



VALIDATION REPORT

“20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra” in India

REPORT No. 2009-0327

REVISION No.: 05



VALIDATION REPORT

DET NORSKE VERITAS
CERTIFICATION AS

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Date of first issue: 12 August 2007		Project No.: PRJC-178396-2009-CCS-IND
Recommended for approval by: Hendrik W. Brinks	Approved by: Hendrik W. Brinks	Organisational unit: DNV Climate Change and Environmental Services
Client: Enercon (India) Limited		Client ref.: Mr. Yogesh Mehra

Project Name: 20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra
Country: India
Methodology: ACM0002
Version: 11
GHG reducing Measure/Technology: Grid-connected electricity generation from renewable energy sources (wind energy)
ER estimate: 33 348 tCO₂e/annum
Size
☒ Large Scale
☐ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval and submission for registration
☐ Rejected
 In summary, it is DNV's opinion that the "20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra" project in India, as described in the PDD of 12 April 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002 version 11. DNV thus requests the registration of the "20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra" project in India as a CDM project activity.

Report No.: 2009-0327	Date of this revision: 30 June 2010	Rev. No. 05
Report title: "20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra" in India		
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Key words: Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Validation
	Market Sector Energy Industry
<input checked="" type="checkbox"/> No distribution without permission from the Client or responsible organisational unit <input type="checkbox"/> Limited distribution <input type="checkbox"/> Unrestricted distribution	

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Abbreviations

BM	Build margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CERC	Central Electricity Regulatory Commission
CL	Clarification request
CM	Combined margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
EIL	Enercon India Limited
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
INR	Indian Rupee
IPCC	Intergovernmental Panel on Climate Change
IREDA	Indian Renewable Energy Development Agency
IRR	Internal rate of return
LoA	Letter of Approval
MEDA	Maharashtra Energy Development Agency
MERC	Maharashtra Electricity Regulatory Commission
MNES	Ministry of Non-conventional Energy Sources
MoEF	Ministry of Environment and Forests
MP	Monitoring Plan
MSEDCL	Maharashtra State Electricity Distribution Company Limited
NGO	Non-governmental Organisation
O&M	Operations & Maintenance
ODA	Official Development Assistance
OM	Operating margin
PDD	Project Design Document
PLF	Plant load factor
PPA	Power purchase agreement
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WEG	Wind Turbine Generator



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra” in India. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, 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 Enercon (India) Limited of India. The host Party India meets all participation requirements and the DNA of India has approved the project on 15 February 2008 and authorized the project participant. The DNA of India also confirmed via the letter of approval that the project assists in achieving sustainable development /2/.

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.

The project correctly applies ACM0002 “Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources”, version 11 /3/. The procedures for monitoring, operating and maintenance have been elaborated as per the requirement of the methodology. Adequate training and monitoring procedures have been implemented.

By generating electricity from wind energy sources and exporting to the western regional grid, which is now part of NEW & NE 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 33 348 tCO_{2e} 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.

A local stake holder consultation process has been carried out by the project participant. DNV published the PDD on the DNV Climate Change web site and comments by Parties, stakeholders and UNFCCC accredited NGOs were invited through the CDM web site. No comments were received during this period.

In summary, it is DNV’s opinion that the “20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra” project in India, as described in the PDD version 4 dated 12 April 2010 /1/, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002 version 11 /3/. DNV thus requests the registration of the “20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra” project in India as a CDM project activity.



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2 INTRODUCTION

Enercon (India) Limited has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra” project in India. 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 and host Party criteria 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 /3/. The validation was based on the recommendations in the Validation and Verification Manual version 1.1 /4/.

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



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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 table outlines the documentation reviewed during the validation:

- /1/ Enercon Wind Farms (SAI) Pvt. Limited: *CDM-PDD for 20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra*, initial version 1 dated 15 June 2007 and final version 4 dated 12 April 2010.
- /2/ Enercon Wind Farms (SAI) Pvt. Limited: *Letter of Approval from DNA of India*, dated 15 February 2008.
- /3/ CDM Executive Board: *ACM0002, Consolidated baseline methodology for grid-connected electricity generation from renewable sources*, version 11.
- /4/ CDM Executive Board: *Validation and Verification Manual*, version 1.1.
- /5/ CDM Executive Board: *Tool for demonstration and assessment of additionality*, version 5.2.
- /6/ Enercon India Limited: *Electricity generation estimate for the proposed project activity provided*, dated 7 July 2006.
- /7/ Enercon Wind Farms (SAI) Pvt. Ltd.: *Purchase Order placed for Wind Energy Generators on Enercon India Limited*, dated 17 August 2006.
- /8/ CEA: *CO₂ Baseline Database for the Indian Power Sector*, version 2, dated 21 June 2007.
www.cea.nic.in
- /9/ Authorization letter issued by Enercon Wind Farms (SAI) Pvt. Ltd. to Enercon (India) Limited dated 19 September 2006 to authorize Enercon (India) Limited as project participant for the project and for PDD preparation, appointment of DOE, sale of CERs and to deal with Ministry of Environment & Forest (DNA of India).
- /10/ Enercon Wind Farms (SAI) Pvt. Limited: *Minutes of meeting of board of director's of Enercon Wind Farms (SAI) Pvt. Limited* held on 3 August 2006.
- /11/ CARE Sustainability: *Environment Impact Assessment report*, carried out by CARE Sustainability of January 2007 for the project activity.
- /12/ Technical specification provided by Enercon India Limited for Enercon E-48 Wind Energy Converters & power curve for the E-48 model dated 14 April 2005.
- /13/ Enercon India Limited: *Final budgetary offer for the WEGs of the proposed project*



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activity, dated 7 July 2006.

- /14/ MSEDCL: *Commissioning certificates of Wind Energy Generators*, dated 28 February 2007, 13 September 2008, 24 September 2008, 4 December 2008, 11 February 2009, 26 February 2009 & 17 March 2009.
- /15/ CDM Executive Board: *Guidelines on the assessment of investment analysis*, version 3.1.
- /16/ Maharashtra Electricity Regulatory Commission tariff order dated 24 November 2003 applicable for and is applicable for all wind power projects in Maharashtra that have come up after November 2003.
- /17/ Enercon Wind Farms (SAI) Pvt. Limited: *Financial analysis spreadsheet for 20 MW Enercon SAI Investment Analysis*, dated 17 February 2010.
- /18/ Maharashtra Energy Development Agency: *Wind power generation for year 2004 - 2005: Electricity generation data of Ahmednagar for year 2004-05*.
- /19/ Maharashtra Energy Development Agency: Historically maximum observed PLF for all WEGs commissioned till 2004-05, in Ahmed Nagar district (area of project activity) is 19.64%.
- /20/ <http://www.windpowerindia.com/statyear.html> to demonstrate wind capacity in state of Maharashtra at the time of the commissioning of the project activity (31 August 2008) and the installed capacity in Maharashtra between 2003 - 2008.
- /21/ Government of Maharashtra: *Maharashtra wind power policy* dated 12 March 1998 to demonstrate sales tax benefits for wind power projects.
<http://www.mercindia.org.in/pdf/Clarificatory%20Order-Wind%20Energy%20%5BCase%20Nos%207,%2015%20&%2016%20of%202004%5D.pdf>
- /22/ Detailed spreadsheet with CDM links of all CDM projects or projects under CDM pipeline to demonstrate common practice analysis dated 31 March 2008.
- /23/ Enercon Wind Farms (SAI) Pvt. Limited: *Notice published in the local newspaper, Sarvmat*, on 29 October 2006 inviting stakeholders to comment on the project.
- /24/ Enercon Wind Farms (SAI) Pvt. Limited: *Minutes of local stakeholder meeting*, conducted on 15 November 2006.
- /25/ DNV: *Short form agreement signed between project participant and DNV for validation of the project activity*, dated 22 November 2006.
- /26/ IREDA and project participants: *Loan Agreement*, dated 22 January 2007.
- /27/ MEDA: *Commissioning Clearance for the project activity*, dated 7 February 2007, 27 February 2007, 20 May 2008, 8 September 2008, 18 September 2008, 3 December 2008, 7 February 2009, 26 February 2009, 13 March 2009 and 16 March 2009.
- /28/ Enercon Wind Farms (SAI) Pvt. Limited: *Declaration letter from Enercon India Limited for Stakeholder consultation for the project activity* dated 8 October 2009.
- /29/ Maharashtra Energy Development Agency: *Infrastructure refund policy for refund of investment made in building power evacuation facility*, dated 14 October 2008.



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- /30/ Project proponent and Enercon India Limited: *CDM consulting agreement*, dated 23 February 2007.
- /31/ Maharashtra Energy Development Agency: *Infrastructure Clearance for the project activity*, dated 3 October 2006.
- /32/ Prime lending rate proposed by Reserve Bank of India for year 2005-06:
<http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/71430.pdf>
 Historical Prime lending rate form the Reserve Bank of India:
<http://www.rbi.org.in/scripts/WSSViewDetail.aspx?TYPE=Section&PARAM1=4>
- /33/ Risk free rate proposed by Reserve Bank of India for year 2005-06.
<http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/87456.pdf>
- /34/ Income Tax Act 1961, sourced from Income Tax Department, Ministry of Finance.
<http://law.incometaxindia.gov.in/TaxmannDit/DisplayPage/dpage1.aspx>
- /35/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, version 2.
- /36/ BSE Sensex data from April 1991 to July 2006 available at www.bseindia.com
- /37/ The Ministry of Environment and Forests (MoEF), India: *Environment Impact Notification S.O. 1533*, (<http://envfor.nic.in/legis/eia/so1533.pdf>) dated 14 September 2006
- /38/ Independent third party report (Fair Aero Consultant & Technologist) dated 10 November 2006 on generation estimate of Enercon (India) make WEG (E-48, 800 kW) in Panchpatta, village in Akole Taluk of Ahmednager District in state of Maharashtra.
- /39/ Enercon Wind Farms (SAI) Pvt. Limited: WACC (benchmark applied for the project activity) calculated based on cost of debt and required rate of return used for 20 MW Enercon Wind farms (SAI) Pvt. Limited project activity.
- /40/ Power purchase agreement signed for the project activity dated 21 May 2007, 3 August 2008, 1 October 2008, 10 December 2008, 17 March 2009 & 30 March 2009.
- /41/ Enercon Wind Farms (SAI) Pvt. Limited: *Sales invoices*, raised to MSEDCL for electricity supplied through 20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra (project activity) for year 2007, 2008, 2009 and 2010.
- /42/ Enercon wind farms (SAI) Pvt. Limited: *Certificate of Incorporation of Enercon wind farms (SAI) Pvt. Limited*, dated 23 September 2005.
- /43/ Enercon wind farms (SAI) Pvt. Limited: *Letter of Authorisation issued by Enercon wind farms (SAI) Pvt. Limited*, dated 23 August 2006 to authorise Enercon (India) Limited as project participant for the CDM project activity on their behalf.
- /44/ Enercon (India) limited: Electricity Monthly Apportioning breakup report prepared by Enercon (India) limited and electricity sales invoice raised to MSEDCL based on breakup report for year 2007, 2008, 2009 and 2010.
- /45/ CRISIL Advisory Services: *Report on Cost of Capital for Central Sector Utilities*, dated 13 April 2000.
- /46/ MERC: *Electricity tariff order for wind projects in state of Maharashtra* dated 24 November 2004.



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- http://mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf
- /47/ Enercon wind farms (SAI) Pvt. Limited: *Operation and maintenance contract*, signed between project proponent and Enercon India Limited, dated 17 August 2006.
 - /48/ Central Electricity Regulatory Commission: *Terms and Conditions of Tariff Regulations 2004*, dated 26 March 2004.
 - /49/ Designated National Authority of India Website (CDM India):
<http://www.cdmindia.nic.in/cdmindia/projectList.jsp?n=y&off=601>
 - /50/ Wind Power Directory 2008 to demonstrate all wind power project commissioned in state of Maharashtra till 2008.

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:

- Change in start date of crediting period.
- Changes to monitoring plan
- Correction in electricity generation units considered for emission reduction calculations.
- Change in applied version of the methodology from ACM0002 version 06 to version 11.
- Change in applied benchmark for the project activity: at the time of decision making for the project activity project participant had considered the post tax 16% equity IRR, inline with the guidelines of Maharashtra Electricity Regulatory Commission (MERC) of India for determination of electricity tariff. However in view of the EB guidelines via EB 40 paragraph 40 that this benchmark is applicable for tariff calculation and hence cannot be used as a benchmark for financial evaluation of project activity; the project participant has assessed the financial additionality of the project against a revised benchmark.
- Change in project IRR value: In webhosted PDD, project proponent had calculated the equity-IRR of the project to demonstrate the additionality of project. However the EB guidelines rejected the CERC/SERC benchmark to demonstrate the additionality of project as this is applicable for electricity tariff calculation. Hence the project participant has assessed the financial additionality of the project against a revised benchmark (project-IRR) and project proponent has now calculated project-IRR to demonstrate the additionality of the project.

3.2 Follow-up Interviews with Project Stakeholders

At the time when the PDD was webhosted for global stakeholder consultation the CDM EB VVM was not in place and the IETA and world bank validation and verification manual, does not warrant mandatory site visit for validation. Hence the site visit for the project activity was not conducted initially. However, considering the CDM VVM requirement on 21-22 January 2010, DNV conducted the site visit of the project at Ahmednagar in line with VVM requirements.

At that time, all WEGs of project activity were commissioned and were fully operational. Representative of the project participant (Enercon India Limited) were interviewed. The main topics of the interviews are summarized in Table 1:



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Table 1 Interview topics

Name	Organization	Topic
Mr. Puneet Katyal, Head-CDM, EIL	Enercon India Limited (EIL)	➤ Financials of the project activity
Mr. Bapan Mishra, Service site incharge, EIL		➤ Environmental compliance
Mr. Ashish Dhawan, Service site incharge, EIL		➤ Estimated emission reductions
Mr. Saujanya Kumar CDM-Corporate, EIL		➤ Project additionality
		➤ Stakeholders consultation process
		➤ Technology applied and operational lifetime
		➤ Monitoring and reporting procedures
		➤ Calibration, internal audit and corrective action procedures
		➤ Provisions for training, operation and maintenance

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol is customised for the project. The protocol shows in transparent manner 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 three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the "20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- mistakes have been made with a direct influence on project results;
- CDM and/or methodology specific requirements have not been met; or
- there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

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Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities				
Requirement	Reference	Conclusion		
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.</i>		

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a corrective action request (CAR) due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.</i>

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 2	Summary of project owner response	Validation conclusion
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

Figure 1: Validation protocol tables

3.4 Internal Quality Control

The final validation report underwent a technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.



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3.5 Validation Team

The validation team consisted of the following personnel:

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>						
				Administrative Work	Desk review	Site Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader	Murali	Govindarajulu	India		√		√	√		
GHG auditor	Srivastava	Gaurav	India	√	√	√	√			
Sector expert	Parthasarthy	Kannan	India		√					√
Technical reviewer (applicant)	Dudek	Agnes	Norway						√	
Technical reviewer	Yang	Weidong	USA						√	

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



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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 validation findings relate to the project design as documented and described in the final project design documentation dated 12 April 2010 /1/.

4.1 Participation Requirements

The project is developed by Enercon Wind Farms (SAI) Pvt. Limited, a special purpose vehicle incorporated by Enercon (India) Limited to set up wind power project in the state of Maharashtra as verified by DNV from the Certificate of Incorporation dated 23 September 2005 /42/. Enercon Wind Farms (SAI) Pvt. Limited authorized Enercon (India) Limited as project participant for the CDM project activity on their behalf as verified by DNV from the authorization letter issued on 23 August 2006 /43/.

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 February 2008, which also confirms that the project assists in achieving sustainable development in India /2/. It has been cross checked from the CDM India website that the project has been approved by the DNA of India /49/.

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 wind farm of Enercon wind farms (SAI) Pvt. Limited has an installed capacity of 20 MW and the entire power generated is being exported to the Maharashtra state grid which is a part of the western regional electricity grid. The project activity consists of the installation of 25 wind energy generators (WEGs) each of 800 kW rating, thereby aggregating to 20 MW, in the Panchpatta, village in Akole Taluk of Ahmednager District in the state of Maharashtra state in India. All the WEGs in the project have been supplied by Enercon (India) Ltd, who is also responsible for the operation, maintenance and management of the project.

The project is expected to generate 36 792 MWh of energy per annum at a plant load factor of 21% /6/ and has also been cross checked against independent third party generation estimation report from Fair Aero Consultant & Technologist dated 10 November 2006. DNV can confirm that the PLF assumed by project proponent is reasonable /38/.

The starting date of the project activity has been identified as 17 August 2006, which is the date of purchase order placed for the wind turbines of the project activity /7/. The lifetime of the project is 20 years which is reasonable for a WEG /46/. The project has selected a fixed crediting period of 10 years with the start date of the crediting period to be 1 November 2010 (or on the date of registration of the CDM project activity, whichever is later). The project is expected to result in 33 348 tCO₂e emission reductions per annum over the crediting period.

The project description is to the consideration of DNV complete and accurate.



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4.3 Baseline Determination

The project correctly applies the approved baseline methodology ACM0002, version 11 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”/3/. 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 western regional grid of India and has been verified from the purchase order placed for the project activity dated 17 August 2006 /7/.
- The project activity is connected to the western regional grid of India, and the system boundaries are clearly identified and information on the characteristics of this grid is available /8/.
- The project does not involve an on-site switch from fossil fuels to a renewable source /1/.

The project being a wind energy generation activity, the rest of the applicability conditions as mentioned in the methodology do not apply to this project activity.

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 (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 Maharashtra state electricity grid which forms a part of the western regional grid of India, the baseline for this project activity is a function of the generation mix of the western regional grid of India. The selection of the western 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” /35/, the weights for OM and BM have been taken as 75:25. The combined margin emission coefficient for the western regional grid of India has been calculated at 0.90641 tCO₂e/MWh and is fixed *ex ante* for the entire fixed 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. 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 /8/. 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

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the Government of India for the purpose of CDM baselines. 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 2003-04, 2004-05 and 2005-06. BM is calculated *ex-ante* based on the 20% most recent capacity additions in the western regional grid of India based on net generation for the year 2005-06 /8/. The operating margin has been determined to be 0.9985 tCO₂e/MWh and the build margin to be 0.63 tCO₂e/MWh. The project design document for the project activity was webhosted on UNFCCC website on 10 July 2007¹. DNV confirms that the database version 2 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 western regional grid of India is fixed *ex-ante* for the entire crediting period /8/.

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 western regional grid of India.
Project emissions	No project emissions	NA
Leakage	No leakage	NA

4.4 Additionality

The additionality of the project activity is demonstrated by applying the “Tool for demonstration and assessment of additionality”, version 5.2 /5/, and primarily through a financial analysis.

4.4.1 Prior CDM consideration and continued action to secure CDM status

The starting date of the project activity has been identified as 17 August 2006, which is the date of purchase order placed for the wind turbines of the project activity, and was evidenced from the purchase order document /7/. 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. The project activity was commissioned in phases starting from 28 February 2007 and ending on 17 March 2009 /14/.

Prior CDM consideration:

The project activity is developed by Enercon wind farms (SAI) Pvt. Limited, a special purpose vehicle incorporated by Enercon (India) Limited to set up wind power project in the state of Maharashtra as verified by DNV from certificate of Incorporation dated 23 September 2005 /42/. The Board of Directors of Enercon wind farms (SAI) Pvt. Ltd. approved the project activity during the meeting dated 3 August 2006 /10/. The decision has been taken based on

¹<http://cdm.unfccc.int/Projects/Validation/DB/PZZ73OCS5CGSWTA68GYVCVUP7XWSBA/view.html>



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the final budgetary offer received from Enercon (India) Limited /13/. During the meeting, board of directors discussed that the returns from the project from sale of electricity supplied to the grid were insufficient to invest in the project. Hence the project viability was reassessed after consideration of the CDM revenues in addition to the revenues from sale of electricity generated. The revenues that the project can earn and their importance were discussed in the meeting /10/. This confirms that revenues from CDM were seriously considered in the decision to proceed with the project activity and is in accordance with EB49 annex 22.

Continued action to secure CDM status:

- On 19 September 2006 Enercon Wind Farms (SAI) Pvt. Ltd. issued a work order /9/ to Enercon (India) Limited and authorized Enercon (India) Limited for PDD preparation, appointment of DOE, sale of CERs and to deal with the Ministry of Environment and Forest (DNA of India) as verified by DNV from authorization letter issued dated 19 September 2006 /9/.
- On 29 October 2006, an advertised invitation for CDM stakeholder consultation meeting was published in the local newspaper Sarvmat dated 29 October 2006 /23/.
- On 15 November 2006, a local CDM stakeholder consultation meeting was conducted at the project site as verified by DNV from the minutes of meeting dated 15 November 2006 /24/.
- On 22 November 2006 Enercon (India) Limited appointed DNV as DOE for validation of the project activity /25/.
- On 10 July 2007 the validation started by webhosting of the PDD on UNFCCC website for global stakeholder consultation.

Since there is no gaps of more than 2 years in the initiatives to secure CDM status from the starting date to the start of validation were identified, sufficient efforts to secure CDM status in parallel to the implementation of the project activity were confirmed.

4.4.2 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.

4.4.3 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.

4.4.4 Investment analysis: Benchmark selection

A project-IRR benchmark calculated based on the weighted average cost of capital (WACC) /39/ for the power sector in India, which can be compared against the project-IRR, has been



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selected as benchmark for the project activity. The WACC was prepared for the power sector in India.

The weighted average cost of capital for the power sector in India has been calculated based on the average prime lending rate of 11% published by the Reserve Bank of India for the year 2006 for the five major banks in India /32/ applicable at the time of investment decision taken for the project activity and is inline with CDM EB guidelines on assessment of Investment Analysis Para 6 /15/. DNV has further cross checked historical value for prime lending rates in India for the 5 years preceding the project investment decision /32/ and the 11% lending rate was found to be a reasonable value.

The cost of equity was determined by using the Capital Asset Pricing Model (CAPM). The key parameters of the CAPM model have been calculated as follows:

- An average risk free rate of 6.63%, applicable at the time of investment decision for long term investment. The project participant has sourced this value ($R_f = 6.63\%$) from the annual report of the Reserve Bank of India. The validation team accepted this value as it has been sourced directly from the RBI report, which is reliable and has been verified from the website of Reserve Bank of India /33/. DNV has further cross checked historical value for average risk free rates in India for the 5 years preceding the project investment decision /33/ confirming that the chosen value is reasonable.
- Market return (R_m) or Compound Accumulated Growth Rate (CAGR) is calculated based on market performance data for a period (1 April 1991 to 31 July 2006) for BSE 200 indices. The data for the same has been verified from BSE Sensex data available at Bombay Stock Exchange website /36/.
- Based on average risk free rate and market return the risk premium worked out to be 11.87% /17/.
- The average raw beta value (1.37) among all the conventional and non conventional power plants listed in the Bombay Stock Exchange for the period of three year (3 August 2003 to 30 July 2006) have been selected: BF Utilities Ltd. (1.73), CESC limited (1.46), Gujarat Industries (1.18), Neyveli Lignite (1.47), Reliance Energy (1.09) and Tata Power Company limited (1.28). Screenshots of the beta values for individual companies published by Bloomberg are provided in Appendix 3 of PDD. These beta values were prevailing at the time of investment decision. The time period of three year considered for 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 /45/ that, for such economies, and for companies whose capital structure and operating environment has been changing, the time period over which 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 beta is being calculated.
- A debt to equity ratio of 70:30 has been considered for WACC calculation and this is in line with guidelines stipulated by MERC for financing wind projects, in its tariff order dated 24 November 2003 /46/.
- As per 80 IA of Income Tax Act; the green field wind power projects in India are eligible to claim tax holiday for 10 consecutive years from the first 15 years, in such cases where the normal tax is exempted and the project has to pay Minimum alternative tax only. It has been verified by DNV that the tenure for such power sector



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projects in India is 10 years and same is applicable for the project activity as well. Further as interest on loan is tax deductible; therefore Marginal tax rate of 11.22% is used for computation of cost of Debt while calculating applicable WACC for the project activity. Hence A marginal tax rate of 11.22% for calculation of WACC is applied correct and is in line with the Indian Income Tax Act /34/

- Based on CAPM model and average prime lending rate the weighted average cost of capital works out to be 13.70% /39/. The WACC is a calculated figure and has been verified by DNV and was found to be correct.

4.4.5 Investment analysis: Input parameters

The input parameters used in the financial analysis of the project activity have been sourced from the final budgetary offer received from Enercon (India) Limited dated 7 July 2006 /12/. The electricity tariff used for the financial analysis has been sourced from the Maharashtra electricity regulatory commission tariff order dated 24 November 2003 /46/.

Given this short period of time between the final budgetary offer and the decision to proceed with the project activity, it is thus reasonable to assume that the final budgetary offer received from Enercon India Limited has been the basis of the decision to proceed with the investment in the project.

DNV has compared the total project cost, the percentage of operation and maintenance costs relative to total investment costs, the electricity tariff and the load factor considered in financial analysis against the budgetary offer from Enercon India Limited /12/, purchase order, O&M contract and PPA, the input values were found to be consistent.

A PLF of 21% considered by the project proponent Enercon Wind Farms (Sai) Pvt. Ltd for the financial analysis is based on the electricity generation estimates provided in budgetary offer from Enercon India Limited /12/ and was based on the micro-siting study conducted by Center for Wind Energy Technology (an independent R&D Institution attached to Ministry of New and Renewable Energy Sources, Government of India) at project site /13/. Thus meets the requirement of EB 48 Annex 11 Para 3 (a) requirement. In DNV's opinion the PLF considered by the project proponent is reasonable considering:

a) Maharashtra Electricity Regulatory Commission (MERC) has categorized wind power projects in three groups for determination of applicable electricity tariff. Group 1 project consist of WEGs commissioned before 27 December 1999, group II consist of WEGs commissioned after 27 December 1999 till 24 November 2003 and group III consist of WEGs commissioned after 24 November 2003. The project activity falls under group III category and the average PLF considered by Maharashtra Electricity Regulatory Commission (MERC) in its tariff order dated 24 November 2003 from group three projects (for the purposes of tariff calculation is only 20% /46/).

b) The project activity is located in the district of Ahmednagar in Maharashtra where the observed historical PLF is 19.07% in the year 2004-05 (year prior to investment decision) /18/.

c) Maximum observed PLF in the district of Ahmednagar (where the project activity is located) in Maharashtra is 19.64% /19/.



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d) The independent third party report (Fair Aero Consultant & Technologist) dated 10 November 2006, also confirms that the plant load factor calculated based on generation estimate of Enercon India Limited make WEG (E-48, 800 kW) in Panchpatta, village in Akole Taluk of Ahmednager District in state of Maharashtra is around 19.64% /38/.

Hence the PLF of 21% considered by the project proponent is deemed reasonable.

The incentives from the Government of India for the renewable energy projects such as accelerated depreciation and tax holidays have been taken into consideration for the financial analysis, and income tax benefits due to accelerated depreciation has been considered in the financial analysis /17/. The following documents have been cross checked for confirming the figures used in the financial calculations:

- Project total investment of 1 032.5 Million INR was verified against the budgetary offer received from the Enercon India Limited (WEG Supplier) for WEGs of project activity dated 7 July 2006 /13/ and actual purchase order for investment cost /7/. DNV confirms that the total project cost considered in budgetary offers matches with the actual purchase order for the investment cost.
- The electricity tariff considered for the project activity is based on the Maharashtra electricity regulatory commission tariff order dated 24 November 2003 /17/. As per the MERC tariff order the electricity tariff is fixed at INR 3.50/kWh (VAT is not applicable on tariff for sale of electricity /41/) with annual escalation of INR 0.15/kWh and is valid only for 13 years. The annual escalation rate (INR 0.15/kWh) has been cross checked by DNV against the power purchase agreement signed for the project activity dated 21 May 2007, 3 August 2008, 1 October 2008, 10 December 2008, 17 March 2009 and 30 March 2009 /40/ and recent sales invoices raised to MSEDCL /41/. DNV confirms the electricity tariff provided in PPA matches the electricity tariff considered for the financial analysis and is fixed for 13 year /40/. Thereafter, it is clearly stated in the tariff order that the tariff is subject to revision at the end of the period. Therefore, any assumption on the tariff applicable from 14th year onwards is uncertain. An electricity tariff of INR 1.80/kWh (VAT is not applicable on tariff for sale of electricity /41/) after 13th year has been used in the for investment analysis and is estimated based on a "cost-plus" approach in line with the approach prescribed by MERC in its tariff order of 24 November 2003 /16/, i.e., based on the expected operating costs incurred in year 14 and return on equity and DNV has checked that the same approach has been followed by MERC /16/. A detailed assessment of electricity tariff is provided in sensitivity analysis section of the report.
- The operation and maintenance services for the project will be provided by Enercon India Limited (O&M contractor for the project activity). DNV has cross checked the operation and maintenance cost and annual escalation provided in the budgetary offer with actual O&M contract /47/ signed for the project activity and confirms the O&M cost and annual escalation value matches the O&M cost considered in the budgetary offer /13/.
- Income tax has been calculated at the rate of 33.66% and minimum alternate tax at the rate of 11.22% /34/. All the taxes and incentives are confirmed to be applied correctly and as per the Indian Income Tax Act /34/. Straight line depreciation has been calculated in line with the prevailing national regulation and industrial practice /34/.



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For the purpose of tax computation the project participant has considered the tax benefits from interest payments.

- The working capital requirement for the project operation has been calculated (45 days for account receivable and 30 days period for operation and maintenance expenses) based on norms prescribed by CERC on its Terms and Conditions of Tariff Regulations of 26 March 2004 /48/.
- A salvage value of 10% has been considered in the financial analysis and is line with norms prescribed by Central Electricity Regulatory Commission (CERC) /48/.

4.4.6 Investment analysis: Calculation and conclusion

The IRR calculations and assumptions provided in a spreadsheet /17/ are consistent with the budgetary offer received from Enercon India Limited of 7 July 2006 /13/. The calculations were verified and found to be in line with EB's guidance on investment analysis /15/. The assumptions used in the calculations are appropriate and have been verified by DNV. The project-IRR of the project over 20 years is 9.09% without the income from CERs /17/. The project is financially less attractive compared to the applied benchmark of 13.70% in the absence of CDM benefits and even after considering lowest beta value of 1.09 the WACC works out to 12.71% the project-IRR is below this benchmark. With CDM revenues, the project IRR improves and thus makes the project feasible.

4.4.7 Investment analysis: 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 and maintenance costs, annual electricity generation and on-grid tariff were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen.

Increase in generation: With an increase in generation by 28.5% (to 27% PLF) the project IRR crosses the benchmark of 13.70% adopted by the project participant. The PLF of 21% considered in the financial analysis is based on the electricity generation estimates for the project activity provided by Enercon (India) Limited /13/ and has also been verified from an independent third party report (Fair Aero Consultant & Technologist) dated 10 November 2006 which also states the plant load factor of Enercon India Limited make WEG (E-48, 800 kW) in Panchpatta, village in Akole Taluk of Ahmednagar District in state of Maharashtra is around 19.64% /38/.

Moreover, the average PLF considered by Maharashtra Electricity Regulatory Commission (MERC) in its tariff order dated 24 November 2003 from group three projects (project commissioned after 2003) for the purposes of tariff working is only 20% /46/. The project activity is located in the district of Ahmednagar in Maharashtra where the observed historical PLF is 19.07% in the year 2004-05 /18/. However, maximum observed PLF in the area of project activity is 19.64% /19/, based on the generation data of a large scale CDM project located in the same area /19/. Hence an increase of 28.5% in electricity generation to achieve a PLF of 27% is highly unlikely.

Decrease in O&M cost: Even with no O&M costs the IRR for the project activity is 11.12%, which is lower than the benchmark return. Hence this parameter has not been considered for the sensitivity analysis and this is deemed reasonable.



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Increase in electricity tariff: The tariff considered for the project activity was based on Maharashtra Electricity Regulation commission tariff order dated 24 November 2003 /16/. As per MERC tariff order electricity tariff is fixed at INR 3.50/kWh (VAT is not applicable on tariff for sale of electricity /41/) with annual escalation of INR 0.15/kWh and is valid only for 13 years as verified by DNV from power purchase agreement signed dated 21 May 2007, 3 August 2008, 1 October 2008, 10 December 2008, 17 March 2009 and 30 March 2009 /40/ and electricity sales invoice receipt raised to state electricity board /41/. Thereafter, it is clearly stated in the tariff order that the tariff is subject to revision at the end of the period. Therefore, any assumption on the tariff applicable from 14th year onwards is uncertain.

Assessment of accuracy of assumptions taken after year 13

In line with the CDM Executive Board guidance on investment analysis, the IRR analysis has been done for 20 years in the financial calculation sheet. There has been *no change* in the assumptions made for the IRR calculations except the tariff. The PPA has been signed only for 13 years /40/ and the tariff of INR 1.80/kWh (VAT is not applicable on tariff for sale of electricity /41/) after 13th year has been used in the calculations. Electricity tariff after 13th year has been estimated based on a "cost-plus" approach, i.e., based on the expected operating costs incurred in year 14 and return on equity. The tariff after 13 year of operation is calculated based on PLF provided in MERC order (20%), net cash flow (taking into account cash inflow outflow) and cost to be recovered after 13 year of operation /16/. DNV has checked that the same approach has been followed by MERC /16/ in determining tariff as provided below (extract from MERC /16/):

"The commission notes that in cost plus approach, which the commission has adopted for tariff proposal, rate per unit charged by such projects during initial period of 10 years is bound to be higher as during this period the project has various debt related obligations. However it is essential that the consumer is able to enjoy the benefit of cheaper power once all debt related obligations are paid off and project has virtually no variable costs". (Page no.14 /46/).

"The rate payable gets reduced after 10 years (i.e. after repayment of loan) so that the net average cost of energy gets reduced". (Page no.135 /46/)

"To ensure that developer does not remove the machine after availing higher purchase rate for 10 years, an agreement may be signed allowing MSEB to have second charge for first 10 years (when the lender institution shall have first charge on the machine) and subsequently MSEB shall have first charge for the balance 10 years". (Page no.141 /46/).

Based on the above extracts from the tariff order of MERC /16/ the tariff used after 13th year is deemed acceptable. Also, DNV has checked the robustness of the assumptions by considering following scenario:

- a) Electricity tariff of 1.80 INR/kWh (VAT is not applicable on tariff for sale of electricity /41/) without any escalation after 13th year of operation, calculated based on cost plus approach as described in MERC tariff order of 24 November 2004, the project IRR works out to be 9.09%.
- b) Electricity tariff of 2.30 INR/kWh (VAT is not applicable on tariff for sale of electricity /41/) without any escalation after 13th year of operation (in case if MERC does not consider adjustment of the surplus gained) calculated based on cost plus

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approach as described in MERC tariff order of 24 November 2004, the project IRR works out to be 9.46%.

- c) In case of the base tariff of 3.50 INR/kWh (VAT is not applicable on tariff for sale of electricity /41/) without any escalation after 13th year of operation the project IRR is 10.24%.
- d) In case the tariff of 5.30 INR/kWh (tariff for the 13 year as per PPA) without any escalation after 13th year of operation the project IRR is 11.22%.
- e) Even after considering same escalation as provided in PPA on tariff for 13 years to be extended to 20 years the project IRR is 11.48%.

It has been established that even after applying any of the above mentioned assumptions on the tariff after 13 years of operation the project IRR is below than the benchmark applied for the project activity.

Decrease in investment cost: With a decrease in investment cost by 23% the project IRR becomes 13.93% and thus exceeds the benchmark adopted by the project participant. However in DNV's opinion, a decrease of 23% in investment cost is deemed not to be realistic considering the fact that the project has been contracted on a turn key basis to Enercon India Limited by the project proponent Enercon Wind Farms (SAI) Pvt. Ltd. and the actual project cost has been cross checked by DNV by reviewing the purchase order /7/. In DNV's opinion, the project cost is not likely to have any increase or decrease. In the worst case scenario, there can only be an increase in the project cost (which decreases the IRR) and not a decrease. Hence, this parameter has not been considered for the sensitivity analysis and this is deemed reasonable.

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

4.4.8 Common Practice Analysis

The state of Maharashtra has been considered for assessing the common practice. Since the policies and tariff regime is consistent throughout the state of Maharashtra, DNV considers the selection of the region is appropriate.

Wind project capacity additions after March 2002 has been considered for the common practice analysis. In the state of Maharashtra till year 2002, the installation of wind based power projects was at peak due to sales tax benefits of INR 10 million per MW per year from the date of commissioning as per Maharashtra wind power policy 1998 /21/. Whereas in order to make investment in wind power attractive on a stand alone basis government of Maharashtra had withdrawn the sales tax benefits from wind power projects from 1 January 2000, however the wind power project sanctioned before 2000 and commissioned and connected to MSEB grid till March 2002 were eligible for sales taxes benefits. Hence it is deemed reasonable that wind power projects installed prior to March 2002 are not considered for common practice analysis.

At the time of the expected commissioning of project activity 31 August 2008 (commissioning got delayed due to MEDA clearance for the installation of WEGs) the installed capacity in Maharashtra was 1 756.38 MW /20/. During 2002-2008 a total capacity of 1 359.875 MW was added out of which 476 MW capacity was added from wind projects with capacity more than 15 MW (comparable capacity) as projects below 15 MW are



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considered as small scale project under CDM, and this entire 476 MW capacity is under CDM pipeline and detailed spreadsheet with CDM links of all these projects has been verified by DNV /22/.

The common practice analysis for the project activity was further assessed by extending range of variation considered for common practice analysis by considering all wind power projects above 10 MW commissioned during the period 2002-2008. Out of 1 359.875 MW total capacity added, 556.175 MW capacity was from wind projects with capacity more than 10 MW /50/ and 545.675 MW (98.11%) capacity is in the CDM pipeline.

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.

4.5 Monitoring

The monitoring plan is in accordance with the monitoring methodology ACM0002, version 11 /3/. 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. DNV considers the project participants able to implement the monitoring plan.

Monitoring of sustainable development indicators is not required by the Indian DNA. There are no environmental impacts due to the project activity.

4.5.1 Parameters determined ex-ante

The combined margin emission coefficient for the western regional grid of India has been calculated at 0.90641 tCO₂e/MWh 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. 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 /8/. This CO₂ baseline database provides information about the OM and BM factors of all the regional electricity grids in India, which has been established as per the "Tool to calculate the emission factor for an electricity system" /35/. 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 2003-04, 2004-05 and 2005-06 /8/. BM is calculated *ex-ante* based on the 20% most recent capacity additions in the grid based on net generation for the year 2005-06 /8/. The operating margin has been determined to be 0.9985 tCO₂e/MWh and the build margin to be 0.63 tCO₂e/MWh /8/. DNV confirms that the database version 2 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 western regional grid of India is fixed *ex-ante* for the entire crediting period /8/.

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4.5.2 Parameters monitored ex-post

The site visit for the project activity was conducted after the commission of all the WEGs of the project activity. During the site visit it was witnessed that machines of some other customers (not the part of this project activity) were also connected to the same meters to which the machine of the project activity are connected. The amount of electricity supplied to the western regional grid by individual project proponent is calculated by Enercon India limited based on the below mentioned apportioning formulae and same formulae is used to raise invoices to Maharashtra State Electricity Distribution Company limited monthly and has been verified by DNV from the apportioning breakup prepared by Enercon (India) limited and invoice raised to MSEDCL by Enercon (India) limited /44/.

Hence the net electricity supplied by the project activity (by all WEGs of project activity) to the western regional grid will be calculated as:

$$EG_y = EG_{\text{export}} - EG_{\text{import}}$$

Where,

EG_y = Net electricity supplied to the grid by the project activity (by all WEGs of project activity)

EG_{export} = Electricity exported to the grid by the WEGs of the project activity.

EG_{import} = Electricity imported to the grid by the WEGs of the project activity.

Electricity exported to the grid by the WEGs of the project activity (EG_{export}) will be calculated as:

$$EG_{\text{export}} = \frac{EG_{\text{JMR, export}} \times \sum_{y=0}^n EG_{\text{gross, y}}}{\left(\sum_{y=0}^n EG_{\text{gross, y}} + \sum_{y=0}^m EG_{\text{gross, y}} \right)}$$

Where,

$EG_{\text{JMR, export}}$ = Total electricity exported to the grid by all WEGs connected to the MSEDCL common meter, including machines of other customers which are not forming the part of the project activity (provided in the joint meter reading records issued by MSEDCL)

$\sum_{y=0}^n EG_{\text{gross, y}}$ = Summation of individual tower reading of all WEGs of the CDM project activity in year (by 20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra).

$\sum_{y=0}^m EG_{\text{gross, y}}$ = Summation of individual tower reading of all WEGs of other customer connected to the common meter of project activity in year.

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Similarly electricity imported from the grid by the WEGs of the project activity (EG_{import}) will be calculated as:

$$EG_{import} = \frac{EG_{JMR, import} \times \sum_{y=0}^n EG_{gross, y}}{(\sum_{y=0}^n EG_{gross, y} + \sum_{y=0}^m EG_{gross, y})}$$

Where

$EG_{JMR, import}$ = Total electricity imported from the grid by all WEGs connected to the MSEDCL common Meter, including machines of other customers which are not forming the part of the project activity (provided in Joint meter reading records issued by MSEDCL).

$\sum_{y=0}^n EG_{gross, y}$ = Summation of individual tower reading of all WEGs of the CDM project activity in year (by 20 MW Enercon Wind farms (SAI) Pvt. Limited in Maharashtra).

$\sum_{y=0}^m EG_{gross, y}$ = Summation of individual tower reading of all WEGs of other customer connected to the common meter of project activity in year.

The meter reading from the LCS of each turbine is noted by the CMS (central monitoring station) directly in the soft format. The LCS meter do not require calibration (as it does not have mobile parts) and it compares energy reading of electricity generated at the micro-processor based controller (LCS) compares the electricity generated (read through mechanical meter) with calculated electricity based on the theoretical power curves by taking into account excitation and inverter losses and if the difference is greater than 25 kW on an hourly basis, the LCS gives a 62:XX status alarm and generates the an error report and automatically stops the WEG operation, however as a part of better monitoring practice O & M contractor will ensure annual calibration of LCS meters of all WEGs which forms the part of the project activity by an Independent third party. 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 and apportioning break up report 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.



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4.5.3 Management system and quality assurance

The responsibility of overall project management lies with Enercon (India) limited, which will also be responsible for operation and maintenance of the project activity. The main and check meters at the uploading station are two way meters with an accuracy class of 0.5% 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.

4.6 Estimate of GHG Emissions

The GHG emission calculations are well documented in line with the consolidated baseline and monitoring methodology ACM0002, version 11 /3/. 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 western regional 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 western regional grid of India. In line with the guidance provided in the Tool to calculate the emission factor for an electricity system /35/, the weights for OM and BM have been taken as 75:25. The CM for the western integrated grid of India has been calculated at 0.90641 tCO₂e/MWh /8/ in section 4.5.1 and is fixed *ex-ante* for the entire fixed crediting period. The project is expected to result in emission reductions of 33 348 tCO₂ per year during the fixed crediting period.

The baseline emission estimates can be replicated using the data and parameter values provided in the PDD. The data sources mentioned have been verified by DNV. The calculations are transparently documented and verified to be correct.

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

4.7 Environmental Impacts

As per the Ministry of Environment and Forests (MoEF), India Environment Impact Notification S.O. 1533 dated 14 September 2006 /33/, wind power projects are not covered under any schedule and thus environmental impact assessment is not required for the project activity. However, Enercon (India) Limited, the equipment supplier and operation and maintenance contractor for the wind farm has voluntarily conducted an environmental impact assessment study for the wind power project in the project activity area. Enercon India Limited has appointed Care Sustainability to conduct the environmental impact assessment study for the wind power project to assess the impact of the project on the local environment /11/. The project is not likely to create any adverse environmental effects /11/. The project complies with environmental regulations in India. A detailed description of rapid environmental impact assessment study has been sufficiently discussed in PDD.



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4.8 Comments by Local Stakeholders

The local stakeholders were invited through local newspaper advertisement in *Sarvmat* on 29 October 2006 /23/ by Enercon (India) Limited, the project proponent, equipment supplier and responsible for operation and maintenance of the project activity. The local stakeholder meeting for the project activity was conducted in Ahmednagar District on 15 November 2006 /24/. The authorities of the local administration, local communities, farmers, officials of Gram Panchayat and contractors were invited to comment on the project activity. A detailed description of stakeholder consultation has been provided in Appendix 2 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.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of 15 June 2007 was made publicly available on UNFCCC website and Parties, stakeholders and NGOs were invited to provide comments through the CDM website during a 30 days period from 10 July 2007 to 8 August 2007². No comments were received during this period.

² <http://cdm.unfccc.int/Projects/Validation/DB/PZZ73OCS5CGSWTA68GYVCVUP7XWSBA/view.html>



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APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirement for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	NA
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR1 OK
4. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	CAR1 OK
5. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	NA

Requirement	Reference	Conclusion
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	NA
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	CAR-5 CAR-5 CL-3 CL-4 OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	CAR-7
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made	CDM Modalities and Procedures §40	OK

Requirement	Reference	Conclusion
publicly available.		
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
19. 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*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR/I	The project sites are located at Panchpatta villages in Akole Taluk in the district of Ahmednagar in Maharashtra.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/ /7/	DR	The 20 MW Wind Power Project comprises 25 numbers of Wind Energy Converters (WEC) each of 800 kW capacities. The plant is grid connected (Western grid) and houses the metering, switchgear and other protection equipment.		OK
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR/I	India is the host country in the project activity and the project participant is Enercon (India) Ltd. It is mentioned in the PDD that EIL is the supplier of WECs, if so, who is the project proponent?	CL1	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			No Annex-1 country has been identified as yet.		
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/ /2/	DR	Host country India is yet to provide the letter of approval in addition to the authorization to the project participant. Host Country Approval letter needs to be provided for verification.	CAR1	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/ /2/	DR	India fulfils the participation requirements, having ratified the Kyoto Protocol on the 26 August 2002 and has established a DNA - National Clean development Mechanism Authority, Ministry of Environment and Forests (MoEF). The voluntary participation of the project needs to be confirmed against the letter of approval from the DNA.	CAR1	OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR/I	The project does not involve any public funding and hence, no diversion of funds from official development assistance is expected.		OK
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.1. Does the project design engineering reflect current good practices?	/1/ /7/	DR/I	The WECs installed under the project has been designed and commissioned by Enercon India Limited. EIL is reputed firm in the field of wind energy. The salient features of the E-48 models implemented under the project activity include gearless construction, variable speed and pitch functions and independent braking technology. The project design thus reflects good practice.		OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/ /7/	DR/I	The technology is already available and widely used in the host country.		OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR/I	The project will require some initial training and maintenance efforts for proper operation. The operation and maintenance of the WEGs have been taken care by EIL. This ensures proper maintenance and operation of the WECs during the crediting period.		OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/ /2/	DR	The letter of approval from the DNA confirming that the project assists in achieving sustainable development needs to be submitted.	CAR1	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project will help to decrease the dependence on fossil fuels for power generation. The project activity will create employment opportunities during construction and also operation phases.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/1/ /3/ /4/	DR	Yes. The approved methodology – ACM0002 Version 06 (19 May 2006) - “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” has been applied.	CAR-4	OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/ /3/ /4/ /7/	DR/I	Yes, the project activity meets the applicability criteria of ACM0002 and is justified as under : <ul style="list-style-type: none"> The project activity involves an electricity capacity addition from a renewable source (wind based) providing power to the western regional grid of India 		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> The geographic and system boundaries for the relevant electricity grid has been clearly identified to be the western electricity grid ; <p>The project activity will displace fossil fuel based electricity that would otherwise be provided by the operation and expansion of the western regional grid of India and sufficient information on the characteristics of the grid are available.</p>		
B.2. Baseline Scenario Determination <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/1/ /3/ /4/	DR	The baseline scenario is that in the absence of the project activity, equivalent amount of energy would have been generated from the existing plants or newer plants by using the fossil fuels in the western grid to which the project activity is connected.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/ /3/ /4/	DR/I	Other than the baseline scenario, the option of setting up project without CDM benefits has been discussed. The selected baseline scenario seems reasonable.		OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/ /3/	DR	Yes, the baseline scenario has been selected in accordance with the baseline methodology		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/8/		ACM0002. The baseline as per the methodology is the electricity generated by the project times the grid emission factor of the connected grid calculated as per the guidelines provided. As the project activity exports power to the western regional grid, the emission factor of the western regional grid is considered and is sourced from the official published CEA website.		
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /8/	DR	Yes, the baseline scenario is arrived at based on conservative assumptions.		OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes, national and sectoral policies have been taken into consideration for selecting the baseline scenario.		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	Yes, all literature and sources have been mentioned.		OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	There are no risks perceived to the proposed baseline.		OK
B.3. Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline</i>					

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>benchmark analysis.</p> <p>The benchmark chosen is the post tax return on equity of 16% as stated for the state of Maharashtra in the Rajasthan Electricity Regulatory Commission order dated 18 January 2005.</p> <p>MERC order should be used?</p> <p>It has been demonstrated that the equity IRR of the project activity without CDM revenues is 9.11% which is lower than the benchmark equity IRR of 16% for independent power producers (IPP) as per RERC order.</p> <p>A sensitivity analysis has also been performed with ±5% change in PLF. And have shown that the equity IRR is less than 16%.</p> <p>On what basis the PLF is selected? Clarify?</p> <p>The financial spread sheet calculations need to be provided for verification.</p> <p>Step 3: Not chosen.</p> <p>Step 4: Common practice analysis:</p> <p>This as been demonstrated on the fact that as per the data the energy generation by wind power plants in 2004-05 was 495.36 GWh as against the total generation of 82 075.33 GWh. This works out to be around 0.6% and cannot be considered as a common</p>	<p>CAR-2</p> <p>CL-2</p>	

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			<p>practice scenario in the region. Apart from that it as been demonstrated that as on 31 March 2005 of the total 411.2 MW wind power projects established in Maharashtra.</p> <p>Source needs to be provided for the above information.</p> <p>Step 5: Impact of CDM registration: The CDM benefits increases the equity IRR of the project by 3.15% thus providing the project with necessary financial back-up.</p> <p>However, to conclude on the additionality, the following is requested:</p> <ul style="list-style-type: none"> • Project IRR and sensitivity analysis detail Justification / work sheet to be provided. • PLF consideration should be justified. • What are the incentives offered by the Government of Maharashtra? Have these been considered in the financial analysis? • PPA should be furnished. <p>All statutory clearances need to be provided for verification.</p>	<p>CL3</p> <p>CL4</p>	
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/ /3/	DR/I	Refer section B.3.1	CAR 5 CL 2	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/4/			CL3 CL5	
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /3/ /4/	DR/I	Refer section B.3.1	CAR-5 CL2 CL3 CL5	OK
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/ /7/	DR	The starting date of the project activity is stated as 19 April 2007. Proof needs to be provided for the same.	CL5	OK
B.4. Calculation of GHG Emission Reductions – Project emissions <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /3/	DR	No project emissions are likely as this is a wind energy power project.		OK
B.5. Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated</i>					

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /3/ /38/ /18/ /19/ /12/	DR/I	Baseline emissions have been estimated as the product of electricity generated in the project activity per year and grid emission factor of the western regional grid, which has been obtained from the official website of the Central Electricity Authority (CEA) The installed capacity of project plant is 20 MW and the plant is expected to export an average of 35.04 GWh electricity to the grid per year at a PLF of 20%.	CL-3	OK
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/ /8/	DR	Yes. The selected baseline is in accordance with the baseline methodology ACM0002. The baseline is transparent and the choice of emission factor of the current generation mix used for estimation of emission coefficient is conservative. It is clearly mentioned in the PDD that, the baseline estimation will consider an <i>ex-ante</i> emission factor throughout the crediting period. Hence, monitoring of OM and BM is not required.		OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/ /8/	DR	Since the emission factors have been selected from authentic sources, there are no uncertainties in the baseline emission		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			estimates.		
B.6. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	No leakages are to be considered as this is a wind energy power project.		OK
B.7. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	The project activity, on implementation as stated, is expected to result in emission reduction of 31 760 tCO ₂ e annually throughout the 10 year fixed crediting period.	CAR-6	OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/ /3/	DR	Yes, the monitoring plan is in accordance with the approved baseline methodology.		OK
B.8.2. Will all monitored data required for verification	/1/	DR	PDD does not mention about the period for	CAR-4	OK

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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?			which the monitored data will be archived. The same may be added in the monitoring plan.		
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	No project emissions are likely as this is a wind energy power project.		OK
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	For baseline calculations, net electricity supplied to the western regional grid by the project activity will be monitored by dedicated electricity meters. The power generated is recorded by meters and same will be documented. As the baseline emission factor is fixed <i>ex-ante</i> , monitoring of the baseline emission factor is not necessary.		OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	Yes, the choice of baseline GHG indicator of CO ₂ is reasonable.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR/I	It was witnessed during the site visit that the Non CDM Machines are also connected to the same meter to which CDM machines are connected; PP is requested to clarify how the electricity supplied by non CDM machine will be accounted for during the crediting period and same need to be included in PDD.	CAR-7	OK
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	Yes, trivector electronic meters will be used for monitoring the electricity exported by the project.		OK
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	Yes, all main and check meters will have 0.5% accuracy.		OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Yes, The measurement interval is mentioned as once in a month, kWh reading will be recorded and document will be maintained.		OK
B.10.7. Is the registration, <i>monitoring, measurement and reporting</i> procedure defined?	/1/	DR	Yes		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR/I	Maintenance procedures for the monitoring equipments and the installation have been addressed in the PDD.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Yes, the meters will be calibrated periodically, if there is any difference between the main and check meter readings.		
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR/I	Procedures for day-to-day record handling including type of records to be stored, the storage area, etc need to be established.	CAR-1	OK
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	No leakages are to be considered as this is a wind energy power project.		OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	The monitoring of sustainable development indicators is not warranted by the legislation of India.		OK
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic	/1/	DR	This is not required as per the legislation and hence not applicable.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
impacts?					
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	This is not required as per the legislation and hence not applicable.		OK
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR/I	Yes, Authority and responsibility of the project management is described in monitoring plan. Pending clarification on proponent of the project activity.	CL-1	OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR/I	Training procedures need to be identified and addressed in the PDD.	CAR-3	OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR/I	No emergencies related to unintended emissions are expected from a wind mills. Therefore procedures for emergency preparedness are not required.		OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	Yes.		OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future	/1/	DR	Please refer to B.13.1		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
monitoring and reporting?					
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR	The start date of the project activity has been defined as 17 August 2006 and operational lifetime cycle is 20 years. Documentary evidence for the project starting date needs to be provided.	CL-5	OK
C.1.2. Is the start 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 30 September 2007. Crediting period cannot start prior to registration, need to be changed accordingly.	CL-2	OK
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	While Indian legislation does not warrant an EIA to be done for this type of project activity, the PDD sufficiently describes the possible impacts during construction & operation.		OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	No, EIA is not needed for this project.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.3. Will the project create any adverse environmental effects?	/1/	DR	As, it is a wind farm project, the impacts are expected to be minimal.		OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	No trans-boundary environmental impacts are expected from this project activity.		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	No negative environmental impacts have been identified.		OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	No specific environmental clearances are required for wind farm projects in India.		OK
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1.1. Have relevant stakeholders been consulted?	/1/	DR/I	All relevant stakeholders were invited for the meeting conducted on 15 November 2006.		OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR/I	A local news paper advertisement was placed on 29 October 2006 inviting the stakeholders and a meeting of the local representatives was conducted on 15th Nov 2006. Proof need to be furnished.	CL-6	OK
E.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the	/1/	DR	Not specifically required for wind farm projects under host country legislation.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
stakeholder consultation process been carried out in accordance with such regulations/laws?					
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Yes. A minute of the meeting is included in the PDD.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	No adverse comments were received from local stakeholders.		OK

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Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

A.6. Letter of approval					
A.6.1. Is the LoA received directly from the DNA or through the project participant.	/1/	DR/I	The LOA has been provided by the project participant. However, it has been validated from the CDM India website (http://cdmindia.nic.in/cdmindia/projectList.jsp?search=search) that the project has indeed been approved by the DNA of India.		OK
A.7. Project design					
A.7.1. Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/	DR/I	Yes, the project description in the PDD is transparent.		OK
A.7.2. Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/ /	DR/I	The project activity was under construction at the time of the start of the validation.		OK
A.7.3. Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/	DR/I	The project is a large scale project with average annual emission reductions above 15000 tonnes CO ₂ e. Site visit has been carried out at the actual project location.		OK
A.7.4. Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR/I	The project activity is new installation and does not involve any alteration to any existing facility.		OK
A.8. Project emissions not addressed by the methodology					
A.8.1. Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the	/1/	DR/I	The project being a wind energy generation activity, there are no emissions from the project activity.		OK

methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).					
A.9. Documentation of baseline emissions					
<p>A.9.1. Documentation of the baseline determination:</p> <ul style="list-style-type: none"> a. 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. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 	/1/	DR/I	<p>All assumptions used in the PDD are correctly quoted and the supporting documents have been properly interpreted.</p> <p>The assumptions regarding the PLF, project cost, O&M cost and electricity tariff are deemed reasonable</p> <p>The methodology has been correctly applied in the context of the project activity.</p> <p>National policies regarding benefits allowable to renewable energy projects have been considered and listed in the PDD.</p>		OK
A.10. Documentation of the calculations					
<p>A.10.1. Algorithms and/or formulae used to determine emission reductions</p> <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. • All values used can be deemed reasonable in the context of the project activity 	/1/	DR/I	<p>All formulae and data used in calculating the emission reductions have been correctly referred and the emission reductions have been calculated in accordance with the methodology.</p>		OK

<ul style="list-style-type: none"> 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. 					
A.11. Implementation of the monitoring plan					
A.11.1. How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project be monitored ex-post and verified later by a DOE?	/1/	DR/I	The monitoring plan described in the PDD is sufficient for accurate reporting and verification of the emission reductions from the project. The electricity generation will be cross-checked from the electricity bills as per the QA/QC procedures. The suitability of the monitoring plan has been assessed through physical verification of the monitoring system on-site.		OK
A.12. CDM consideration prior to starting date					
A.12.1. The prior consideration of CDM for the project activity complies with EB41 annex 46	/1/	DR/I	Yes. It has been demonstrated that the project proponent had prior knowledge of CDM and real and continuous actions were taken for ensuring CDM benefits		OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 1: Host Party approval letter must be provided for verification.	A.2.2 A.2.3 A.4.1	The Host Govt. Approval for the project is enclosed.	The Letter of Approval from DNA of India dated 15 February 2008, has been verified by DNV. OK Accepted CAR 1 is closed.
CAR 2: For benchmark analysis the arguments must be based on the MERC order. Provide the financial spread sheet calculations for verification. As CDM Executive Board (EB 40 Para 40) has objected the use of 16% post tax return of equity stipulated by CERC as benchmark, project proponent is requested to revise the applied benchmark for the project activity inline with EB guideline on Investment analysis Project proponent is requested to justify the suitability of applied benchmark (financial hurdle rate) for the project activity.	B.3.1 B.3.2 B.3.3	In line with the order on EB 41, we understand that the benchmark used by CERC and State Regulatory Commissions are no longer applicable We also understand that as per Guidance to Investment Analysis, EB 51, annex 58, Para 12, the weighted average cost of capital can be considered as a benchmark for the Project IRR. Therefore we have calculated the benchmark WACC applicable for power sector companies in India and have compared the same with the project IRR. The spreadsheet showing the WACC	The benchmark applied by the project proponent at the time of decision making was the post tax 16% equity IRR as per the Maharashtra Electricity Regulatory Commission (MERC) of India to determine the tariff. However in view of the EB guidelines via EB 40 paragraph 40 that this benchmark is applicable for tariff calculation and hence cannot be used as a benchmark for financial evaluation of project activity; the project participant has assessed the financial additionality of the project against a revised benchmark. A Project-IRR benchmark of weighted average cost of capital (WACC) for the power sector in India, which can be compared against the project IRR and has been selected as benchmark. DNV confirms that this benchmark is in line with the EB guidance on Investment

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>computation is enclosed.</p> <p>In addition we have revised the PDD to conform to the recent changes in the Additionality tool, PDD template and EB Guidance. The revised PDD is attached herewith.</p>	<p>analysis & meets the requirement of Para 12, 13 & 15.</p> <p>The option of weighted average cost of capital (WACC) for the power sector in India as a benchmark is appropriate and in line with the Guidance on the Assessment of Investment Analysis (EB 51) which state that weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR (point 12) and applicable for projects which could be developed by an entity other than the project participant and the benchmark should be based on publicly available data sources which can be clearly validated by the DOE (Para 13). Such data sources may include local lending and equity indices (Para 13). The weighted average cost of capital for the power sector in India has been calculated based on the average prime lending rate of 11% proposed by the Reserve Bank of India applicable at the time of investment decision taken for the project activity, and the cost of equity determined by using the Capital Asset Pricing Model (CAPM). The key parameters of the CAPM model have</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>been calculated as follows:</p> <ul style="list-style-type: none"> ▪ An average risk free rate of 6.63%, applicable at the time of investment decision for long term investment. The project participant has sourced this value ($R_f = 6.63\%$) from the annual report of the Reserve Bank of India. The validation team accepted this value as it has been sourced directly from the RBI report, which is authentic and reliable and has been verified from the website of Reserve Bank of India. ▪ Market return (R_m) or Compound Accumulated Growth Rate (CAGR) is calculated based on market performance data for a period (1 April 1991 to 31 July 2006) for BSE 200 indices. The data for the same has been sourced and verified from BSE Sensex data available at Bombay Stock Exchange website. ▪ The average raw beta value among all the conventional and

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>non conventional power plants listed in the Bombay Stock Exchange for the period of three year (3 August 2003 to 30 July 2006) has been applied for the calculation of cost of equity of the project. Screenshots of the beta values for individual companies published by Bloomberg are provided in Appendix 3 of PDD. These beta values were prevailing at the time of investment decision.</p> <p>The minimum expected return of equity based on the CAPM Model worked out to be 11.87%.</p> <p>Based on CAPM model and lending rate the weighted average cost of capital works out to be 13.70%.</p> <p>The WACC is a calculated figure and has been verified by DNV and was found to be correct.</p> <p>OK Accepted.</p> <p>CAR 2 Closed.</p>
CAR 3: The medium of storage of monitored data	B.8.2 B.10.8	The data would be archived for a period two years after the crediting period. The	OK. The day to day monitoring and record handling has been entrusted to

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>(power fed to the grid) and the duration for which they will be kept available needs to be specified.</p> <p>The training procedures, the emergency preparedness needs to be addressed in the PDD.</p> <p>Day-to-day handling procedures need to be mentioned in the PDD.</p>	<p>B.10.9</p> <p>B.13.2</p>	<p>data is stored in electronic and hard form.</p> <p>Training procedure for personnels: Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the Wind Energy Converters (WECs), it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that Enercon's service staff is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. The Enercon Training Academy provides need-based training to meet the training requirements of Enercon projects. This includes emergency preparedness and handling of routine and non routine tasks so as to ensure 100% satisfactory service to the customers.</p> <p>The training is contemporary, which results in imparting focused knowledge</p>	<p>the O&M contractor Enercon India Limited. The procedure for the same is described in the version 3 of the PDD. The records will be kept for the period up to two years after the completion of the crediting period.</p> <p>Training requirement and procedure are well elaborated in the revised PDD version 03</p> <p>CAR 3 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		leading to value addition to the attitude and skills of all trainees. This ultimately leads to creativity in problem solving. This has been amended in the PDD under section B.7.2.	
CAR 4 Project proponent is requested to apply latest version of the methodology as the project is not likely to be registered in version 6.	B.1.1	The PDD has been revised to ACM0002 Version 11.	Necessary changes have been incorporated in the revised PDD. Revised PDD has been reviewed by DNV. OK Accepted CAR 4 Closed.
CAR 5 Project proponent is requested to use latest “Tools for demonstration and assessment of additionality”. Version 5.2	B.3.1 B.3.2 B.3.3	The PDD has been revised to latest tool to demonstrate additionality version 05.2.	Necessary changes have been incorporated in the revised PDD. Revised PDD has been reviewed by DNV. OK Accepted. CAR 5 Closed.
CAR 6 Project proponent is requested to revise the emission reduction calculated based on the corrected electricity generation figures.	B.7.1	ER sheet has been revised based on the corrected electricity generation figures.	Revised Emission Reduction Sheet has been reviewed by DNV. OK Accepted. CAR 6 Closed.
CAR 7 It was witnessed during the site visit that the Non CDM machines are also connected to the same meter to which CDM machines are connected; PP is requested to clarify how the electricity supplied by non CDM machine	B.10.3	A detailed description of the formulae that will be used in provided in revised PDD version 03.	Revised PDD version 02 has been reviewed by DNV. The net electricity supplied to the grid by the project activity will be calculated based on the apportioning of electricity export and import figures.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
will be accounted for during the crediting period and same need to be included in PDD.			OK Accepted. CAR 7 Closed.
CL 1: It is mentioned in the PDD that EIL is the supplier of WECs, if so, who is the project proponent?	A.2.1 B.13.1	EIL is the Equipment supplier, Operation and Maintenance contractor and the Project proponent. The information has been provided in the revised PDD under section A.2, A.3 and annex 1 to the PDD.	Enercon Wind Farms (SAI) Pvt. Ltd. issued work order to Enercon (India) Limited & authorized Enercon (India) Limited as project participant on there behalf & authorized Enercon (India) limited for PDD preparation, appointment of DoE, sale of CERs & to deal with Ministry of Environment & Forest (DNA of India) and has been verified by DNV from authorization letter issued dated 19 September 2006. PDD has been corrected now and project participant name and details has been included in revised PDD version 03. OK Accepted CL 1 Closed.
CL2: Crediting period cannot start prior to registration. Chosen crediting must be clarified?	C.1.2	The start date crediting period has been amended in the revised PDD as 01/09/2010.	Necessary changes have been incorporated in revised PDD version 3. Revised PDD has been reviewed by DNV. OK Accepted.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			CL 2 Closed.
<p>CL3:</p> <p>Financial spreadsheet needs to be provided for verification.</p> <p>All statutory clearances and PPA needs to be provided for verification.</p> <p>PLF consideration should be justified,</p>	<p>B.3.1</p> <p>B.3.2</p> <p>B.3.3</p>	<p>The Financial calculations (spreadsheet) are enclosed.</p> <p>The Infrastructure clearance, commissioning certificate and land clearances are enclosed. The PPA for the project activity is enclosed.</p> <p>There were two sources of PLF available to the PP:-</p> <ol style="list-style-type: none"> 1. MERC order dated 24 November 2003 2. PLF estimate provided by the supplier. 3. Third party validated PLF <p>PLF of 20 % has been considered appropriate by MERC in its order dated 24 November 2003. MERC has proposed a normative PLF/CUF of 20 % for the calculation of tariff for group III wind energy projects in Maharashtra has been prescribed under the section 2.2.2 group III new projects. The MERC order Dated 24 November 2006 is enclosed.</p>	<p>Financial Spreadsheet for project IRR & Benchmark has been reviewed by DNV and was found to be corrected.</p> <p>Clearance Infrastructure clearance, commissioning certificate and land clearances, PPA for the project activity has been verified by DNV.</p> <p>Project proponent has considered a PLF of 21% for the financial analysis and is based on the electricity generation estimates received from the Enercon India Limited. DNV confirms that the electricity generation data considered for investment analysis meets the requirement of EB 48 Annex 12 as DNV has also cross checked the PLF considered for the project activity with Independent third party report (Fair Aero Consultant & Technologist) dated 10 November 2006 which states the generation estimate of Enercon India Limited make WEG (E-48, 800 kW) in Panchpatta, village in Akole Taluk of Ahmednager District in state of Maharashtra is around 19.64%.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>The Plant load factor provided by the WEG Supplier is 21%.</p> <p>The plant load factor provided by independent third party validator is 19.64%.</p> <p>For the purpose of Substantiating additionality, we have considered the Plant Load Factor of 21% which is conservative.</p>	<p>OK Accepted.</p> <p>CL 3 Closed.</p>
<p>CL4:</p> <p>It is stated that the energy generation by wind power plants in 2004-05 was 495.36 GWh as against the total generation of 82 075.33 GWh.</p> <p>Source needs to be provided for the information and other information used for arguments.</p> <p>CL 4 Pending:</p> <p>Project proponent is requested to revise the common practice analysis as comparison of annual electricity generation (thermal dominated grid) with wind based electricity contribution (renewable energy contribution)</p>	<p>B.3.1</p> <p>B.3.2</p> <p>B.3.3</p>	<p>Common Practice</p> <p>The comparison of the electricity generation by wind with the total generation has been removed from the PDD.</p> <p>The project was scheduled to be commissioned by 31 August 2008. Thus we have presented the common practice for the data that was available at the time of scheduled commission date. The total installed wind power capacity in Maharashtra was 1 756.38 MW in 2007-08.</p> <p>Paragraph 4(a) of the additionality tool also states that projects can be</p>	<p>Project proponent is requested to revise the common practice analysis as comparison of annual electricity generation (thermal dominated grid) with wind based electricity contribution (renewable energy contribution) will not reflect the appropriate scenario for Common Practice Analysis.</p> <p>CL 4 Pending</p> <p>Since generation of wind energy depends on local or region specific wind patterns installation of WEGs, Maharashtra has been considered for assessing the common practice. The installed capacity in Maharashtra was</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>will not reflect the appropriate scenario for Common Practice Analysis.</p> <p>PP is requested to clarify why wind power project installed before tariff order of 24 November 2003 can not be compared with wind power project installed after tariff order of 24 November 2003. Reference for the same need to be incorporated in revised PDD.</p> <p>Evidence for the same need to be submitted for verification.</p>		<p>considered similar if they rely on a broadly similar technology and are of a similar scale. Enercon Wind Farm Sai has a total capacity of 20 MW and hence the project is categorized as large scale project activity (>15 MW). The proposed wind power project involves the installation of 25 wind turbines, each of which has rated output of 800 kW, providing a total capacity of 20 MW. Therefore in accordance with Paragraph 4(a), we have analysed wind projects of more than 15 MW capacities. During the period 2002-2008 a total of 476 MW was added from wind projects with more than 15 MW size. We would like to submit that the entire 476 MW is under CDM. We have provided the web-links of all such projects in the PDD.</p>	<p>1 756.38 MW as table provided in PDD for common practice analysis till the year 2002-03, the installation of wind based power projects were at peak due to sales tax benefit of Rs. 10 million per MW per year for a period of 5 years from the date of commissioning under Maharashtra wind power policy 1998, whereas, whereas in order to make investment in wind attractive on a stand alone basis MERC had withdrawn the sales tax benefits from wind power projects in March-2002. Hence wind power projects installed prior to March 2003 can not be considered for common practice analysis. Period 2002-2008 a total of only 476 MW was added from wind projects with more than 15 MW size and this entire 476 MW capacity is under CDM pipeline and same can be verified from projects available on UNFCCC website. A detailed spreadsheet with CDM links of all these projects has been verified by DNV.</p> <p>A detailed analysis has been provided in revised PDD version 03.</p> <p>Revised PDD version 03 has been reviewed by DNV.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			OK Accepted. CL 4 Closed.
CL5: Proof of start date of the project activity needs to be provided for verification.	B.3.4 C.1.1	The Start date of the project activity is 17 August 2006. The Purchase order is enclosed.	Purchase order placed dated 16 August 2006 has been verified by DNV. Purchase order date has been accepted by DNV as project start date as it is the earliest date for the project's implementation and has been verified by DNV from the purchase order placed for the project activity. OK Accepted. CL 5 Closed.
CL6: How stakeholders were invited for comments? Provide proof of advertisement. The minutes of the stakeholders meeting needs to be provided for verification. How due account was taken on villagers expectation needs to be clarified.	E.1.2	The stakeholder comments were invited by publishing an advertisement in local newspaper Sarvmat on 29 October 2006. The minutes of local stakeholder meeting held on 15 November 2006 at Ahmednagar District, were recorded in local language and their English version has been provided in the PDD. The following documents are enclosed. 1. Copy of advertisement in local newspaper 2. Copy of original minutes of meeting	Details regarding stakeholder consultation have now been included in the revised PDD version 3. Copy of local Newspapers has been verified by DNV. Minutes of meeting of stakeholder consultation has been verified by DNV. OK Accepted CL 6 Closed.

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		3. Copy of English version of minutes of meeting	
<p>CL 7</p> <p>It is observed that PP has identified two alternatives to the project activity, these being Project not undertaken as a CDM project activity.</p> <p>Setting up of comparable utility scale fossil fuel fired or hydro power projects that supply to the Maharashtra grid.</p> <p>It needs to be justified in the PDD why alternative B can not be considered as baseline alternative.</p>	B.3.1	<p>The additionality tool version 5.2, step 2, “determine whether the proposed project activity is not the most economically and financially attractive”.</p> <p>As per sub-step 2b of the additionality tools, the appropriate analysis method can be either investment comparison analysis (wherein IRRs of all the alternatives are compared) or benchmark analysis wherein the IRR is compared to an appropriate benchmark financial indicator. Sub-step 2c states that, if the CDM project activity has a less favourable indicator (e.g. lower IRR) than the benchmark, then the CDM project activity cannot be considered as financially attractive.</p> <p>In light of the above, the alternatives have not been discussed further.</p> <p>The baseline for a project activity is determined in accordance with the</p>	<p>As per applied methodology ACM0002 version 11, the baseline scenario for grid connected electricity generation activities, “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”.</p> <p>Setting up of comparable utility scale fossil fuel fired project or hydro power project that supply power to the Maharashtra grid will represents a scenario of capacity addition of new generation sources and is reflected in the combined margin (CM) of the grid.</p> <p>As per the Guidance on the Assessment of Investment Analysis (version 3.1) circumstances where the baseline does</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>applicable methodology. As per ACM0002, i.e. the applicable methodology for the project, for grid connected electricity generation activities, Grid is considered as the baseline since in the absence of the project activity 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. Accordingly, Grid has been considered as the baseline for the project.</p>	<p>not require investment or is outside the direct control of the project developer, i.e. cases where the choice of the developer has option to invest or not to invest the additionality of project can be demonstrated through benchmark analysis. In case of benchmark analysis project proponent has to demonstrate only that the implementation of project activity without CDM is less economically attractive than the selected benchmark for the project activity.</p> <p>Furthermore, the “Validation and Verification Manual”, version 1.1, clarified that in case the applied methodology for the proposed CDM project activity prescribes the baseline scenario no further analysis is required.</p> <p>OK Accepted CL 7 Closed.</p>

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Gaurav Srivastava

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

<i>GHG Auditor:</i>	Yes				
<i>Technical Area</i>	<i>CDM Validator</i>	<i>CDM Verifier</i>	<i>Sector Expert</i>	<i>Methodology Expert</i>	<i>Technical Reviewer</i>
<i>Landfill gas</i>					
<i>Hydro power</i>					
<i>Renewables Wind power</i>					
<i>Other renewable</i>					
<i>Biomass</i>					
<i>Grid connection of isolated system</i>					
<i>Cement</i>					
<i>Waste-heat / waste-gas recovery</i>					
<i>Efficiency of thermal power plants</i>					
<i>Coal mine methane</i>					
<i>Fuel switch</i>					
<i>Manure management</i>					
<i>Waste / wastewater treatment</i>					
<i>Energy efficiency</i>					
<i>N₂O</i>					
<i>HFCs</i>					
<i>Flare reduction</i>					
<i>PFCs</i>					
<i>Charcoal</i>					
<i>CO₂ recovery</i>					
<i>Transport</i>					
<i>Non-renewable biomass</i>					
<i>Biofuel</i>					
<i>Pipeline leakage reduction</i>					
<i>SF₆</i>					

Høvik, 5 November 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Murali Govindarajulu

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Knowledge	Sector Expert	Technical Reviewer
Landfill gas					
Hydro power	Aug 2009	Aug 2009			
Renewables	Jan 2009	Jan 2009			
Other renewable		Sept 2009			
Biomass			Nov 2009		
Grid connection of isolated system		Sept 2009			
Cement					
Waste-heat / waste-gas recovery			Nov 2009		
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment			Nov 2009		
Energy efficiency	Jan 2009	Sept 2009	Nov 2009		
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 27 November 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Kannan Parthasarath

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

GHG Auditor:	
Technical Area	CDM Validator CDM Verifier Sector Knowledge Sector Expert Technical Reviewer
Landfill gas	
Hydro power	
Renewables Wind power	Jan 2010
Other renewable	
Biomass	
Grid connection of isolated system	
Cement	
Waste-heat / waste-gas recovery	
Efficiency of thermal power plants	
Coal mine methane	
Fuel switch	
Manure management	
Waste / wastewater treatment	
Energy efficiency	
N ₂ O	
HFCs	
Flare reduction	
PFCs	
Charcoal	
CO ₂ recovery	
Transport	
Non-renewable biomass	
Biofuel	
Pipeline leakage reduction	
SF ₆	

Høvik, 23 January 2010

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Agnes Dudek

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Knowledge	Sector Expert	Technical Reviewer
Landfill gas					
Hydro power	Mar 2010				
Renewables					
Wind power					
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 29 March 2010

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Weidong Yang

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJi-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Knowledge	Sector Expert	Technical Reviewer
Landfill gas					
Renewables					Jan 2009
Hydro power					
Wind power					
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants					
Coal mine methane					June 2010
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N ₂ O					June 2010
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 June 2010

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services