK	
A.2.6	Does the project design engineering reflect current good practices?	/1/ /8/ /22/	DR/I	The project activity utilizes 64 machines of Enercon model E-53 WEG of 800 kW capacities which are approved by Centre for Wind Energy Technology, Government of India. The salient features of the E-53 models to be implemented under the project activity include gearless construction, variable speed, pitch functions and independent braking technology. Thus the project design reflects good practice.		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/ /8/ /22/	DR	The technology is already available and widely used in the host country. There is no technology transfer from Annex-I party.		OK	
A.3 Participation requirements (VVM Para 51-54, 125-127)							
A.3.1	Do all participating Parties fulfil the participation requirements as follows:	/1/ /27/	DR	The Letter of Approval (LOA) from the DNA of India (Host) needs to be provided for verification	CAR1	OK	
a) Party has ratified the Kyoto Protocol		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
b) Party has designated a Designated National Authority		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
c) The assigned amount has been determined		<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Yes	<input type="checkbox"/> No
A.3.2	Do the letters of approval meet the following	/1/	DR	The Letter of Approval (LOA) from the DNA of	CAR1	OK	

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

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.																																										
requirements?		/27/ /39/		India (Host) needs to be provided for verification																																												
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a) LoA confirms that Party has ratified the Kyoto Protocol b) LoA confirms that participation is voluntary c) The LoA confirms that the project contributes to the sustainable development of the host country? d) The LoA refers to the precise project activity title in the PDD e) The LoA is unconditional with respect to (a) to (d) above f) The LoA is issued by the respective Party’s DNA g) The LoA was received directly by the DNA or the 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		The Letter of Approval (LOA) from the DNA of India (Host) is pending.																																														
A.3.3	Have all private/public project participants been authorized by an involved Party?	/1/ /27/	DR	The Letter of Approval (LOA) from the DNA of India (Host) needs to be provided for verification	CAR1	OK																																										
A.4 Technical description of the project activity (VVM Para 58-64)																																																
A.4.1	Is the project’s location clearly defined?	/1/ /9/ /13/ /14/ /15/ /16/ /17/ /20/	DR/I	Yes, the project’s spatial boundaries are defined. The project activity is spread across villages Chattar, Narmana, Seth Wadala, Jam Ambardi, Mevasa, Dhun Dhoraji, Sadodar, Bodi, Padavala and Machharda in Jamnagar and Rajkot District of Gujarat state in India. However unique identification number of WEGs, their geographical co-ordinates and name of the substations to which the WEGs of the project	CAR2	OK																																										

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/21/		activity will be connected needs to be included in the PDD.		
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)					
B.1.1 Does the project apply an approved methodology and the correct and valid version thereof?	/1/ /29/	DR	The project correctly applies the approved baseline methodology “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” ACM 0002, version 11 for large scale CDM projects.		OK
B.1.2 If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/ /29/ /30/ /31/ /32/ /33/ /34/ /35/	DR	Not applicable for the project activity		OK
B.2 Applicability of methodology (and tools) (VVM Para 65-76) <i>Insert a row for each applicability criteria of the applied methodology (and tools)</i>					
B.2.1 How was it validated that project complies with the	/1/	DR/I	The project activity involves installation of WEG		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	<p>following applicability criteria:</p> <p>The methodology is applicable to grid connected renewable power generation 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).</p>	<p>/9/ /10/ /21/ /22/ /29/</p>		for generation of power from wind energy to supply to the grid and is a green field project		
B.2.2	<p>How was it validated that project complies with the following applicability criteria:</p> <p>The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types:</p> <ul style="list-style-type: none"> • 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. 	<p>/1/ /9/ /10/ /21/ /22/ /29/</p>	DR/I	The project activity is a green field project that uses wind energy to generate electricity and hence this applicability criterion is not applicable for the project activity		OK
B.2.3	<p>How was it validated that project complies with the following applicability criteria:</p> <p>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.</p>	<p>/1/ /9/ /10/ /21/ /22/ /29/</p>	DR/I	The project activity is a green field project that uses wind energy to generate electricity and hence this applicability criterion is not applicable for the project activity.		OK
B.2.4	How was it validated that project complies with the	/1/	DR/I	The project activity is a green field project that		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
<p>following applicability criteria: insert applicability criteria 3?</p> <p>In case of hydro power plants, one of the following conditions must apply:</p> <ul style="list-style-type: none"> 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/m². <p>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/m².</p>		/9/ /10/ /21/ /22/ /29/		uses wind energy to generate electricity and hence this applicability criterion is not applicable for the project activity.		
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/ /29/ /31/ /36/	DR	Yes the selected baseline corresponds to “the baseline emissions are the product of electrical energy baseline EGBL, y expressed in kWh of electricity produced by the renewable generating unit multiplied by an emission factor” as prescribed in the applied methodology. $BE_y = EG_{BL,y} * EF_{CO2}$		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/ /13/ /20/ /21/ /29/ /31/ /36/	DR/I	Yes, the project boundary includes: (i) The project activity is spread across villages Chattar, Narmana, Seth Wadala, Jam Ambardi, Mevasa, Dhun Dhoraji, Sadodar, Bodi, Padavala and Machharda in Jamnagar and Rajkot District of Gujarat state in India. (ii) The spatial boundary of the project also includes transmission network for the evacuation of electricity to the NEW & NE grid to which the project activity is		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			connected. The project boundary has been defined clearly in the PDD		
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 arrive at this conclusion.	/1/ /29/	DR	Baseline GHG sources identified for the project activity are CO ₂ – Included as it is the main emission source CH ₄ – Excluded as it is a minor emission source N ₂ O – Excluded as it is a minor emission source No project activity emission for Wind power plant. This is in line with the applicable methodology ACM0002 version 11, Table 1.		OK
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/ /29/	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) <i>Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.</i>					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/ /29/ /31/	DR	The baseline scenario has been chosen as per the methodology ACM0002 version 11. According to the methodology the baseline scenario is,		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			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”.		
B.4.2 How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/ /29/ /30/	DR	Yes, It has been argued that implementation of project activity without CDM revenue is not economically attractive and hence can not be considered as alternative to the project activity.		OK
B.4.3 What is the baseline scenario?	/1/ /29/ /31/ /36/	DR	As per the methodology ACM0002 version 11, if the project activity is installation of a new grid-connected renewable power plant/unit, 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”. 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 NEW & NE regional grid of India has been sourced from CEA database version 5.		OK
B.4.4 Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/ /29/ /31/	DR	Yes the baseline scenario has been identified inline with applied methodology ACM0002 version 11, the baseline scenario identified is electricity delivered to the grid by the project		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				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” version 02.		
B.4.5	Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /29/ /31/ /36/	DR	Inline with the applied methodology ACM0002 version 11, 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”. The combined margin emission factor for the NEW & NE regional grid of India has been sourced from CEA database version 5 and the value applied is 0.92252 tCO ₂ e/MWh.		OK
B.4.6	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /25/ /29/ /30/ /49/ /50/ /52/	DR	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/ /29/ /31/ /36/	DR	The project is located in the state of Gujarat which forms a part of the NEWNE Grid. Hence the baseline scenario has been appropriately considered to be the grid mix in the NEWNE grid. The baseline determination is compatible with the available data. The combined margin		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>emission factor value for the NEWNE 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 CO₂ 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 5 used for calculation of combined margin emission coefficient for the NEWNE regional grid of India was the latest data available at the time of the commencement of validation (inline with the requirement of “Tool to calculate the emission factor for an electricity system”) and same was used during the webhosting of the PDD. The OM in the CEA database is calculated <i>ex-ante</i> using the simple OM approach based on the generation-weighted average emissions per electricity unit over a three year period of 2006-2007, 2007-2008 and 2008-2009. BM is calculated <i>ex ante</i> based on the 20% most recent capacity additions in the NEWNE grid based on net generation for the year 2008-09 as described in “Tool to calculate the emission factor for an electricity system” version 02, The operating margin has been determined to be 1.00498 tCO₂e/MWh and the build margin to be 0.6752 tCO₂e/MWh.</p> <p>Inline with tool, the weights for OM and BM are 0.75 and 0.25 respectively has been used to arrive</p>		

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				at CM value and the value applied is 0.92252 tCO ₂ e/MWh.		
B.4.8	Is the baseline determination adequately documented in the PDD? <ul style="list-style-type: none"> 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/ /29/ /31/ /36/	DR	Inline with the applied methodology ACM0002 version 11, 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”. The combined margin emission factor for the NEW & NE regional grid of India has been sourced from CEA database version 5 and the value applied is 0.9225 tCO ₂ e/MWh.		OK
B.5 Additionality determination (VVM Para 94-121)						
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /29/ /30/	DR	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/ /29/ /30/	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/ /29/ /30/	DR	Yes. The relevant arguments 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/ /29/ /30/	DR	The project additionality has been mainly based on investment analysis.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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/ /5/ /6/ /7/ /9/ /10/ /34/ /40/	DR	<p>The start date of the project activity (5 December 2009) is after 2 August 2008 (CDM EB guidelines on CDM consideration).</p> <p>The project proponent through an email communication has notified the DNA of India on 11 March 2010 and UNFCCC secretariat on 7 April 2010, regarding the commencement of the CDM project activity. On 15 March 2010 project proponent had received the acknowledgement of email from DNA of India and on 12 May 2010 had received the acknowledgement of email from UNFCCC secretariat (within six months of the project start date as per the EB guidance). DNV has also evidenced the CDM consideration from the board approval of date 28 November 2009 for the project activity, which is before the starting date of the project activity which clearly states that “project would not be financially viable on a stand alone basis by sale of electricity and the director informed the board that the risk posed to the project activity could be mitigated through Clean Development Mechanism of UNFCCC, which provides additional revenue stream to clean energy projects through the sale of certified emission reductions and the project could still be a viable investment if the benefits of CDM can be availed”. CDM was therefore found to be seriously considered in the decision to proceed with the project activity.</p> <p>PP is requested to</p> <p>a. Include the chronology of events for</p>	CH	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			demonstrating prior consideration of CDM revenues in the PDD. b. Provide original Minutes of the board meeting held on 28 November 2009.		
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/ /5/ /6/ /7/ /9/ /10/ /34/ /40/	DR	The start date of the project activity (5 December 2009) is after 2 August 2008 (CDM EB guidelines on CDM consideration). The project proponent through an email communication has notified the DNA of India on 11 March 2010 and UNFCCC secretariat on 7 April 2010, regarding the commencement of the CDM project activity. On 15 March 2010 project proponent had received the acknowledgement of email from DNA of India and on 12 May 2010 had received the acknowledgement of email from UNFCCC secretariat (within six months of the project start date as per the EB guidance). DNV has also evidenced the CDM consideration from the board approval of date 28 November 2009 for the project activity, which is before the starting date of the project activity which clearly states that "project would not be financially viable on a stand alone basis by sale of electricity and the director informed the board that the risk posed to the project activity could be mitigated through Clean Development Mechanism of UNFCCC, which provides additional revenue stream to clean energy projects through the sale of certified emission reductions and the project could still be a viable investment if the benefits of CDM can be availed". CDM was therefore found to be seriously considered in the decision to proceed		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			with the project activity.		
Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)					
B.5.7 What initiatives were 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/ /5/ /9/ /10/ /34/	DR	The start date of the project activity is 5 December 2009 after 2 August 2008 (CDM EB guidelines on CDM consideration) and hence this is not applicable.		OK
Investment analysis (VVM Para 108-114) <i>The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation.</i>					
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/ /17/ /29/ /30/	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/ /29/ /30/	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/ /29/ /30/ /33/	DR	The project participant has applied benchmark analysis to demonstrate the additionality of the project. This is inline with CDM EB guideline on assessment of investment analysis Para 16 which states that "if the alternative to the project activity is the supply of electricity from a grid this is not to be considered as investment and a benchmark approach is considered appropriate".		OK
B.5.11 Is the benchmark/discount rate the latest available at the time of decision?	/1/ /29/ /30/	DR	Yes the expected/required return on equity is used as benchmark and was available at the time of investment decision. The expected/required		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/33/ /41/ /42/ /43/ /44/		<p>return on equity is calculated based on the PLR and equity returns considered are that at the time of decision making. This has been calculated based on the long term risk free rate applicable on long term investment made, published by RBI and market risk premium calculated based on market returns of various index of Sensex and beta values provided by Bloomberg.</p> <p>However, PP is requested to justify why expected/required return on equity is considered as suitable indicator to evaluate the financial viability for the project activity as 70% of the project cost is funded through loan and without which investment in the project activity would have not been made by the PP.</p> <p>PP is also requested to justify the suitability and conservativeness of beta values considered to calculate expected return on equity and same need to be incorporated in the PDD.</p>	CL2	
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/ /29/ /30/ /33/ /41/ /42/ /43/ /44/	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/ /29/ /30/ /33/	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	/25/ /49/	DR	Yes, the income tax calculation takes		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
account? Is the depreciation year in accordance with normal accounting practice in the host country?	/50/ /52/		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.		
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/ /22/ /38/ /46/	DR	<p>20 years operating life has been considered which is realistic for WEG and has been verified from certificate from technology supplier.</p> <p>A salvage value of 10% of equipment cost has been considered for investment analysis and has been added back in cash flow in the last year of operation of project activity and is line with the Central Electricity Regulatory Commission (CERC) guidance on renewable energy projects dated 16 September 2009.</p> <p>For Land, 100% value has been added back to the cash flow in last year of operation.</p> <p>PP is requested to justify why working capital is not added back in last year of operation in the financial analysis sheet.</p>	CL3	OK
B.5.16 When 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/ /8/ /9/ /10/ /14/ /17/ /29/ /30/ /32/ /33/	DR	The investment decision was made on the basis of the detailed project report (DPR) dated 25 November 2009, which is prepared based on the quotation received from Enercon India Limited dated 20 November 2009. The DPR for the project activity was prepared on 25 November 2009, whereas the purchase order was placed on 5 December 2009. Hence given this short period of time between the detailed project report preparation and the decision to proceed with the project activity, it is reasonable to assume that the DPR was the basis for the input parameters for the project activity.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>However it was found that</p> <ul style="list-style-type: none"> a. The PLF value provided C-WET report is not consistent with the values used in investment analysis and PDD. The inconsistency in the values used for the PLF need to be clarified. b. The C-WET report on PLF is based on 74 number of WEGs for the project activity where as the number of WEGs for the project activity as per the PDD is only 64. DNV confirms the number of WEGs for the project activity by referring the PO placed by the PP and the DPR. PP is requested to provide clarification on this regard. c. PP is requested to justify the suitability of the PLF value considered for the investment analysis based on the PLF study conducted by C-WET, as the C-WET study was conducted for Samana in Jamnagar district, Gujarat, where as the project activity is located both in Jamnagar and Rajkot districts, Gujarat. 	CL4	
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/ /8/ /9/ /14/	DR	<p><input type="checkbox"/> 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</p> <p><input checked="" type="checkbox"/> The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company)</p> <p><input type="checkbox"/> Other approach.</p> <p>Plant load factor used in investment analysis was based on the as per the Guidelines on reporting</p>		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>and validation of PLF – EB48, Annex 11.</p> <p>However it was found that</p> <ol style="list-style-type: none"> The PLF value provided C-WET report is not consistent with the values used in investment analysis and PDD. The inconsistency in the values used for the PLF need to be clarified. The C-WET report on PLF is based on 74 number of WEGs for the project activity where as the number of WEGs for the project activity as per the PDD is only 64. DNV confirms the number of WEGs for the project activity by referring the PO placed by the PP and the DPR. PP is requested to provide clarification on this regard. PP is requested to justify the suitability of the PLF value considered for the investment analysis based on the PLF study conducted by C-WET, as the C-WET study was conducted only for Samana in Jamnagar district, Gujarat, where as the project activity is located both in Jamnagar and Rajkot districts, Gujarat. 	CL4	
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 accordance with VVM paragraph 95.	/1/ /9/ /17/ /38/ /46/ /48/	DR	<input checked="" type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants <p>The electricity tariff considered by the PP is based on the GERC draft order dated 17 June 2009, the latest tariff order of GERC as at the time of decision making. PPA is signed for the commissioned 6.4 MW with GUVNL based on</p>		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the latest tariff order of GERC dated 30 January 2010. DNV has cross checked the tariff details from both the PPA made and the latest GERC tariff order and found the tariff is slightly higher than the tariff considered at the time of decision making. PP is requested to evaluate the project IRR based on the PPA tariff and also to conduct a sensitivity analysis based on the same. PP is requested to provide sales invoices, if raised any, to GUVNL, for tariff verification.	CAR3	
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/ /8/ /9/ /10/ /12/	DR	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants The investment decision was made on the basis of the detailed project report (DPR) of 25 November 2009, which is prepared based on the quotation received from Enercon India Limited. The DPR for the project activity was prepared on 25 November 2009, whereas the purchase order was placed on 5 December 2009. Given this short period of time between the detailed project report preparation and the decision to proceed with the project activity, it is reasonable to consider DPR as primary source of input parameters. Hence the investment cost considered based on the DPR is in line with the “guidance on assessment of Investment analysis. Since the DPR for the project activity is not prepared by independent third party, PP is	CAR3	OK

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

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>requested to compare these input values with other wind power project commissioned in the region in the recent past to justify the reasonableness of the input values used in investment analysis.</p> <p>DNV has cross checked from the purchase order placed for the project activity that the actual project cost is only 2816 Million INR which is 7.89% lesser than the cost considered in the DPR. PP is also requested to evaluate the project IRR based on the actual project cost and also to conduct a sensitivity analysis based on the actual project parameters</p>		
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/ /8/ /9/ /12/	DR	<p><input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices)</p> <p><input checked="" type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants</p> <p>The O&M Cost was considered based on the detailed project report (DPR) of 25 November 2009, which is prepared based on the quotation received from Enercon India Limited (O &M contractor for the project activity).</p> <p>Since the DPR for the project activity is not prepared by independent third party, PP is requested to compare these input values with other wind power project commissioned in the region in recent past to justify the reasonableness of the input values used in investment analysis</p>	CAR3	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	/1/ /9/ /47/	DR	<p><input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices)</p> <p><input checked="" type="checkbox"/> Review of feasibility reports, public</p>		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
the projects that have been used for cross-checking in accordance with VVM paragraph 95.	/49/ /50/		<p>announcements and annual financial reports related to the project and the project participants</p> <p>All the input parameters used in the financial calculation excel sheet are relevant at the time of decision making. References and supporting documents are also provided.</p> <p>However, the PP is requested to provide copy of supporting document for the insurance charges for verification.</p> <p>Further, PP is requested to clarify the mismatch in the loan re-payment period, 12 years stated in the loan sanction letter of IDFC and 10 years considered in the DPR and financial analysis.</p> <p>PP is also requested to clarify why the generation based incentive of 0.50 INR/kWh is not considered in the financial analysis.</p>	CAR3	
B.5.22 Was the financial calculation spreadsheet verified and found to be correct?	/1/ /3/ /4/	DR	The financial calculation spread sheet has been checked and clarification stated above has been asked and based on the PP response final conclusion will be made. .	CAR3	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/ /3/ /17/ /30/	DR	<p>The key parameters contributing to more than 20% of the revenue/costs during operating or implementation have been identified and the possible correlation between the parameters has been considered.</p> <p>Even though the tariff is fixed for 20 years for the project activity as per the PPA, PP is requested to conduct sensitivity analysis for the tariff.</p>	CAR4	OK
B.5.24 Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/ /3/ /8/ /9/	DR	PP has carried a sensitivity analysis to analyse the effect of $\pm 10\%$ variation in capital cost, electricity generation, debt equity ratio and O&M cost of the project and it has demonstrated that		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/10/ /12/ /17/ /30/ /38/ /46/ /47/ /48/ /49/ /50/ /51/ /52/		even after $\pm 10\%$ variation the equity IRR for the project remains below than the applied benchmark. PP is requested to conduct sensitivity analysis for the tariff, even though the tariff is fixed for 20 years for the project activity as per the PPA. Also the sensitivity analysis needs to be performed in the parameters till they touch the benchmark and the likelihood of that being achieved need to be indicated.	CAR3 CAR4	
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/ /3/ /8/ /9/ /10/ /12/ /17/ /30/ /38/ /46/ /47/ /48/ /49/ /50/ /51/ /52/	DR	PP has carried a sensitivity analysis to analyse the effect of $\pm 10\%$ variation in capital cost, electricity generation, debt equity ratio and O&M cost of the project and it has demonstrated that even after $\pm 10\%$ variation the equity IRR for the project remains below than the applied benchmark. PP is requested to conduct sensitivity analysis for the tariff, even though the tariff is fixed for 20 years for the project activity as per the PPA. Also the sensitivity analysis needs to be performed in the parameters till they touch the benchmark and the likelihood of that being achieved need to be indicated.	CAR3 CAR4	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	/1/ /29/ /30/	DR	PP has not opted for barrier analysis to demonstrate the additionality of the project		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
investment analysis? Each barrier is discussed separately.					
Common practice analysis (VVM Para 119-121)					
B.5.27 What is the geographical scope of the common practice analysis? Is this justified?	/1/ /29/ /30/ /53/	DR	<p>The state of Gujarat has been considered for assessing the common practice. Since the policies and tariff regime is consistent throughout the state of Gujarat, DNV considers the selection of the region is appropriate.</p> <p>In State of Gujarat all wind projects above 15 MW has been considered for common practice analysis. It was noted that all wind power project from single investor above 15MW is under CDM pipeline. Hence it has been demonstrated that investment in large scale wind power project in Gujarat is not a common practice.</p>		OK
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/ /29/ /30/ /53/	DR	<p>The state of Gujarat has been considered for assessing the common practice. Since the policies and tariff regime is consistent throughout the state of Gujarat, DNV considers the selection of the region is appropriate.</p> <p>In State of Gujarat all wind projects above 15 MW has been considered for common practice analysis. It was noted that all wind power project from single investor above 15MW is under CDM pipeline. Hence it has been demonstrated that investment in large scale wind power project in Gujarat is not a common practice.</p>		OK
B.5.29 What is the data source(s) used for the common practice analysis?	/1/ /29/ /30/ /53/	DR	<p>The data source used for the common practice analysis is from the list of projects commissioned and under operation in Gujarat as per the Indian Wind Power Directory 2009.</p> <p>The copy of the of the Indian Wind Power Directory 2009 need to be presented as the</p>	CL5	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			supporting evidence for the arguments under common practice analysis.		
B.5.30 How many similar non-CDM-projects exist in the region within the scope?	/1/ /29/ /30/ /53/	DR	Project Participant is requested to provide a copy of the Indian Wind Power Directory 2009.	CL5	OK
B.5.31 How were possible essential distinctions between the project activity and similar activities assessed?	/1/ /29/ /30/ /53/	DR	Refer section B.5.29 and B.5.30 of the report.	CL5	OK
B.5.32 What is the conclusion of the common practice analysis?	/1/ /29/ /30/ /53/	DR	To be concluded, once response to the clarifications raised for Common Practice analysis are provided by PP.	CL5	OK
Conclusion					
B.5.33 What is the conclusion with regard to the additionality of the project activity?	/1/ /3/ /8/ /9/ /10/ /12/ /17/ /30/ /38/ /46/ /47/ /48/ /49/ /50/ /51/ /52/ /53/	DR	Conclusion on additionality of the project activity calls for all the CLs and CARs mentioned in the additionality section to be addressed.	CL1 to CL5, CAR3 CAR4	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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 emission factor for NEWNE regional grid available at validation verified?	/1/ /29/ /31/ /36/	DR	The OM emission factor has been computed using the simple OM approach based on the generation-weighted average emissions per electricity unit over a three year period of 2006-2007, 2007-2008 and 2008-2009 available in the CEA database version 5, for the NEW & NE regional grid, inline with approach prescribed in "Tool to calculate the emission factor for an electricity system" version 02. This is fixed ex-ante value and the value applied is 1.00498 tCO ₂ e/MWh. DNV verified from the values applied for OM calculation from CEA website. The calculation is also found to be correct.		OK
B.6.2 How was the BM emission factor for NEWNE regional grid available at validation verified?	/1/ /29/ /31/ /36/	DR	BM is calculated <i>ex-ante</i> based on the 20% most recent capacity additions in the grid based on net generation for the year 2008-09, in accordance with "Tool to calculate the emission factor for an electricity system" version 02. This value is sourced from CEA database version 5. This is fixed ex-ante value and the value applied is 0.6752 tCO ₂ e/MWh		OK
B.6.3 How was the CM _{CO2} emission factor for NEWNE regional grid available at validation verified?	/1/ /29/ /31/ /36/	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) in the ratio of 75:25 as applicable for wind projects. The CM thus arrived is 0.92252 tCO ₂ /MWh. DNV verified the calculation and found it to be in order.		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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/ /29/ /31/ /36/	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/ /29/ /31/ /36/	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/ /29/ /31/ /36/	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 methodology and in a complete and transparent manner?	/1/ /29/	DR/I	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
Leakage (VVM Para 89-93)						
B.6.8	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /29/	DR	This is not applicable as the project activity is electricity generation from wind energy.		OK
Emission Reductions (VVM Para 89-93)						
B.6.9	Algorithms and/or formulae used to determine emission reductions: <ul style="list-style-type: none"> 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. 	/1/ /29/ /31/ /36/	DR	All the assumptions and data used by the project participants are listed in the PDD and the data are properly referenced.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
<ul style="list-style-type: none"> 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. 					
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/ /17/ /29/ /48/ /55/	DR/I	No, PP is requested to justify how the current monitoring arrangement defined in the PDD meets the requirement of the applied version of methodology, which requires Quantity of net electricity generation supplied by the project plant/unit to the grid in year need to be monitored, whereas the current arrangement mentioned in the PDD calculates net electricity based on the apportioning of electricity recorded by the common meter (meter to which machines of other investors are also connected). PP is also requested to explain the detailed procedures of apportioning in Annex 4 of the PDD.	CL6	OK
B.7.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/ /17/ /29/ /48/ /55/	DR	Refer section B.7.1 of the report	CL6	OK
B.7.3 In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/ /17/ /29/	DR	Refer section B.7.1 of the report	CL6	OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/48/ /55/				
B.7.4	In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/ /17/ /29/ /48/ /55/	DR	Refer section B.7.1 of the report	CL6	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/ /17/ /29/ /48/ /55/	DR	Refer section B.7.1 of the report	CL6	OK
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /17/ /29/ /48/ /55/	DR	Refer section B.7.1 of the report	CL6	OK
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /17/ /29/ /48/ /55/	DR	Refer section B.7.1 of the report	CL6	OK
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/ /17/ /29/ /48/	DR	Unless the issue of current monitoring arrangement is inline with the methodology issue in not resolved no conclusion can be drawn in this regard.	CL6	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/55/				
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/ /17/ /29/ /48/ /55/		For the operation and maintenance of the facility, contract has been entered with Enercon (India) Limited and they will be providing daily generation report. The QA/QC procedures indicated in Annex 4 need to be further formalized by including the role of PP and the requirements of CDM.	CAR5	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/ /17/ /29/ /48/ /55/	DR	Yes. The systems and procedures detailed are adequate to ensure the verification of emissions reductions from the project activity.		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/ /17/ /29/ /48/ /55/	DR	The monthly data of electricity generated (JMR sheet, Invoice & controller data) will be collected in both print and electronic form. The data will 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.		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/ /27/ /54/	DR	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. However this action plan is not clear from webhosted PDD. PP is requested to provide the DNA approval for	CAR1	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the project activity for confirmation and in case if the DNA approval talks about the same and this action plan needs to be incorporated in the revised PDD.		
B.7.13 Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /27/ /54/	DR	The monitoring plan does not provide for the collection and archiving of relevant data concerning environmental, social and economic impacts and this is not warranted by the current legislation. However PP is requested to detail the action plan for monitoring 2% of the CER revenue to be spent on sustainable development activities of the local population.	CAR1	OK
B.7.14 Are the sustainable development indicators in line with stated national priorities in the host country?	/1/ /27/ /54/	DR	The Letter of approval from the DNA of India needs to be submitted for verification.	CAR1	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/ /5/ /8/ /9/ /10/	DR	The start date of the project activity is stated to be 5 December 2009, which is the date of purchase order placed for the supply of 64 WEGs for the project activity. The purchase order dated 5 December 2009 has been verified by DNV.		OK
C.1.3 Is the stated expected operational lifetime of the project activity reasonable?	/1/ /9/ /22/ /38/ /46/	DR	The operational lifetime of the project activity has been mentioned as 20 years which is reasonable and has been verified by DNV from certificate provided by technology supplier.		OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
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 chosen a fixed crediting period of 10 years with the start date of the crediting period being 1 June 2011.		OK
D Environmental Impacts (VVM Para 131-133)					
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 that need monitoring?	/1/ /13/ /20/ /21/ /37/ /56/	DR/I	It was found that during the validation visit that: a. The land used for the project activity is a forest land and PP needs to clarify that the Wild Life Protection Act 1972 is not applicable and EIA is not required for the project activity. b. MoEF clearance for the project activity has been provided in the name of Vish Wind Infrastructure Limited. PP is requested to provide clarification on this regard.	CL7	OK
D.1.2 Does the project comply with environmental legislation in the host country?	/1/ /13/ /20/ /21/ /37/ /56/	DR/I	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. However it was found that during the validation visit that: a. The land used for the project activity is a forest land and PP needs to clarify that the Wild Life Protection Act 1972 is not applicable and EIA is not required for the project activity. b. MoEF clearance for the project activity has been provided in the name of Vish Wind Infrastructure Limited. PP is requested to	CL7	OK

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Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			provide clarification on this regard.		
D.1.3 Will the project create any adverse environmental effects?	/1/	DR/I	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/ /13/ /20/ /21/ /37/ /56/	DR/I	Conclusion on environmental impacts by the project activity calls for CL7 to be addressed.	CL7	OK
E Stakeholder Comments (VVM Para 128-130)					
E.1.1 Have relevant stakeholders been consulted?	/1/ /18/ 19/	DR	Yes. The stake holders meeting was conducted on 9 February 2010 at Jamnagar district. The stakeholders consulted were local villagers, representatives of Enercon India Limited (EPC & O&M contractor of the wind farm) and EIPDPL representatives. Invitation published in local news paper, personal invitations sent and minutes of the meeting of the local stakeholder consultation has been verified by DNV during the validation visit. However PP is requested to provide the translated version of the invitation published in the local newspaper and personal invitations which are in the local (Gujarati) language.	CL8	OK
E.1.2 Have appropriate media been used to invite comments by local stakeholders?	/1/ /18/ /19/	DR	Yes. The local stakeholders were invited through newspaper advertisement and individual invitations sent to village representatives. The advertisement was published in local		OK

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Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				<p>language news paper on 9 February 2010 by project proponent.</p> <p>News paper advertisement, attendance sheet and minutes of meeting have been verified by DNV during the site visit.</p> <p>However PP is requested to provide the translated version of the invitation published in the local newspaper and personal invitations which are in the local (Gujarati) language</p>	CL8	
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/ /37/	DR	A stakeholder consultation process is not required by regulations/laws in India, the host country, for wind energy projects.		OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/ /18/ 19/	DR	A summary of the comments received has been provided in the PDD.		OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/ /18/ 19/	DR	There were no adverse comments received from the stakeholders and the net beneficial effects of the project activity were acknowledged by the stakeholders present.		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
<p>CAR 1</p> <p>PP is requested to provide the Letter of Approval (LOA) from the DNA of India (host) for verification.</p> <p>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 PDD.</p> <p>PP is requested to provide the DNA approval for the project activity for confirmation and in case if the DNA approval talks about the same and this action plan needs to be incorporated in the revised PDD.</p>	<p>A.3.1 A.3.2 A.3.3 B.7.12 B.7.13 B.7.14</p>	<p>The Host Country Approval has been provided to DoE.</p> <p>The action plan for monitoring of 2% CER revenue contributed towards sustainable development has been added in Section B.7.2 of the revised PDD</p>	<p>The letter of Approval received from DNA of India dated 15 November 2010 has been verified by DNV.</p> <p>As required by DNA of India requires project proponent has committed to spend 2% percentage of the CERs revenue every year for Sustainable Development including society/community development. The monitor-able action plan for the same has been included in section B.7.1 of the PDD. DNV has verified from the commitment and monitor-able action plan made by project proponent from the undertaking submitted to DNA of India by project proponent dated 20 July 2010.</p> <p>OK Accepted CAR 1 Closed.</p>
<p>CAR 2</p> <p>PP has started commissioning of WEGs on 6 July 2010 onwards and as on 1 October 2010, only 8 WEGs have been commissioned out of 64 WEGs.</p> <p>The following information needs to be included in the PDD</p>	<p>A.2.2 A.2.4 A.4.1</p>	<p>The replies of the queries are as follows:</p> <p>a. The unique identification numbers of all the 64 WEG's and their geographical co-ordinates are included in</p>	<p>The unique identification number, geo coordinates of all 64 WEGs, substation details to which the project activity will be connected to, date of commissioning of already commissioned WEGs and expected date of commissioning of remaining WEGs has been included in revised PDD.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<ul style="list-style-type: none"> a. The unique identification number of all 64 WEGs and their geographical co-ordinates. b. Name of the substations to which the WEGs of the project activity will be connected. c. Commissioning dates and geo co-ordinates of the WEGs which are already commissioned d. Expected date of commissioning for the remaining 56 WEGs. 		<ul style="list-style-type: none"> Appendix 2 of the PDD. b. The project activity is connected to the Enercon's substation at Sadodar and finally connected to the utility's (GETCO) substation at Moti Paneli. The same information is provided in section B.7.2 of PDD c. The information of commissioned machines is included in Appendix 2 of the PDD. d. The expected date of commissioning for remaining 54 WEG's is 20 April 2011. 	<p>Revised PDD version 3 has been reviewed by DNV.</p> <p>OK Accepted.</p> <p>CAR 2 Closed.</p>
<p>CAR 3</p> <p>Since the DPR for the project activity is not prepared by independent third party, PP is requested to compare these input values with other wind power project commissioned in the region in the recent past to justify the reasonableness of the input values used in investment analysis.</p> <p>Also PP is requested to</p> <ul style="list-style-type: none"> a. Evaluate the project IRR based on the PPA tariff. b. provide sales invoices, if raised any, to GUVNL, for tariff verification c. Provide the project IRR based on the 	<p>B.5.18</p> <p>B.5.19</p> <p>B.5.20</p> <p>B.5.21</p> <p>B.5.22</p> <p>B.5.24</p> <p>B.5.25</p> <p>B.5.33</p>	<p>A comparison sheet has been provided to DOE, the sheet compares the input values of the project activity with the input values of other project activities commissioned in the same region in the recent past.</p> <ul style="list-style-type: none"> a. The PPA tariff value is 3.56/kWh the equity IRR at PPA value is 8.14% which is 0.07% higher than the tariff value of 3.55/kWh. b. The sales invoices of latest months have been provided to 	<p>Project proponent has submitted a detailed comparison sheet including project cost, O & M costs, escalation in O & M costs, insurance costs, and electricity tariff has been submitted by project proponent and the details of other projects were also found to be in same range.</p> <p>The electricity tariff considered in detailed project report was based on the GERC draft tariff regulation of 17 June 2009, applicable at the time of investment decision. However DNV has verified from the actual power purchase</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>actual project cost and also to conduct a sensitivity analysis based on the actual project parameters.</p> <p>d. Provide copy of supporting document for the insurance charges for verification.</p> <p>e. Clarify the mismatch in the loan repayment period, 12 years stated in the loan sanction letter of IDFC and 10 years considered in the DPR and financial analysis.</p> <p>f. Clarify why the generation based incentive of 0.50 INR/kWh is not considered in the financial analysis.</p>		<p>DOE for tariff verification.</p> <p>c. At actual project cost and at actual applicable tariff, the equity IRR comes out to be 10.38% which is well below the benchmark, after increasing the PLF by 10% to perform sensitivity analysis the equity IRR comes out to be 13.18%. Since O&M contract is not yet finalized we have taken the O&M cost as mentioned in the offer letter and DPR.</p> <p>d. The reference of insurance cost has been provided to DOE for verification.</p> <p>e. The loan repayment period was assumed as 10 years for the project activity. The loan repayment period of 10 years is accepted norm for power sector projects and is envisaged by Central Electricity regulatory commission and State Electricity Regulatory commission. However, in actual the PP was able to secure loan from IDFC for period of 12 years. To capture the deviation, the PP has included the sensitivity analysis</p>	<p>agreement signed dated 10 June 2010, 7 July 2010 respectively and 06 January 2011 and recent sales invoices raised to state electricity board that the applicable tariff rate for the project activity is 3.56 INR/kWh without any escalation and is fixed for 20 years. This was based on the GERC final tariff order dated 30 January 2010. Even after considering the electricity tariff of 3.56 INR/kWh the equity IRR for the project works out to be 18.14% which is still below than the benchmark.</p> <p>The total project cost considered in detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009. However the total project cost for the project activity was verified to be only 2816 million INR and has been verified by DNV from the actual purchase order placed to Enercon India Limited dated 5 December 2009. Even after considering the actual project cost, the equity IRR for the project works out to be 10.03% which is still below than the benchmark.</p> <p>The GERC tariff order does not provide separate value for insurance charges. GERC tariff order considers insurance</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		<p>at loan tenure of 12 years in the PDD.</p> <p>f. As per order on generation based incentive, the PP can get incentive of INR 0.50 per kWh which is capped to the extent of 6.2 Million INR per MW and maximum of 1.55 Million per MW each year.</p> <p>Further, generation based incentive does not allow for accelerated depreciation of 80% in case of which normal depreciation of 15% will apply. GBI is included in investment analysis in the revised spreadsheet.</p>	<p>charges as a part of O & M cost and provides 1.5% of the total project cost as O & M cost. DNV has cross checked that after considering insurance charges with operation and maintenance cost the total cost is 1.42% of the project cost which is below than the O &M cost provided in GERC order (1.5% of the project cost).</p> <p>DNV has also cross-checked the insurance cost considered for the project activity against the insurance cost considered by various other CDM projects (UNFCCC Ref No: 3611, 3142, 2819 & 3854 and the value found to be 0.18% of the project cost, hence the value considered in the DPR was found to be reasonable.</p> <p>The loan tenure considered in detailed project report was based on the GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues” dated 17 June 2009. However the actual loan tenure was found to be 12 years and has been verified by DNV from the loan agreement signed with IDFC dated 30 April 2010. Even after considering the</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>actual loan tenure, the equity IRR for the project works out to be 7.92% which is below than the benchmark.</p> <p>Ministry of new and renewable energy sources, government of India offers two types of incentives for wind power projects, project activity can claim any one out of these two:</p> <p>a) 80% accelerated depreciation under the Income Tax Act.</p> <p>b) Generation based incentives (GBI) of 0.5 INR/kWh with cap of 6.2 Million INR/MW of installed capacity. This 6.2 Million INR/MW can be claimed in a period not less than 4 years and a maximum period of 10 years.</p> <p>The project activity has applied for generation based incentives and it was been verified by DNV that project proponent can avail only under one scheme as project proponent have to intimate first to Ministry about the option opted and ministry have procedure in place to track that project can avail benefit under one scheme only.</p> <p>DNV has verified from the income tax act that the Depreciation rate (based on written down value) applied is inline with Income Tax Act 1961 of India.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			OK Accepted. CAR 3 Closed.
<p>CAR 4</p> <p>PP has carried out sensitivity analysis to analyse the effect of $\pm 10\%$ variation in electricity generation, debt equity ratio, capital cost and O&M cost of the project.</p> <p>PP is requested to conduct</p> <ol style="list-style-type: none"> sensitivity analysis for the tariff considered The sensitivity analysis needs to be performed in the parameters till they touch the benchmark and the likelihood of that being achieved need to be indicated. 	<p>B.5.23</p> <p>B.5.24</p> <p>B.5.25</p> <p>B.5.33</p>	<ol style="list-style-type: none"> The sensitivity analysis has been performed at the actual tariff rate and been added in the PDD. The sensitivity analysis is extended to the point at which the equity IRR crosses the benchmark cost of equity. The justification of the reasonable variation that can be unexpected is also included in the PDD. 	<p>Decrease in capital cost: the total project cost considered in detailed project report was based on the budgetary offer received from Enercon (India) Limited dated 20 November 2009. However the total project cost for the project activity was verified to be only 2816 million INR and has been verified by DNV from the actual purchase order placed to Enercon India Limited dated 5 December 2009. Even after considering the actual project cost, the equity IRR for the project works out to be 10.03% which is still below than the benchmark. With a decrease in investment cost by 25.9% (from the cost considered in DPR, available at the time of investment decision) the equity IRR becomes 16.85% thus exceeds the benchmark. However in DNV's opinion a decrease of 25.9% in project cost is unrealistic as the purchase order is already placed; hence any decrease in project cost is not realistic.</p> <p>Increase in electricity tariff: The</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>electricity tariff considered in detailed project report was based on the GERC draft tariff regulation of 17 June 2009, applicable at the time of investment decision. However DNV has verified from the actual power purchase agreement signed dated 10 June 2010, 7 July 2010 respectively and 06 January 2011 and recent sales invoices raised to state electricity board that the applicable tariff rate for the project activity is 3.56 INR/kWh without any escalation and is fixed for 20 years. This was based on the GERC final tariff order dated 30 January 2010. Even after considering the electricity tariff of 3.56 INR/kWh the equity IRR for the project works out to be 8.14% which is still below than the benchmark. With an increase of 38% in electricity tariff the equity IRR becomes 16.85% thus exceeds the benchmark. However in DNV's opinion an increase of 38% in electricity tariff is highly unlikely as the power purchase agreement for the project activity is already signed for the project and the tariff is fixed for 20 years without any escalation.</p> <p>Increase in plant load factor: With an</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>increase in generation by 37.1% (at 35.25% PLF) the equity IRR becomes 16.86% and thus exceeds the benchmark. The PLF of 25.71% considered in the financial analysis is based on the electricity generation estimates for the project activity provided by an independent third party (entre for Wind Energy Technology) report for Enercon India Limited make WEGs (E-53, 800 kW) dated 16 April 2010.</p> <p>Enercon India Limited, supplier of WEGs has only provided the generation guarantee based on the 25.4% PLF in its budgetary offer dated 20 November 2009. Moreover the Gujarat Electricity Regulatory Commission (GERC) has considered an average PLF of 23% in its final tariff order dated 30 January 2010 for the purposes of tariff working. Hence an increase of 37.1% in electricity generation to achieve a PLF of 35.25% is highly unlikely.</p> <p>Decrease in O&M cost: Even with no O&M costs the equity IRR for the project activity is 11.44%, which is lower than the benchmark return. Hence this parameter is not sensitive for the project activity.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>Increase in debt equity Ratio: the debt equity ratio of 70:30 considered in detailed project report was based on the GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues” dated 17 June 2009. Even after considering the scenario of project activity could have been financed 100% from equity (7.85%) or 100% loan (8.16%) the equity IRR from the project activity is below benchmark. Hence this parameter is not sensitive for the project activity.</p> <p>Loan tenure: The loan tenure considered in detailed project report was based on the GERC draft order on “Determination of the tariff for Procurement of Power by Distribution Licensees from Wind Energy Generators and other commercial issues” dated 17 June 2009. However the actual loan tenure was found to be 12 years and has been verified by DNV from the loan agreement signed with IDFC dated 30 April 2010. Even after considering the actual loan tenure, the equity IRR for the project works out to be 7.92% which is below than the</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>benchmark. Hence this parameter is not sensitive for the project activity.</p> <p>Hence the project activity is financially not viable without the benefits from CDM.</p> <p>OK Accepted.</p> <p>CAR 4 closed.</p>
<p>CAR5</p> <p>The QA/QC procedures indicated in Annex 4 need to be further formalized by including the role of PP and the requirements of CDM.</p>	<p>B.7.9</p>	<p>The PP will be keeping and monitoring the data for electricity generation and calibration reports post project implementation. Enercon (India) Limited will be the O&M contractor who will be having the responsibility for activities such as maintaining electricity generation records, calibration records and maintenance of the WEGs (Wind Energy Generators). The QA/QC procedures have been revised to detail the responsibility of the PP and Enercon in respect of data archiving, internal audits and procedures to address data uncertainty in Section B.7.2 and annex 4 of the PDD.</p>	<p>The responsibility of overall project management lies with Enercon (India) limited (O &M contractor for the project activity). The main and check meters at the uploading station are two way meters with an accuracy class of 0.2% and are in custody of State Electricity Board. The readings in these meters are taken by State Electricity Board officials and used for billing purposes and will be used for calculation for the emission reductions from the project activity. These meters are annually tested and calibrated by officials of State Electricity Board. The monthly electricity sales receipts will also be archived until 2 years after the crediting period to facilitate cross-checking during the crediting period.</p> <p>OK Accepted.</p> <p>CAR 5 Closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>CL 1</p> <p>PP is requested to:</p> <ol style="list-style-type: none"> Include the chronology of prior consideration of CDM events in the PDD. Provide original Minutes of Meeting of the board meeting held on 28 November 2009. 	<p>B.5.5 B.5.33</p>	<ol style="list-style-type: none"> The chronology of prior consideration of CDM events is included in the PDD and evidence for the same has been provided to DoE for verification. The original Board Resolution was shown to DOE during the visit to corporate office. 	<p>The starting date of the project activity has been identified as 5 December 2009, which is the date of purchase order placed to Enercon India Limited for the wind turbines of the project activity. The wind farm is operated and maintained by the WEG supplier and any civil work or transmission network can only be started after the placement of purchase order project for the wind turbines. Hence the start date defined for the project activity is appropriate and in line with the EB guidance on start date of project activity /35/.</p> <p>Since the start date of the project activity is after 2 August 2008, the project proponent through an email communication has notified the DNA of India on 11 March 2010 and UNFCCC secretariat on 7 April 2010, regarding the commencement of the CDM project activity. On 15 March 2010 project proponent had received the acknowledgement of email from DNA of India and on 12 May 2010 had received the acknowledgement of email from UNFCCC secretariat (within six months of the project start date as per the EB guidance). DNV has also evidenced the CDM consideration from</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>the board approval of date 28 November 2009 for the project activity, which is before the starting date of the project activity which clearly states that “project would not be financially viable on a stand alone basis by sale of electricity and the director informed the board that the risk posed to the project activity could be mitigated through Clean Development Mechanism of UNFCCC, which provides additional revenue stream to clean energy projects through the sale of certified emission reductions and the project could still be a viable investment if the benefits of CDM can be availed”. CDM was therefore found to be seriously considered in the decision to proceed with the project activity.</p> <p>OK Accepted. CL 1 Closed.</p>
<p>CL 2 PP is requested to justify why expected/required return on equity is considered as suitable indicator to evaluate the financial viability for the project activity as 70% of the project cost is funded through loan and without which investment in the project activity would have not been made by</p>	<p>B.5.11 B.5.33</p>	<p>Clause 5.3(b) of the Tariff Policy notified by the Government of India stipulates a debt-equity ratio of 70:30 for financing power projects. However in order to attain loan from financial institution project proponent have to commit at least 30% of the project cost and the commitment of project proponent is subject to its expected</p>	<p>The benchmark selected for the project activity is as per the CDM EB guidance on assessment of investment analysis. The project activity is electricity generation based on wind energy which could be developed by an entity other than project participant. The benchmark should thus be based on publicly available data sources. The financial</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>the PP.</p> <p>PP is also requested to justify the suitability and conservativeness of beta values considered to calculate expected return on equity and same need to be incorporated in the PDD.</p>		<p>return of its 30% equity. Since the project proponent is an equity investor in the project. The decision to invest or not to invest is based on the returns generated by the equity investment, represented by the post tax Equity IRR. As per Para 12 of the Guidance to Investment Analysis states that required returns on equity is appropriate benchmark for Equity IRR. Therefore the cost of equity is considered appropriate benchmark. Accordingly, the post tax Equity IRR has been considered as the relevant financial indicator for Investment Analysis.</p> <p>Moreover the CDM revenues was decisive factor to go ahead with the project can also be loan sanction letter from the bank in which bank has also considered the CDM processing fess while granting the loan for the project.</p> <p>Beta values are representative of volatility of the stock over the market index. We have considered major players that are active in power sector in India. The values are directly derived from the third party data source (Bloomberg). The average of the beta returns of the power stocks is</p>	<p>indicator applied for the project activity is equity IRR and the benchmark used for the project activity is required rate of return on equity for the project has been calculated using the Capital Asset Pricing Model (CAPM). As per CAPM, the required return on equity investment is the return of a risk-free security plus beta times the difference between the market return and the risk-free return. The Government Securities have been taken to represent the risk free return. Stock index has been used to represent the market return. Power Industry specific beta value is applied to represent the market returns relevant to the risk of the project activity sector. The suitability of the benchmark and the appropriateness of the calculations adopted has been verified and accepted based on Financial Management: Theory and Practice book written by Professor Prasanna Chandra (Director, Centre for Financial Management and ex professor of finance at IIM-Bangalore). The key parameters of the CAPM model have been calculated as follows:</p> <ul style="list-style-type: none"> • An average government bond rate (risk free rate) applicable at

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		<p>considered in order to determine the beta applicable for the project activity. The beta for the various power stocks ranges from 0.96 to 1.57 for Gujarat Industries and Reliance respectively. Therefore we have considered the average beta that will be reflective of the volatility of the power stocks vis-à-vis market index. The same have been incorporated in the PDD.</p> <p>As per principles of corporate finance require that Beta need to be adjusted to reflect the change in financing mix between the project and the listed power companies. However, since the power company's equity ratios are lower than that of the project activity, any subsequent adjustment on account of change in debt: equity mix will result in a higher beta value and higher benchmark.</p> <p>We have incorporated the results of re-levering in the spreadsheet to demonstrate the conservativeness of the beta values. The average re-levered beta works out to be 2.13 which is less than the average raw beta of 1.17. Hence the use of average raw beta is conservative and appropriate. Calculations for the</p>	<p>the time of investment decision (in November 2009) for long term investment (for 20 years) has been considered. The project participant has sourced this value ($R_f = 7.98\%$ for the period from June 2009 to September 2009) from the monthly bulletin on government securities market published by Reserve Bank of India. Reserve Bank of India is the central controlling bank and its database is an official source of information in India. DNV accepted this value as it has been sourced directly from the RBI report and was latest at the time of investment decision. DNV has further cross checked historical value for average risk free rates in India for the 5 years preceding the project investment decision confirming that the chosen value is reasonable.</p> <ul style="list-style-type: none"> • Market return ($R_m = 15.55\%$) or Compound Accumulated Growth Rate (CAGR): In India the market return can be calculated from the following

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		same are included in revised Benchmark analysis sheet submitted to DoE.	<p>available indices: (i) BSE-Sensex, (ii) BSE-200 and (iii) BSE-500 (iv) BSE 100. Hence the project proponent has calculated the market return from all these indices from the start date of the indices till date of investment and the minimum market return indices has been used for the market return calculation. The minimum market return was offered by BSE 200 (15.5%) and hence conservatively same has been applied for the benchmark calculation.</p> <ul style="list-style-type: none"> • The average raw equity beta value of 1.17 (coefficient reflecting the volatility of the stock relative to the market) is calculated or the period of five year (31 October 2004 to 25 October 2009) using BSE index of the market portfolio for the companies in the power sector that were listed at the time of decision making: Tata Power (1.029), CESC limited (1.105), Reliance Energy (1.569), Gujarat Industries (0.961) and

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>Energy Development (1.187). These values were sourced from Bloomberg web site and screenshots of the same are provided in Appendix 3 of PDD.</p> <ul style="list-style-type: none"> • The time period of five year considered for equity beta value calculation is justified as per Credit Rating Information Services of India limited (CRISIL) recommendations to CERC and it was recommended by financial experts in the report that, for such economies, and for companies whose capital structure and operating environment has been changing, the time period over which equity beta is calculated should be small, as in case of power sector in India which went significant restructuring after electricity act 2003. This ensures that the risk profile of the company vis-à-vis the market is relatively stable over the term over which equity beta is being calculated. • Though the principles of corporate finance require that

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>equity Beta need to be adjusted to reflect the change in financing mix between the project and the listed power companies. However, since the debt equity ratios of the power company's listed at the stock exchanges were lower than that of the project activity, any adjustment on account of change in debt equity ratio will result in a higher equity beta value (2.13) which in turn will result in higher benchmark (24.11%), DNV has accepted the use of average raw equity beta value instead of adjusted equity beta values.</p> <p>Based on Capital Asset Pricing Model expected cost of equity works out to be 16.84%. The expected cost of equity calculation has been verified by DNV and was found to be correct.</p> <p>OK Accepted CL 2 Closed.</p>
<p>CL 3 PP is requested to justify why working capital is not added back in last year of operation in the financial analysis sheet.</p>	<p>B.5.15 B.5.33</p>	<p>The PP has envisaged no loan on working capital hence all the working capital amount is considered as margin money, in the cash flow statement the final year cash outflow in 'increase</p>	<p>It has been verified from the investment analysis spreadsheet that PP has not considered any loan for working capital and hence the working capital has been considered in investment analysis as</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		decrease in currents assets' is negative which reflects that working capital is added back in the final year of computation.	margin money and same has been added back in last year of operation. OK Accepted CL 3 Closed.
<p>CL 4</p> <p>PP is requested to address the following:</p> <ol style="list-style-type: none"> The PLF value provided C-WET report is not consistent with the values used in investment analysis and PDD. The inconsistency in the values used for the PLF need to be clarified. The C-WET report on PLF is based on 74 number of WEGs for the project activity where as the number of WEGs for the project activity as per the PDD is only 64. DNV confirms the number of WEGs for the project activity by referring the PO placed by the PP and the DPR. PP is requested to provide clarification on this regard. PP is requested to justify the suitability of the PLF value considered for the investment analysis based on the PLF study conducted by C-WET, as the C-WET study was conducted for Samana in Jamnagar district, Gujarat, where as the project activity is located both in Jamnagar and Rajkot districts, Gujarat. 	<p>B.5.16</p> <p>B.5.17</p> <p>B.5.33</p>	<p>The replies are as follows:</p> <ol style="list-style-type: none"> The value of PLF estimated by C-WET is 25.71% for the project activity; however we had initially assumed an additional 3% transmission loss between WEG's and Enercon substation which had reduced the value of effective PLF to 24.94%. This value was considered in the financial analysis. However, we have now assumed the actual net value as mentioned in the CWET report i.e. 25.71%. This is more conservative. Primarily 74 locations have been identified, out of which 64 would be finally selected during the commissioning of the project. The reason for identifying 74 locations is the uncertain land mass at some of the locations which might be 	<p>The plant load factor provided in the detailed project report is 25.40%, which was based on the Electricity generation guarantee provided in budgetary offer received from Enercon (India) Limited dated 20 November 2009.</p> <p>However the investment analysis is conducted based on the plant load factor of 25.71% as provided in independent third party generation estimation report, prepared by Centre for Wind Energy Technology (an autonomous research and development institution under Ministry of New and Renewable Energy). This is inline with Para 3 (b) of UNFCCC guidelines for the reporting and validation of plant load factors version 01 "plant load factor determined by a third party (engineering company) contracted by the project participants".</p> <p>DNV has accepted the application of plant load factor of 25.71% as provided in independent third party generation estimation report as</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		<p>detrimental to foundation lying at those locations. Therefore PLF estimation has been done for the 74 locations; however any variation in the PLF value due to finally selected 64 locations has been covered in the sensitivity analysis of 10% considered in the financial analysis.</p> <p>c. We would like to submit that CWET report is based on the PLF estimated for specific 74 locations. The geographical coordinates for these 74 locations have been mentioned in the CWET report, which can be verified by the DOE.</p> <p>The report is based on specific location numbers and not on districts hence the question on suitability of PLF report does not arises.</p>	<p>a) Application of this value for investment analysis is more conservative.</p> <p>b) This is based on the generation estimate provided by independent third party Centre for Wind Energy Technology (an autonomous research and development institution under Ministry of New and Renewable Energy), inline with Para 3 (b) of UNFCCC guidelines for the reporting and validation of plant load factors version 01.</p> <p>It has been verified that the C-WET study was conducted based on the geo coordinates of the specific, the study was conducted for 74 locations and the geo coordinates provided in the PDD has been verified from CWET report.</p> <p>The final geo coordinates of the specific locations has been cross checked by DNV from the geo coordinates mentioned in the final PDD.</p> <p>OK Accepted.</p> <p>CL 4 Closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>CL 5</p> <p>Project Participant is requested is provide a copy of the Indian Wind Power Directory 2009.</p>	<p>B.5.29 B.5.30 B.5.31 B.5.32 B.5.33</p>	<p>A copy of Indian Wind Power Directory 2009 has been provided to DOE for verification.</p>	<p>In India, the regulatory environment for the power sector in general and renewable energy in particular is governed by the policies, regulations and tariff orders implemented at the state level, albeit derived from those by the central government. The geographical scope of common practice analysis should be at the state level. The state of Gujarat has been considered for assessing the common practice. DNV considers the selection of the region is appropriate. All the wind power projects with capacity more than 15 MW size (comparable size) in state of Gujarat were considered for common practice analysis, and it has been verified by DNV from by DNV from wind power directory 2009, that in state of Gujarat 697.815 MW capacity is added by wind power projects with capacity more than 15 MW size (comparable size) and this entire 697.815 MW capacity is under CDM pipeline and has been verified by DNV from the wind power directory 2009. A list of these projects with CDM links has been included in section B.5 of the PDD and same has been verified by DNV.</p> <p>In conclusion, it is DNV's opinion that</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>it has been correctly demonstrated that the project activity does not represent a common practice and thus the emission reductions achieved by the project are additional to any would happen in absence of the project.</p> <p>OK Accepted. CL 5 Closed.</p>
<p>CL 6</p> <p>PP is requested to justify how the current monitoring arrangement defined in the PDD meets the requirement of the applied version of methodology, which requires Quantity of net electricity generation supplied by the project plant/unit to the grid in year need to be monitored, whereas the current arrangement mentioned in the PDD calculates net electricity based on the apportioning of electricity recorded by the common meter (meter to which machines of other investors are also connected).</p> <p>PP is also requested to explain the detailed procedures of apportioning in Annex 4 of the PDD.</p>	<p>B.7.1 B.7.2 B.7.3 B.7.4 B.7.5 B.7.6 B.7.7 B.7.8</p>	<p>The apportioning procedure for the project activity is done based on the following meters:</p> <ul style="list-style-type: none"> i) Meters at VCB metering yards of various project owners connected to substation of Enercon ii) Meter at Enercon substation catering to all the machines of the project activity and other project developers. <p>The meter reading at the VCB metering yard and the Enercon substation are directly monitored and hence the apportioning of the electricity is based on the meter readings that are directly measured.</p>	<p>The net electricity generated will be calculated from the readings of export and import indicated by the main GETCO meter (also known as revenue meter) at the Sadodar substation maintained by Enercon (India) Limited. During the interview it was found that wind turbines installed by the project proponent and wind turbines installed by other project owners will also be connected to the same main meter. However the WEGs of a single customer (VIPCPL in this case) are divided into clusters and each cluster has dedicated metering system. Different clusters are connected to different Vacuum Circuit Breaker metering yards (VCB) which ultimately lead to the shared main GETCO meter (also known as revenue meter) at the Sadodar substation maintained by</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		The apportioning procedure is detailed in the section B.7.2 of the PDD.	<p>Enercon (India) Limited. The meter reading at these metering points will be taken jointly by the representatives of Enercon and GETCO in the form of Joint Meter Reading and Gujarat Electricity Development Authority (GEDA) will apportion the net electricity supplied to the grid at the Enercon substation to all the project owners after adjusting the transmission losses to the meter readings taken at dedicated cluster meters of different project owners. Based on which GETCO will issue a share certificate to each project owner for net electricity exported to the grid and each project owner raises sales invoices to the state electricity board based on the net electricity figures provided in the share certificates. Hence net electricity generation figures provided in the share certificate will be used for emission reduction calculation and same will be cross checked against the sales invoices raised to SEB. The procedures for metering defined above are inline with the provisions of the power purchase agreement.</p> <p>OK Accepted.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			CAR 6 Closed.
<p>CL 7</p> <p>PP is requested to address the following:</p> <p>a. The land used for the project activity is a forest land and PP needs to clarify that the Wild Life Protection Act 1972 is not applicable and EIA is not required for the project activity.</p> <p>b. MoEF clearance for the project activity has been provided in the name of Vish Wind Infrastructure Limited. PP is requested to provide clarification on this regard.</p>	<p>D.1.1</p> <p>D.1.2</p> <p>D.1.4</p>	<p>a. PP has received the stage II forest clearance, which is the overall approval given by Ministry of Environment and Forest (MoEF) against the forest land used for the project activity. As per the regulations, no other provisions like Wild life Protection Act 1972 are required further for the project activity. As per the EIA notification issued by Ministry of Environment and Forest dated 27 January 1994 SO60 (E) and 14 September 2006 SO1533(E), Environment Impact Assessment is not mandatory for Wind Energy Projects. The same has been confirmed by MoEF vide their letter dated 20 November 1997. These documents have been provided to DOE for reference. This implies that Environment Impact Assessment (EIA) is not applicable for the project activity`.</p>	<p>It has been verified by DNV that the project activity has already received stage II forest clearance, which the overall approval is given by Ministry of Environment and Forest (MoEF) against the forest land used for the project activity.</p> <p>As per the regulations, no other provisions like Wild life Protection Act 1972 are required further for the project activity. It has been verified by DNV that the project activity does not fall under wild life or bird statutory area.</p> <p>It has been verified by DNV that as per EIA notification issued by Ministry of Environment and Forest dated 14th Sep 2006 SO1533 (E), Environment Impact Assessment is not mandatory for Wind Energy Projects.</p> <p>It has been verified by DNV from the undertaking submitted to Ministry of Environment and Forest (DNA of India) by Vish Wind Infrastructure Limited, that all the formalities to ensure transfer of lease pertaining to “Vaayu India power project in Gujarat” in favor of VIPCPL will be completed as per</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		<p>b. Vish Wind Infrastructure Limited has acquired land on behalf of the PP. The land will subsequently be sub-leased/transferred in the name of VIPCPL by Vish Wind as per the due procedures. An undertaking by Vish wind in this regard has been provided to the DOE.</p>	<p>prevailing norms.</p> <p>The transfer of lease pertaining to “Vaayu India power project in Gujarat” in favor of VIPCPL will be cross checked during the first verification for the project; Hence a forward action request has been raised (refer FAR 1).</p> <p>OK Accepted. CL 7 Closed.</p>
<p>CL 8</p> <p>PP is requested to provide the translated version of the invitation published in the local newspaper and personal invitations which are in the local (Gujarati) language.</p>	<p>E.1.1 E.1.2</p>	<p>The translated version of paper advertisement and personal invitations has been provided to DOE for verification.</p>	<p>The translated version of the invitation published in the local newspaper and personal invitations has been verified by DNV.</p> <p>OK Accepted. CL 8 Closed.</p>

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
<p>FAR 1</p> <p>It has been verified that the Ministry of Environment and Forest clearance for the project activity has been provided in the name of Vish Wind Infrastructure Limited and a clarified has been raised in this regard (refer CL 7 raised). In response to the clarification requested project proponent submitted an undertaking submitted by Vish Wind Infrastructure Limited to Ministry of Environment and Forest (DNA of India), that all the formalities to ensure transfer of lease pertaining to “Vaayu India power project in Gujarat” in favor of VIPCPL will be completed as per prevailing norms.</p> <p>Hence the transfer of land lease pertaining to “Vaayu India power project in Gujarat” project in favor of VIPCPL need to be cross checked during the first verification for the project activity.</p>	D.1.4	<p>The transfer of land lease pertaining to “Vaayu India power project in Gujarat” project in favor of VIPCPL will be submitted to DoE during first verification.</p>

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APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Thamizharasi Kaliaperumal

Holds a Bachelor Degree in Chemical Engineering, she has an overall experience of around five years in Chemical /Petrochemical processing industries and CDM Consultancy altogether. Her main areas of work include Production support, Process trouble shooting (Technical Services), Energy Management (EnCon Measures, Energy Audits, CDM projects), Project feasibility studies, Management Information System.

She has completed ISO 14001:2004 - Environmental Management System Auditor / Lead Auditor Program, certified by IRCA.

She has been trained in various CDM Validation and Verification project activities.

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 eleven 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 140001 and OHSAS 18001 standards in chemical process industry for more than three years.

He has experience of around 4 years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.

Gaurav Srivastava

Gaurav Srivastava, CDM Validator/Verifier, DNV Bangalore, India holds a Master's Degree in Energy Systems. His educational qualification covers the fields of sustainable development, power plant technology, renewable energy technology, performance of thermal & electrical utilities and project financing. He has completed ISO 14001:2004 - Environmental Management System Auditor / Lead Auditor Program, certified by IRCA.

He has received extensive training in the CDM validation and verification process and has performed validation & verification of several CDM projects both India & abroad.

He has experience of around 3 and half years in validation and verification of numerous CDM projects in DNV, both in India & abroad. His qualification, training and experience in CDM demonstrate his sufficient sectoral competence in energy generation from renewable energy sources.

Kannan Parthasarathy

Handled Various projects on Wind Turbine requirements since 1993 onwards as on date in DNV. This includes the following:

- Wind Turbine Generator - various inspection and projects Covering WTG capacity 250KW to 1.5MW and various manufacturer (Various services provided to different manufacturer - Vestas RRB/AWT/NEG Micon/Vestas/Poioneer Wincon/Poioneer Asia/Gamesa/Suzlan/GE/Siva Electric/Wind Win etc)
- Vendor inspection of various items and component assessments. Castings Hub & Extender/ Tower/ Nacelle/ Gear box/Generator/Forging-Shaft/Yawing system etc
- safety Testing of Over speed machine and Breaking system
- Installation Commissioning of Machines and Power curve at specific site studies. Analysis of Plant Load factor (PLF) - actual Vs plant capacity
- Design services and Co-ordination with DNV Principle Denmark Office.
- CWET Centre for Wind Energy Testing - providing technical support in establishing the system & procedures. Also Wind Monitoring Mast installation and assessments at CWET Testing Location.
- Wind Turbine Array arrangement and studies; Conducted Micro-siting studies (Wind) and arrive at power curve (Theoretical) requirements.
- Type testing of 1 MW Gear Box and Generator and manufacturing assessments.
- Management System Certificate audits (Experience of above also performed during the work at NEPC-Micon)

Tang Zhiang

Mr. Tang Zhiang, Walter holds a Bachelor Degree in Thermodynamic Engineering and a Master Degree in Business Administration. Having an overall experience of around twelve years. Prior to joining DNV, having around 5 years in the field of power industry covering of consulting and engineering for thermal power, wind power, hydropower and solar energy projects. His experience also covers the field of space industry for thermal design, the energy analysis and thermal control for about 4 years.

He has gained the relevant financial and investment knowledge through his courses in MBA. He has applied his financial and investment knowledge in his consulting work for the power industry, such as investment risk analysis, financial accounting, investment parameters assessment, etc.

He has experience of more than 3 years in validation and verification of numerous CDM, VCS and GS projects in DNV both in China and abroad.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in “Energy Generation from Renewable Energy Sources”.