



VALIDATION REPORT

HINDUSTAN ZINC LIMITED

VALIDATION OF THE

WIND POWER PROJECT BY HZL IN

GUJARAT

REPORT No.INDIA-VAL/101.49/2007

REVISION No. 01

BUREAU VERITAS CERTIFICATION

VALIDATION REPORT

Date of first issue: 19/07/2007	Organisational unit: Bureau Veritas Certification Holding SA
Client: Hindustan Zinc Limited	Client ref.: Mr. Naveen Kumar Singhal

Summary:

Bureau Veritas Certification has made a validation of the 'Wind power project by HZL in Gujarat.' project of M/s. Hindustan Zinc Limited (hereafter called "the project") located in Site Samana, Villages Methan, Dhun-Dhoraji, Sadodar, Jamwadi, Laloi, Narmana, Haripar Mevasa and Bagadhara, Taluk: Kalavad, Jamjodhpar, District Jamnagar, Gujarat, India 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 rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan ii) follow-up interviews with project stakeholders iii) resolution of outstanding issues and the issuance of the Draft Validation Report and opinion. The overall validation, from Contract Review to Draft Validation Report & Opinion, was conducted using internal procedures

The first output of the validation process is a list of Clarification and Corrective Actions Requests (CL and CAR), presented in Appendix A. Taking into account this output, the project proponent revised its project design document.

In summary, it is Bureau Veritas Certification's opinion that the project correctly applies the baseline and monitoring methodology number and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

Report No.: INDIA-Val/101.49/2007	Subject Group: CDM
Report title: Wind power project by HZL in Gujarat.	
Work carried out by: S.V. Pendse R. Seshapathy Sushil Budhia	
Work verified by: H.B. Muralidhar	
Date of this revision: 23/05/2008	Rev. No.: Rev. no 01
Number of pages: 74	

Indexing terms

☒ No distribution without permission from the Client or responsible organisational unit

☐ Limited distribution

☐ Unrestricted distribution

VALIDATION REPORT

ABBREVIATIONS

BMS	BVQI Management System
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reductions
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon Dioxide
CPP	Captive Power Plant
DIS	Draft of International Standard
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
GHG	Green House Gas(es)
I	Interview
IETA	International Emissions Trading Association
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organisation for Standardization
MoV	Means of Verification
MP	Monitoring Plan
NGO	Non Government Organisation
PDD	Project Design Document
UNFCCC	United Nations Framework Convention for Climate Change
HZL	Hindustan Zinc Limited
EIL	Enercon India Limited
GERC	Gujarat Electricity Regulatory Commission



 VALIDATION REPORT

Table of Contents	Page
1 INTRODUCTION	3
1.1 Objective	3
1.2 Scope	3
1.3 GHG Project Description	3
1.4 Validation team	4
2 METHODOLOGY.....	4
2.1 Review of Documents	6
2.2 Follow-up Interviews	7
2.3 Resolution of Clarification and Corrective Action Requests	
3 VALIDATION FINDINGS	
3.1 Project Design	
3.2 Baseline & Additonallty	
3.3 Monitoring Plan	
3.4 Calculation of GHG Emissions	
3.5 Sustainable Development Impacts	
3.6 Comments by Local Stakeholders	2948
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	
5 VALIDATION OPINION	
6 REFERENCES	

Appendix A: Validation Protocol

Appendix B: Explanation of how due account of comments was taken by the validation team.

Appendix C: CVs of Verifiers

Annex 1 : Evidence of starting date

Annex 2 : Evidence of CDM Consideration

Annex 3 : Evidence of generation guarantee

Annex 4 : Evidence of O&M Charges

Annex 5 : Evidence of Power purchase cost

1 INTRODUCTION

Hindustan Zinc Limited (hereafter called “the client”) has commissioned Bureau Veritas Certification to validate its “Wind power project by HZL in Gujarat” located in Site Samana, Villages Methan, Dhun Dhoraji, Sadodar, Laloi, Narmana, Haripar mevasa, Bagadhara and Jamwadi, Taluk – Kalavad & Jamjodhpar, District Jamnagar, Gujarat, India.

This report summarizes the findings of the validation of the project, performed on the basis of UNFCCC criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

1.1 OBJECTIVE

The validation serves as project design verification and is a requirement of all Client projects. The validation is an independent third party assessment of the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant UNFCCC and host country criteria are validated in order to confirm that the project design, as documented, is sound and reasonable, and meets the stated requirements and 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).

UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM rules and modalities and the subsequent decisions by the CDM Executive Board, as well as the host country criteria.

1.2 SCOPE

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against Kyoto Protocol requirements, UNFCCC rules and associated interpretations. Bureau Veritas Certification has, based on the recommendations in the Validation and Verification Manual (IETA/PCF, v. 3.3, 2004), employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

1.3 GHG PROJECT DESCRIPTION

The project activity envisages implementation of an 88.8 MW wind power project consisting of 111 WEGs of individual capacity 0.8 MW at Samana Site in Gujarat, India. The electricity generated from the wind farm will be exported to the regional electricity grid and sold to the state electricity utility thereby marginally contributing to reducing the energy demand supply gap in the state of Gujarat.



VALIDATION REPORT

The proposed project activity is an initiative by Hindustan Zinc Limited to export Wind Electric Generator (WEG) generated renewable electricity to the power deficit western region grid in order to decrease power shortage, diversify the grid and reduce greenhouse gas emissions

Enercon India Limited has supplied the wind energy technology to HZL. WEG is ingeniously devised to convert kinetic energy from the “air in motion” directly into electricity without using conventional sources like coal, oil or natural gas for power generation. The project activity implements gearless Enercon E-48 and E-48SL WEGs with synchronous generator, pitch regulation, low cut-in speed and aerodynamic braking system. The specification for the WEGs is provided in section A.4.3 of PDD.

The wind power generated from the project site will be displacing the electricity generated from thermal power stations feeding into regional grid (during power surplus time) and will be replacing the usage of diesel generators for meeting the power demand during shortage periods. Since wind power is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic green house gas GHG emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas.

1.4 VALIDATION TEAM

The validation team consists of the following personnel:

Mr.	Sameer V. Pendse	Bureau Veritas Certification- Team Leader, Climate change verifier
Mr.	R. Seshapathy	Bureau Veritas Certification, Climate change verifier
Mr.	Sushil Budhia	Sushil Budhia and Associates, Financial expert
Mr.	H.B. Muralidhar	Bureau Veritas Certification, Climate change -Internal technical reviewer

Competence details of the team are given in Annex.C of this Draft Validation Report.

2 METHODOLOGY

The overall validation, from Contract Review to Draft Validation Report & Opinion, was conducted using internal procedures

In order to ensure transparency, a validation protocol was customized for the project, according to the Validation and Verification Manual (IETA/PCF, v. 3.3, 2004). The protocol shows, in a 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 five tables. The different columns in these tables are described in Figure 1.

The completed validation protocol is enclosed in Appendix A to this report.

VALIDATION REPORT

Validation Protocol Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), a Corrective Action Request (CAR) or a Clarification Request (CL) of risk or non-compliance with stated requirements. The CAR's and CL's are numbered and presented to the client in the Draft Validation Report.	Used to refer to the relevant protocol questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent validation process.

Validation Protocol Table 2: Requirements checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in several sections. Each section is then further subdivided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	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.	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.	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). Clarification Request (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol Table 3: Baseline and Monitoring Methodologies				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
The various requirements of baseline and monitoring methodologies should be met. The checklist is organised in several sections. Each section is then further subdivided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	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.	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.	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). Clarification Request (CL) is used when the validation team has identified a need for further clarification.

VALIDATION REPORT

Validation Protocol Table 4: Legal requirements				
Checklist Question	Reference	Means verification (MoV)	Comment	Draft and/or Final Conclusion
The national legal requirements the project must meet.	Gives reference to documents where the answer to the checklist question or item is found.	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.	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.	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). Clarification Request (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol Table 5 : Resolution of Corrective Action and Clarification Requests			
Report clarifications and corrective action requests	Ref. to checklist question in tables 2/3	Summary of project owner response	Validation conclusion
If the conclusions from the Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Tables 2 or 3 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Tables 2/3, under "Final Conclusion".

Figure 1 Validation protocol tables

2.1 REVIEW OF DOCUMENTS

The Project Design Document (PDD) submitted by Hindustan Zinc Limited and additional background documents related to the project design and baseline, i.e. Indian Law, Guidelines for Completing the Project Design Document (CDM-PDD), the Proposed New Methodology: Baseline (CDM-NMB) and the Proposed New Methodology: Monitoring (CDM-NMM), Approved methodology ACM 0002, Version 6, 19 May 2006. Kyoto Protocol, Clarifications on Validation Requirements to be checked by a Designated Operational Entity was reviewed.

The following documents were used as references to the validation work, in addition to internal procedures: IETA/PCF – Validation and Verification Manual (v. 3.3, Mar 2004); ISO DIS 14064-3 - Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions; ISO DIS 14064-2 - Greenhouse gases — Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.



VALIDATION REPORT

To address Bureau Veritas Certification corrective action and clarification requests Hindustan Zinc Limited revised the PDD and resubmitted it in August 2007.

The validation findings presented in this report relate to the project as described in the PDD of August 2007.

2.2 FOLLOW-UP INTERVIEWS

On 19/04/2007 & 20/04/2007 Bureau Veritas Certification performed interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Hindustan Zinc Limited were interviewed (see References). The main topics of the interviews are summarised in Table 1.

VALIDATION REPORT

Table 1 Interview topics

Interviewed organisation	Persons interviewed and Interview topics
Hindustan Zinc Limited	• Mr. Srikanth Sarangapani – A.G.M – Wind Energy Project - CDM Consideration, additionality, overall Project View • Mr. Ajey Mohatkar – Associate Manager – Wind Power Project - Operational aspects of wind power project, monitoring, CDM consideration. • Mr. Sunil Bohra – Financials, IRR working • Mr. Ajeet Modi - Financials, IRR working
Enercon India Limited	• Mr. G. K. Chaudhari – Head Business Development & Operations – Enercon's plans for installations of wind turbines, plans for social and economical development of villages. • Mr. K.D. Baria – Regional Service In-charge – Operation and maintenance of Wind farm, customer relations • Mr. Kishor Vasara – Area Service In-charge - Operation and maintenance of Wind farm • Mr. S.P.Gaopande – Substation and external electrical In-charge – Operational aspects of substation. • Mr. Dinesh Sharma – Project execution In-Charge – Project execution plan. • Paritosh Desai – Land Officer – Liaison with stakeholders, acting on their comments, suggestions etc.
Local Stakeholders	• Mr. Dheeru Bhai - Village Moti-Vavdi • Mr.Narsingh Bhai – Village Methan • Mr.Magan Bhai – Village Jamwadi • Mr. Arjun Bhai – Village Moti-Vavdi • Mr. Vallabh Bhai – Village Dhun-Dhoraji • Mr. Haneef Bhai – Village Mevasa • Mr. Ramesh Lakum- Village Haripar • Mr.N.A. Patil – Village Haripar • Mr. Dost Mohammed – Village Mevasa • Mr. Ramji Bhai – Village Hakumati Sarvaniya • Mr. Mahendra Arjan - Village Dhun-Dhoraji • Mr. Iqbal Noor Mohammed - Village Haripar

2.3 RESOLUTION OF CLARIFICATION AND CORRECTIVE ACTION REQUESTS

The objective of this phase of the validation was to raise the requests for corrective actions and clarification and any other outstanding issues that needed to be clarified for Bureau Veritas Certification positive conclusion on the project design.

To guarantee the transparency of the validation process, the concerns raised are documented in more detail in the validation protocol in Appendix A.

3 VALIDATION FINDINGS

In the following sections, the findings of the validation are stated. The validation findings for each validation subject are presented as follows:

- 1) The findings from the desk review of the original project design documents and the findings from interviews during the follow up visit are summarised. A more detailed record of these findings can be found in the Validation Protocol in Appendix A.
- 2) Where Bureau Veritas Certification had identified issues that needed clarification or that represented a risk to the fulfillment of the project objectives, a Clarification or Corrective Action Request, respectively, have been issued. The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the Project resulted in 2 (Two) Corrective Action Requests.
- 3) The conclusions for validation subject are presented.

3.1 PROJECT DESIGN

The project activity envisages implementation of an 88.8 MW wind power project consisting of 111 WEGs of individual capacity 0.8 MW at Samana Site in Gujarat, India. The electricity generated from the wind farm will be exported to the regional electricity grid and sold to the state electricity utility thereby marginally contributing to reducing the energy demand supply gap in the state of Gujarat.

The proposed project activity is an initiative by Hindustan Zinc Limited to export Wind Electric Generator (WEG) generated renewable electricity to the power deficit western region grid in order to decrease power shortage, diversify the grid and reduce greenhouse gas emissions

Enercon India Limited has supplied the wind energy technology to HZL. The project activity implements gearless Enercon E-48 and E-48SL WEGs with synchronous generator, pitch regulation, low cut-in speed and aerodynamic braking system. The specification for the WEGs is provided in section A.4.3 of PDD.

The wind power generated from the project site will be displacing the electricity generated from thermal power stations feeding into regional grid (during power surplus time) and will be replacing the usage of diesel generators for meeting the power demand during shortage periods. Since wind power is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic GHG emissions generated by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas.

During the site visit for validation it was observed that out of 88.8 MW of total installation, only 38.40 MW had been installed and remaining installation of 50.4 MW was planned in September 2007.

The project design is sound and the geographical (Site Samana, Villages Methan, Dhun Dhoraji, Sadodar, Laloi, Narmana, Haripar mevasa, Bagadhara and Jamwadi, Taluk – Kalavad

VALIDATION REPORT

& Jamjodhpar, District Jamnagar, Gujarat, India) and temporal (20 years) boundaries of the project are clearly defined.

Prominent Corrective action Requests and Clarifications related to Project Design & their resolution by validation team are summarised below

3.2 BASELINE & ADDITIONALITY

The Project uses the approved baseline methodology ACM 0002 Version 6, dated 19 May 2006

The alternatives considered for determination of the baseline scenario in the context of the project activity include:

1. Proposed project activity not undertaken as CDM Project Activity.
2. No project activity and equivalent amount of energy would have been produced by the project grid electricity system through its currently running power plants and by new capacity addition to the grid i.e. Continuation of current situation

These alternatives are realistic and credible in nature & alternatives considered do not include those alternatives that:

- Do not comply with legal and regulatory requirements; or
- Depend on key resources such as fuels, materials or technology that are not available at the project site.

The Project Scenario is considered additional in comparison to the baseline scenario, and therefore eligible to receive Certified Emissions Reductions (CERs) under the CDM, based on an analysis, presented by the PDD, of investment, technological and other barriers, and prevailing practice.

Validators have assessed the claims of the Project participant on additionality. The various claims and their assessment is presented below –

A. Starting date & Evidence of CDM Consideration -

Starting date of the project activity is 15/01/2007. This is the date on which contract agreement with EPC contractor M/s. Enercon India Limited for first phase for supply, erection, commissioning of 48 nos. Enercon make E48 800 KW wind turbines was entered in. This can be considered as first real action and therefore accepted as starting date for the project activity.

There are evidences available to demonstrate that an incentive from CDM was seriously considered in a decision to proceed with proposed CDM project activity. These are as following

1. Letter from HZL to Suzlon energy dated 04/05/2006-enquiring eligibility of getting carbon credits for renewable power generation projects.
2. Letter from HZL to EIL
3. Communication with various CDM consultants during May-June 2006 regarding plans of HZL and eligibility of project under CDM, expected revenue etc.

VALIDATION REPORT

4. Presentation dated November 2006 made by Mr. Naveen Singhal to the management on investment in wind power and necessity of revenue from CDM for financial viability of the project.

These steps apparently resulted in Board resolution dated 30th November 2006 in making a decision to go ahead for investments in wind Project. This board resolution clearly mentions about the revenue coming from CDM for financial viability of the project activity. Based on the documents made available for the validation, it could be satisfactorily concluded that CDM was seriously considered during the project conceptualisation phase.

As stated earlier the baseline scenario as per ACM 0002 is Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations, PP has identified 2 alternatives to the proposed project activity and based on this, alternative 2, i.e. no project activity and equivalent amount of energy would have been produced by the project grid electricity system through its currently running power plants and by new capacity addition to the grid i.e. Continuation of current situation is justified as credible and realistic alternative for the proposed activity. This is taken further for various tests under additionality.

Project proponent has used both the Steps i.e. Step 2: Investment Analysis & Step 3: Barrier analysis for proving the additionality of emission reductions.

A. Investment Analysis & validation of the same

The Project uses benchmark analysis method as the baseline i.e. 'the no project option' does not require investment or is outside the direct control of the project developer (*refer to step 1*). Also benchmark analysis will be a more appropriate process for comparison with a government stipulated benchmark and would yield more credible results.

HZL is vertically integrated enterprise with its operations being limited to exploration, mining, ore processing to smelting of non-ferrous metals. The proposed project activity is a diversification of mainstream business of HZL into wind power sector economics. This is the first project activity being undertaken by HZL with a motive of being an independent wind power producer exporting the generated electricity from its wind farm to the regional electricity system. The returns for undertaking new projects by HZL are mainly set to expansion of its current business activity and cannot be applied to this new diversification. It has been verified based on the Board resolutions for project approvals of mainstream projects (mining and smelting) that the rates of return are high being in the range of 19-32% (1. Meeting of Board of Directors held on 25th April 2003 and 2. Meeting of Board of Directors held on 27th July 2005). However, it is not suitable to compare the return of low risk investments with the returns achieved or achievable by higher risk investments.

Further, since there is no precedence of a decision to invest in renewable energy based power generation, an equity returns based benchmark to proceed with the decision to invest in the project activity, which is applicable to independent power producers in the country implementing similar project activities and which is approved by the relevant government authority is considered to be more appropriate.

Also, according to the 'tool for the demonstration and assessment of additionality' version 04 – *"The benchmark is to represent standard returns in the market, considering **the specific risk of***

VALIDATION REPORT

the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer”.

According to decision from EB-40, benchmark of 14% as per GERC order is now not considered as benchmark for investment in the project activity. Project participant, has now considered three other benchmarks for investment analysis. Elaborate explanation on each of these is provided in PDD. Validation comments for all these benchmarks are as follows:

Benchmark 1: Government bond rates increased by a suitable risk premium to reflect private investment and / or project type.

The required rate of return on equity for the project has been calculated using the Capital Asset Pricing Model (CAPM). As per CAPM, the required return on equity investment is the return of a risk-free security plus beta times the difference between the market return and the risk-free return. The Government Securities have been taken to represent the risk free return. Stock index has been used to represent the market return. Power Industry specific beta value is applied to represent the market returns relevant to the risk of the project activity sector.

Average government bond rate has been considered to be 7.34% as prevailing in year 2005-06. This has been taken from Reserve Bank of India. Reserve Bank of India is the central controlling bank and its database is an official source of information in India. Validation team therefore accepts this risk free rate as reasonable.

Beta value in the calculation represents systematic risk by quantifying the sensitivity of the stocks of the companies representing a particular project type/sector with the market returns. The Project Participant in this case has considered private power sector companies in India that have either partial or complete investment in renewable power sector. The beta value thus arrived at relates to the type of the project activity. The beta values have been taken from Bloomberg. Project participant has provided screenshots from Bloomberg terminal. These screen shots for all the investors in the list has been provided. This list is considered complete since validation team agrees that these are the only companies in India that have full or significant but partial exposure to renewable power sector. The Beta value taken for this analysis is based on the beta values of the listed private companies engaged in similar business as the project activity (i.e. the power sector) at the start of the project activity estimated by regressing weekly returns on stock against local index, using 10 years of data if available. Otherwise the data available since the listing of the company on the stock exchange has been used. Based on this information, average beta value is 1.02. validation team accepts this value as reasonable since it is taken over a reasonably long duration for companies relevant to the type of the project.

Market risk premium has been calculated as the historical geometric mean return on the stocks (using the BSE Sensex Index with 1979 as the base year) minus the historical geometric mean return on government securities. This would give the incremental returns over and above the risk free rate. This figure is arrived to be 19.43%. The validation team accepts this value as reasonable since it is calculated in a conservative manner [geometric mean rather than simple interest type calculation] and over a long term duration.

The average risk free rate is calculated as the geometric mean of the compounded annual return & this is 10.31%, which is also sourced from Reserve Bank of India and considering a historical risk free rate is deemed to be a conservative approach.

VALIDATION REPORT

Considering these both viz. market rate of return and Average risk free rate, Market Risk Premium comes to 9.12 %. With government bond rate of 7.34%, Rate of return on equity or cost of equity benchmark comes to 16.66% based on beta value of 1.02.

The validation team hereby confirms that it has assessed the information provided. The validation team notes that the above approach is in line with the requirement of clause 6(a) of the 'Tool for demonstration and assessment of additionality, Version 04'. The validation team therefore accepts the above method of calculation of benchmark.

Benchmark 2: Deposit Rates increased by Market Risk Premium.

Benchmark has also been estimated using the Government Deposit Rates applicable at the time of start of the project activity. The average deposit rate as published by Reserve Bank of India and applicable in the year 2005-06 was 6.625%.

The average risk free rate is calculated as the geometric mean of the compounded annual return. Geometric mean of compounded return for the year 2005-06, comes out to be 10.04%.

This data is available at Reserve Bank of India's web-link. Accordingly the market risk premium arrives at 9.38 % and subsequently the benchmark i.e. deposit rate increased by

Market Risk Premium comes to 16.21% using the beta value of 1.02 as calculated for Benchmark 1.

The validation team hereby confirms that it has assessed the information provided. The validation team notes that the above approach is in line with the requirement of clause 6(a) of the 'Tool for demonstration and assessment of additionality, Version 04'. The validation team therefore accepts the above method of calculation of benchmark for the reasons stated in assessment of Benchmark 1.

Benchmark 3: Estimates of the cost of financing and required return on capital for the country and type of project activity concerned), based on bankers views on comparable projects.

ICICI Bank Limited, which is one of the biggest private sector banks in India and has been financing private sector wind energy projects (type of project activity concerned) over the past few years, in its letter dated 17/10/2008 addressed to M/s. Hindustan Zinc Limited has confirmed that an Internal Rate of Return of over 16% for the capital employed is desirable to ensure economic viability and adequate cash flows of a high risk wind power project. Subsequently the bank vide letter dated 23/10/2008 has also clarified that this rate of return as 16% has been the same for last three years. Hence DOE is of the opinion that the same rate of return is applicable as benchmark to proposed project activity, which was conceptualised in December 2006 and is therefore in conformity with the banker's expectations. [Within 3 years of these letters by ICICI bank].

The above stated IRR is inclusive of cost of financing and the required rate of return as expressed by an expert. It therefore is in line with clause 6(b) of the tool for demonstration and assessment of additionality, version 04. The validation team therefore accepts this as an alternative benchmark.



 VALIDATION REPORT

As directed by EB, project participant has finally considered the benchmark arrived by adding deposit rate and suitable risk premium. The benchmark applicable for the project activity is 16.21%.

Validation team observes that the equity IRR of the project after sensitivity analysis and without consideration of CDM benefits is 13.87%. This is lower than the above benchmark. The project activity is therefore considered additional.

The financial expert in the team has verified various claims. It has been satisfactorily demonstrated that IRR has been prohibitive in case of returns from project without CDM revenues. As presented in PDD, IRR without CDM revenue is only 11.63 % where as with CDM revenue it works out be 14.04 % (CER Price @ €8 per CER), Various data & assumptions to arrive at IRR workings have been validated. These are as follows -

- Capital cost – This is as per Contract agreement – Contract No. HZL/PROJ/WPP-UMBRELLA/07 dated 15/01/2007 between HZL and EIL for Wind Energy Farm at Samana - 48 nos. Enercon make E48 – 800 KW rating WEC. & Contract agreement – Contract No. HZL/PROJ/WPP-UMBRELLA-2/07 dated 01/03/2007 between HZL and EIL for Wind Energy Farm at Samana - 63 nos. Enercon make E48 SL – 800 KW rating WEC.
- PLF of 24.26 % - This is based on suppliers' guarantee given during supply contract.
- Rate for power purchase – This is as per Power Purchase agreement dated 23/03/2007 for 48 nos. of WECs and Power Purchase agreement dated 04/10/2007 for 47 nos. of WECs between HZL and Gujarat Urja Vikas Nigam Limited. Same has been assumed for remaining installations of 12.8 MW as well.
- O& M contract no. HZL/WPP/O&M/GUJARAT-001/07 dated 15/01/2007 for Wind Energy Farm at Samana -48 Nos. and Contract No. HZL/WPP/O&M/GUJARAT-2-001/07 dated 01/03/2007 for Wind Energy Farm at Samana -63 Nos between HZL and EIL. .
- Insurance Policy 242500/5/00000/11/2007/00468 dated 05/04/2007 issued by The Oriental Insurance Company Limited for 38.4 MW Wind Farm. Price is 0.18% of machinery cost and therefore same is considered for remaining installations of 50.4 MW.
- Accelerated Depreciation – As per provisions of Income tax Act, 1961 – Government of India
- Residual Value: As per the prevailing practice in the host country.

Statutory auditor by the company has duly certified the data used by the company. Financial expert on the validation team additionally validated this. Investment analysis includes various benefits like accelerated depreciation available to the project activity from the national and sectoral policies for promoting renewable energy generation in India.

Further as additionality tool, version 4, the financial indicator can be based either on (1) project IRR or (2) equity IRR. There is no general preference between the approaches (1) or (2). The benchmark chosen for analysis shall be fully consistent with the choice of approach'.

Further, this working is also supported by sensitivity analysis, which considers PLF and O&M escalation rate as the variables for sensitivity. The variation for sensitivity is considered to be in



VALIDATION REPORT

two slabs – $\pm 5\%$ and $\pm 10\%$. Applying these two slabs of variations, it has been satisfactorily demonstrated that post tax equity IRR is still below the benchmark mentioned above. The upper variation value of 10% considered for PLF, O&M cost escalation rate is found reasonable by DOE as:

- PLF value considered by project activity (based on suppliers guarantee) is 24.26% which is already higher than the PLF considered by GERC in its tariff order as mentioned above. A 10% increase in this PLF value is deemed to be a reasonable estimate, since the wind mast data provided by the supplier for the site and the corresponding generation capability indicates the assumed PLF as the achievable PLF on the specific location.
- O& M cost is fixed for 10 years and the prices would be renegotiated after 10 years, and a maximum of $\pm 10\%$ is seen as reasonable variation expected in the prices.

To conclude, in addition to the above the DOE has further validated the appropriateness of the Investment Analysis in accordance with the guidance on the assessment of investment analysis as follows:

EB Guidance	Validation
The period of assessment should not be limited to the proposed crediting period of the CDM project activity. Both project IRR and equity IRR calculations shall as a preference reflect the period of expected operation of the underlying project activity (technical lifetime), or - if a shorter period is chosen - include the fair value of the project activity assets at the end of the assessment period. In general a minimum period of 10 years and a maximum of 20 years will be appropriate. The IRR calculation may include the cost of major maintenance and/or rehabilitation if these are expected to be incurred during the period of assessment. Project participants are requested to justify and DOEs are requested to validate the appropriateness of the period of assessment in the context of the underlying project activity, without reference to the proposed CDM crediting period.	Taken as 20 years i.e. applicable to the operational life time of the project.
The fair value of any project activity assets at the end of the assessment period should be included as a cash inflow in the final year. The fair value should be calculated in accordance with local accounting regulations where available, or international best practice. It is expected that such fair value calculations will include both the book value of the asset and the reasonable expectation of the potential profit or loss on the realization of the assets.	The residual value has been included in the investment analysis in accordance with local accounting regulations.
Depreciation, and other non-cash items related to the project activity, which have been deducted in estimating gross profits on which tax is calculated, should be added back to net profits for the purpose of calculating the financial indicator (e.g.	Depreciation has been added back to net profits. Since the IRR is estimated post tax, taxation is included in the investment analysis as an expense,



VALIDATION REPORT

IRR, NPV). Taxation should only be included as an expense in the IRR/NPV calculation in cases where the benchmark or other comparator is intended for post-tax comparisons.	
Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing. The DOE should also validate that the listed input values have been consistently applied in all calculations.	It has been comprehensively validated that the input values are valid and were applicable at the time of decision to invest in the project. These have also been consistently applied in all calculations including the emission reduction calculations. Various data & assumptions to arrive at the post tax equity IRR workings as have been validated are as follows - - Capital cost – This is as per Contract agreement – Contract No. HZL/PROJ/WPP-UMBRELLA/07 dated 15/01/2007 between HZL and EIL for Wind Energy Farm at Samana - 48 nos. Enercon make E48 – 800 KW rating WEC. & Contract agreement – Contract No. HZL/PROJ/WPP-UMBRELLA-2/07 dated 01/03/2007 between HZL and EIL for Wind Energy Farm at Samana - 63 nos. Enercon make E48 SL – 800 KW rating WEC. - PLF of 24.26 % - This is based on suppliers' guarantee given during supply contract. - Rate for power purchase – This is as per Power Purchase agreement dated 23/03/2007 for 48 nos. of WECs and Power Purchase agreement dated 04/10/2007 for 47 nos. of WECs between HZL and Gujarat Urja Vikas Nigam Limited. Same has been assumed for remaining installations of 12.8 MW as well. - O& M contract no. HZL/WPP/O&M/GUJARAT-001/07 dated 15/01/2007 for Wind Energy Farm at Samana -48 Nos. and Contract No. HZL/WPP/O&M/GUJARAT-2-001/07 dated 01/03/2007 for Wind Energy Farm at Samana -63 Nos between HZL and EIL. .



VALIDATION REPORT

	- Insurance Policy 242500/5/00000/11/2007/00468 dated 05/04/2007 issued by The Oriental Insurance Company Limited for 38.4 MW Wind Farm. Price is 0.18% of machinery cost and therefore same is considered for remaining installations of 50.4 MW. - Accelerated Depreciation – As per provisions of Income tax Act, 1961 – Government of India - Residual Value: As per the prevailing practice in the host country. Statutory auditor by the company has duly certified the data used by the company. Financial expert on the validation team additionally validated this. Investment analysis includes various benefits like accelerated depreciation available to the project activity from the national and Sectoral policies for promoting renewable energy generation in India.
Project participants should supply spreadsheet versions of all investment analysis. All formulas used in this analysis be readable and all relevant cells be viewable and unprotected.	The unprotected and readable spreadsheet versions of investment analysis have been provided.
In the calculation of equity IRR only the portion of investment costs which is financed by equity should be considered as the net cash outflow, the portion of the investment costs which is financed by debt should not be considered a cash outflow.	The project activity is financed through 100% equity. The post tax equity IRR thus calculated cannot take into account the debt outflow since there is no debt.
In cases where a benchmark approach is used the applied benchmark shall be appropriate to the type of IRR calculated. Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. Required/expected returns on equity are appropriate benchmarks for equity IRR. Benchmarks supplied by relevant national authorities are also appropriate if the DOE can validate that they are applicable to the project activity and the type of IRR calculation presented.	According to decision from EB-40, benchmark of 14% as per GERC order is now not considered as benchmark for investment in the project activity. Project participant, has now considered three other benchmarks for investment analysis. Elaborate explanation on each of these is provided in PDD. Validation comments for all these benchmarks The various publicly available documents which explicitly state the appropriate benchmark for power generation projects for determination of tariffs available at the start date of the Project are stated below:

VALIDATION REPORT

In the cases of projects which could be developed by an entity other than the project participant the benchmark should be based on publicly available data sources which can be clearly validated by the DOE. Such data sources may include local lending and borrowing rates, equity indices, or benchmarks determined by relevant national authorities. The DOE's validation of such benchmarks shall also include its opinion of the suitability of the benchmark applied in the context of the underlying project activity.	(a) Since there are various wind farm developers in the country implementing similar projects, the benchmark should be based on publicly available data sources which can be clearly validated by the DOE. In accordance with the guidance, the suitability of benchmark has been validated by the DOE keeping in mind that the unwillingness of one investor to assume the associated risks is not sufficient evidence that the project is additional, as this may be based on the subjective profit expectations of that investor. The applied benchmark must be suitable for the specific proposed project activity. It is not suitable to compare the return of low risk investments with the returns achieved or achievable by higher risk investments. The DOE has validated that the benchmark is applicable to similar project activities in the region and is not dependent on the risk profile particularly of HZL. Further, DOE has verified the returns from the mainstream projects of HZL based on various Board Resolutions for project approval of such projects (mining and smelting) being quite high in the range of 19%-32% (1. Meeting of Board of Directors held on 25th April 2003 and 2. Meeting of Board of Directors held on 27th July 2005).
Internal company benchmarks/expected returns (including those used as the expected return on equity in the calculation of a weighted average cost of capital - WACC), should only be applied in cases where there is only one possible project developer and should be demonstrated to have been used for similar projects with similar risks, developed by the same company or, if the company is brand new, would have been used for similar projects in the same sector in the country/region. This shall require as a minimum clear evidence of the resolution by the company's Board and/or shareholders and will require the validating DOE to undertake a thorough assessment of the financial statements of the project developer - including the proposed WACC - to assess the past financial behavior of the entity during at least the last 3 years in relation to similar	Internal company benchmark has not been used as per the provisions of the tool for demonstration and assessment of additionality version 04 which states that <i>"The benchmark is to represent standard returns in the market, considering the specific risk of the project type, but not linked to the subjective profitability expectation or risk profile of a particular project developer"</i>. Further since this is the first renewable wind power project of HZL, there is no precedence of a decision to invest in renewable energy based power generation which can be compared to the proposed project activity.

VALIDATION REPORT

projects.	
Risk premiums applied in the determination of required returns on equity shall reflect the risk profile of the project activity being assessed, established according to national/international accounting principles. It is not considered reasonable to apply the rate general stock market returns as a risk premium for project activities that face a different risk profile than an investment in such indices.	Not Applicable.
If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate.	Since the baseline scenario as stipulated by ACM0002 is the supply of electricity from a grid, as per the provisions of the guidance on assessment of investment analysis, the benchmark approach is considered appropriate.
The DOE should assess in detail whether the range of variations is reasonable in the project context. Past trends may be a guide to determine the reasonable range. As a general point of departure variations in the sensitivity analysis should at least cover a range of +10% and -10%, unless this is not deemed appropriate in the context of the specific project circumstances. In cases where a scenario will result in the project activity passing the benchmark or becoming the most financially attractive alternative the DOE shall provide an assessment of the probability of the occurrence of this scenario in comparison to the likelihood of the assumptions in the presented investment analysis, taking into consideration correlations between the variables as well as the specific socio-economic and policy context of the project activity.	The sensitivity analysis has considered variations in the range of $\pm 5\%$ and $\pm 10\%$ which have been considered appropriate in the context of specific project circumstances as follows: Applying these two slabs of variations, it has been satisfactorily demonstrated that post tax equity IRR is still below the benchmark mentioned above. The upper variation value of 10% considered for PLF, O&M cost escalation rate is found reasonable by DOE as: - PLF value considered by project activity (based on suppliers guarantee) is 24.26% which is already higher than the PLF considered by GERC in its tariff order as mentioned above (GERC considers a PLF of 23%). A 10% increase in this PLF is taken as the maximum variation that can be reasonably assumed for the project. since the wind mast data provided by the supplier for the site and the corresponding generation capability indicates the assumed PLF as the achievable PLF on the specific location. - O&M cost is fixed for 10 years and the prices would be renegotiated after 10 years, and a maximum of $\pm 10\%$ is



 VALIDATION REPORT

	seen as reasonable variation expected in the prices.
--	--

Thus, as per the sub step 2.C para 8.b. of the tool for the demonstration and assessment of additionality “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.”

Based on the above, it can be concluded that the investment in Wind farm of the stated capacity is a financially unattractive proposition for the project participant without CDM revenues.

Under Step 3, various barriers like following barriers and their validation by the validation team

B. Barrier Analysis: following claims are presented in PDD

Barriers due to prevailing practice including institutional barriers are presented in PDD as below -

1. Third party sale is not allowed in state of Gujarat
2. Rates are lower than other states
3. Most of the installations in Gujarat are for captive use.
4. Likely chances of affecting cash flows due to heavy losses incurred by Gujarat Electricity Board (GEB)
5. Gujarat Electricity Regulatory Commission (GERC)'s mandate on sharing of CDM Benefits

Validation of the claims by DOE

It is correct that as per the prevalent policies in Gujarat, third party sale is not allowed. Investors have mostly preferred for captive use over sale to Electricity body. As per data available for investments in the state till December 2006, it can be seen that more than 75% of investors are using the energy is for captive only.

Rates of power purchase are found to be comparable but lower than prominent states like Maharashtra, Karnataka and Rajasthan. Important to note is that there is no annual escalation in prices as prevailing in some other states in the India. Price of Rs. 3.37/kWh is fixed for 20 years. It is also well explained in PDD, there has been no consistency in policies of Gujarat Government since 1993 till date. This has affected installations in wind energy in the state compared to other states in India.

The claims presented by project participant are found to be verifiable by evidences available through publicly available information.

As per publicly available information on investment in Wind energy in Gujarat, HZL wind farm is one of the very few projects in Gujarat developed for selling the generated output to the state electricity utility. Additionally a large-scale investment of this nature has been the “first of its kind” in the state and it is the largest wind farm by Enercon India Limited to be commissioned in Gujarat.

VALIDATION REPORT

It is also evident that erstwhile Gujarat Electricity Board has been incurring heavy losses over the years (To the tune of approx. 1000 Crores in a year). Therefore investment with a scale of 88.8 MW is definitely risky since cash flows are likely to be affected due to this situation & CDM funds would be instrumental in mitigating such a risk.

Further GERC in its order on 11/08/2006 has mandated the private investors to share 25% of the gross benefit from CDM with the respective distribution licensee, which means that the anticipated revenue from CDM will also not be fully available to the project participant.

The validation team has thus validated the claims of the project proponents and are justified to be true in the project scenario. The likelihood of these regulatory risks affecting the project activity is high considering the prevailing circumstances in the state of Gujarat. In wake of this, the validation team concludes the above barriers to be prohibitive.

Other Barriers

Arguments –

Inherent problems with Wind energy installations & ‘virgin site’ of the project activity

Validation of the claims by DOE -

As such output from Wind energy installations cannot be predicted as it depends on several factors including wind speed, grid availability, site conditions etc. Hence suppliers of WEGs keep on searching for different sites for consistent energy generation. The site selected by HZL is new (Virgin) since the performance of the site w.r.t its consistent generation is not yet proven. Supplier has given the certificate backed-up by data that this site is not yet harnessed for WEG installations. This was also evident during site visit since infrastructure like Substation is not yet fully operational. The arguments provided by the project proponent are justified to be prohibitive but cannot be considered as a decisive barrier.

Common practice analysis

The validation team explains the assessment of the common practice according to the draft Validation and Verification Manual under consideration by EB. This is explained stepwise as follows:

(a) How the geographical scope of the common practice analysis has been validated

In India, the regulatory environment for the power sector in general and renewable energy in particular is governed by the policies, regulations and tariff orders implemented at the state level, albeit derived from those by the central government. The geographical scope of the common practice analysis therefore should be at the state level.

Project participant has conducted the common practice analysis at the Gujarat state level. The validation team therefore agrees with this geographical scope.

(b) How the DOE has undertaken an assessment of the existence of similar projects;

Under the common practice analysis, it is necessary to ensure that the identification of projects of similar nature is complete [at temporal level as well as at other levels] before different criteria are applied for eliminating these.

Project participant has obtained the basic information on similar scale projects from Wind Power Directory, 2006. In India, this information is considered to be the most updated and exhaustive information on windmill installations across the country. The source of information therefore is acceptable to the validation team.

VALIDATION REPORT

Project participant has considered however the directory for the year 2006. This version is not likely to list those projects, which are implemented between March 2006 till the date of decision of the project activity [December 2006]. In order to overcome this lack of information, project participant also made use of other publicly available sources stated in his response.

In order to verify this information for completeness, the validation team, separately verified the data in 2007 version of the Wind Power Directory. Accordingly, the validation team hereby confirms that the analysis presented by the project participant covers all the windmill projects in Gujarat that were implemented by March 2007 and were of similar scale [i.e. windmill capacity installed by single private sector investor in Gujarat is more than 15 MW].

(c) How the DOE has assessed the essential distinctions if similar projects are widely observed. According to the information available in various sources listed in his response, project participant has identified 7 windmill projects which are likely to be similar to the project activity, Validation team assessed the analysis by project participant as follows –

Sr. No.	Investor	Assessment by validation team
1	Gujarat NRE Coke	The links provided by project participant clearly demonstrate that the complete capacity is already seeking CDM status.
2	Gujarat Guardian Limited	Project participant has demonstrated through weblinks that the project is different from the project activity on following accounts – 1. This project is for meeting the captive demand whereas the project activity is for export to the grid only. 2. This project is also seeking carbon credits through VER route. [refer pages 51, 52, 53 & 54 of the PDD available at the link provided by the project participant] Validation team agrees that the risks involved in a captive power project are different from those for a project exporting power. The baseline for captive project could be a fossil fuel based power plant whereas for the project activity, it is the electricity displaced from the grid. Further, since the project activity has achieved carbon finance under VER route, it

VALIDATION REPORT

		is clear that the project activity would not be implemented without such additional incentive. Project participant also states that the project activity is also seeking CDM status. However, this information is not publicly available and hence could not be verified. In overall assessment, the validation team confirms that the project participant has demonstrated that the project activity is different from this project.
3	Patnaik Minerals Pvt. Ltd	Project participant has demonstrated that the project is seeking CDM status.
4	Indian Petrochemicals Co. Ltd	The project was implemented before 2000 and therefore is not eligible under CDM. Project participant has demonstrated that the project is different from project activity since – 1. It is a captive power project. 2. The regulatory environment is different. E.g. the tariff, wheeling charges and incentives like electricity duty and demand cut, sales tax, etc. are different with respect to the project activity. Validation team therefore agrees that project participant has demonstrated that the project activity is different from this project.
5	Ratnamani Metals and tubes Limited	Project participant has demonstrated that the project activity is seeking

 VALIDATION REPORT

		CDM status.
6	SREI Infrastructure	This project is implemented in parallel to the project activity and hence need not be considered under common practice. Nevertheless, project participant has demonstrated that the management of this company already has plans to seek CDM status for its renewable energy activities.
7	MSPL Limited	Project participant has demonstrated that the project is already seeking CDM status.

Thus the validation team confirms that the project participant has demonstrated that similar projects in the same region are either implemented only with due consideration of CDM or the project activity has essential distinctions with respect to any similar projects that are evident.

Project participant has provided information on other issues regarding penetration of wind energy in the country and the region and the validation team concurs with the same. All data and information provided has been verified with publicly available data provided through the sources mentioned in the PDD.

Considering all the available information, DOE is of the opinion that installations of similar scale are not a common practice in the region and that that wind power project development is substantially dependent on CDM.

Prominent Corrective action Requests and Clarifications related to Baseline & their resolution by validation team are summarised below

CAR-1– Section B.3.1 Table 2

Refer section B.5 of PDD. Following need to be clarified

1. Latest tool for demonstration and assessment of additionality is version 4, however PDD uses version 2 only.
2. Under step 1 of additionality screen, PDD mentions coal based power plant as one of the alternatives, which is not realistic in the context of project.
3. Technology barriers mentioned in barrier analysis are not specific to project but are generic in nature.

Response from Project participant

1. The tool for demonstration and assessment of additionality version 4 has been incorporated in the revised PDD under section B.5.

VALIDATION REPORT

2. The alternative 2 i.e. setting up a coal-based power plant that would produce equivalent units of power as the project activity has been deleted in the revised PDD in accordance with the footnote of the additionality tool version 04.

3. The technological barriers listed in the PDD are with respect to the inherent risks that the WEGs with synchronous generators bear. This barrier is particularly important in case of simultaneous aberration in grid parameters viz. voltage and current asymmetry fluctuations as well as frequency variation under which the WEG would not be able to sustain operation. It becomes a more difficult task in the context of very frequent variations over a time scale. As there have been frequent frequency variations in the western grid (In the western region grid, for the year 2005-06, there has been a variation in the grid frequency between 48.5 to 52.02 Hz) this barrier becomes particularly relevant to the proposed project activity. However, this is not the most important barrier faced by the project activity as the barrier analysis rest on prevailing practice barrier and virgin site barrier as the major barriers to demonstrate additionality along with investment analysis as conducted in the PDD.

Conclusion by Validation Team

1. Verified version 2, dated 06/01/2008 of PDD for the reference and application of version 4 of additionality.
2. Verified version 2, dated 06/01/2008 of PDD for deletion of coal-based power plant that would produce equivalent units of power as the project activity
3. Verified the claims of technology barrier through evidences of literature of gearless technology visa-vis technology with gears. It is correct that wind turbines gearless technology are more susceptible towards frequency variations, which are prevailing in western grid. However, since the barrier is not so pronounced taking into consideration large number of installations utilising this technology, the barrier is not prohibitive in nature. Since the barrier is removed from the PDD, the CAR is closed.

Based on response to all the mentioned points, Corrective Action Request – CAR-1 is closed.

3.3 MONITORING PLAN

The Project uses the approved consolidated monitoring methodology ACM 0002, version 6, and dated 19/05/2006.

The adopted monitoring methodology is applicable to the type of the project activity since the project activity is grid-connected renewable power generation from wind sources

The methodology requires monitoring of the following parameters:

- Electricity generation from the proposed project activity;
- Data needed to recalculate the operating margin emission factor, if needed, based on the choice of the method to determine the operating margin (OM), consistent with “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” (ACM0002);
- Data needed to recalculate the build margin emission factor, if needed, consistent with “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”(ACM0002);

VALIDATION REPORT

The details of parameters, their frequency and relevant QA/QC procedures have been explained section B.7.1 of PDD. Description of monitoring plan for monitoring of electricity on regular basis has been explained in Section B.7.2 of PDD.

The net electricity generated will be calculated from the readings of export and import indicated by the main meter connected to the incoming feeder of GUVNL. The procedures for metering will be as per the provisions of the power purchase agreement. The WEGs of a single customer (HZL in this case) at a particular site are connected to a Vacuum Circuit Breaker metering yard (VCB) which in turn connects to a feeder that ultimately leads to the shared main GETCO meter at the substation maintained by Enercon India Limited. Data monitoring takes place at the VCB metering yard and GETCO meter at the substation. The electricity metered at the GETCO meter is proportionally divided among the customers connected to the meter on the basis of the prorata readings taken at the VCB end.

Authority and responsibility of project management as well as registration, monitoring, measurement and reporting related to project lies with Hindustan Zinc Limited. HZL has formulated a Project Team to ensure proper and continuous monitoring of the performance of turbines and generation of power.

To ensure trouble free operations and efficient generations through all the wind turbines, HZL has entered into a comprehensive Operation and Maintenance agreement with the manufactures of the turbines for a period of 20 years. The contractor EIL, under the O&M contract with HZL would be responsible for the operation and maintenance of the project activity for the entire crediting period

Prominent Corrective action Requests and Clarifications related to Monitoring plan & their resolution by validation team are summarised below

CAR-2 – Section D.1.3, Table 2

Site visit revealed that different HZL machines are connected to different vacuum circuit breakers and then to different feeders. These feeders are then connected to one metering station installed by state authorities i.e. GETCO. Every turbine has display card provided by supplier. In such cases, aspects like data monitoring from individual machines, calibration / verification of display systems, alternative methods of monitoring and measurements, source of data for emission reduction calculations, losses to be considered etc. are not explained in PDD.

Response from Project Participant

The WEGs of a single customer (HZL in this case) at a particular site are connected to a Vacuum Circuit Breaker (VCB) which in turn connects to a feeder that ultimately leads to the main GETCO meter at the substation maintained by Enercon India Limited. Data monitoring takes place at all the metering locations mentioned above. The electricity metered at the GETCO meter is proportionally divided among the customers connected to the meter on the basis of the prorata readings taken at the VCB end. The emission reduction calculations are done on the basis of the Main meter reading and as mentioned in the share certificate issued by GEDA on monthly basis.

Furthermore real time data of generation from each WEG on a daily basis will be uploaded online and updated. HZL can access that data online through a dedicated user account of HZL.

VALIDATION REPORT

The calibration of the main GETCO meter will take place yearly.

The calibration of the meters installed in an individual WEG will take place on yearly basis in accordance with Enercon's operation & maintenance manual which is consistently followed at all Enercon sites across the world. Also, Enercon is an ISO 9001 company and all procedures for operation and maintenance are in place.

The emission reduction calculations will be done on the basis of net electricity supplied to the grid after subtracting the losses incurred due to transmission from the WEG to the GETCO feeder. The joint meter readings will serve as the most authentic data source for the same.

The revised PDD (version2) incorporates the required information in accordance with observations on site.

Conclusion by Validation Team

The explanation provided is found to be satisfactory. Same is evident in revised version of PDD. Corrective Action Request CAR-2 therefore is closed.

3.4 CALCULATION OF GHG EMISSIONS

As per ACM 0002, Version 6, dated 19/05/2006, the baseline emission sources considered are fossil fuel fired power plants connected to the relevant electricity system (grid). The relevant grid considered for the calculation of baseline emissions is the western region grid and not the state or the National grid.

As required under ACM 0002, Version 6, dated 19/05/2006, the baseline emissions are calculated as per combined margin approach, both in terms of relevant grid definitions and the emission factors. The operating margin in the baseline emissions is calculated using equation (1) described in ACM 0002, Version 6, dated 19/05/2006. For calculating the operating margin, data vintage of 3-year average (based on the most recent publicly available statistics available at the time of PDD submission) has been used. The build margin calculations have been completed with most recent information available on plants already built at the time of PDD submission. The combined margin calculation is based on CEA data – Latest version dated December 2007. As per methodology ACM 0002, Version6, dated 19 May 2006. 'For wind and solar projects, the default weights are as follows: wOM = 0.75 and wBM = 0.25 (owing to their intermittent and non-dispatchable nature). The detailed algorithms are described later under sections B.6.1. The value applied for combined margin 0.9011 tCO₂/MWh is found to be correct.

Conservativeness:

The approach in the determining the baseline as well as estimated emission reductions have been found to be conservative. Monitoring plans also include the external data like grid emission factor for Western grid. The values used for calculations are found to be latest as per the sources indicated.

The Central Electricity Authority of the Government of India has published the CO₂ Baseline Database for the Indian power sector, which includes data for all regional grids in India. Version 2.0 of the CO₂ Baseline Database was initially adopted for baseline determination in accordance with ACM0002. The resulting emission factor from applying the data provided in version 2.0 of the CEA database was 0.9064 tCO₂/MWh. However during the course of validation, version 3.0 of the database was published with data added for the year 2006-2007.

VALIDATION REPORT

The emission factor resulting from data in the updated database is 0.9011 tCO₂/MWh. Thus, a more conservative baseline for the project activity is established using data from version 3.0. Therefore, the ex-ante values for the operating margin, build margin, and corresponding emission factor were updated as per version 3.0 of the CO₂ Baseline Database

As described in ACM 0002, Version 6, dated 19/05/2006, there are no project emissions as well as no leakage effects. Therefore emission reductions by the project activity equal the baseline emissions relevant to the project activity.

Estimated values for generation of 175491 MWh units of electricity annually and thereby 158127 tonnes of equivalent CO₂ are found to be reasonable. Calculations are presented in complete and transparent manner.

3.5 SUSTAINABLE DEVELOPMENT IMPACTS

Host country legislation does not require detailed environmental impact analysis for wind projects. No significant environmental impacts have been identified from the project activity. The environmental impacts during construction phase and during operation and maintenance phase of the activity are presented in PDD. The other normal (negative/ positive) environmental impacts assessed due to the activity are summarized below:

- Wind Power plants are known to contribute to zero atmospheric pollution as no fuel combustion is involved during any stage of the operation. During transportation, movement of construction material during construction will have some impact on the air. As the transportation is quite less for the project activity, the impacts will be negligible.
- There is no effluent discharge from project activity. However during construction phase, project proponents provided proper sanitary arrangements.
- There are no migratory birds / endangered species in the region of project activity. Therefore no harm to the ecological environment is envisaged.
- Noise is generated due to the movement of rotor blades. It has no direct effect on the population, as the area is less populated and noise generated will be attenuated by ambient conditions.
- The land on which the project activity takes place is barren and largely infertile. Prior to the project activity, most of the land in Jamnagar district had no beneficial use. The project proponents had bought the land for a worthwhile application and obtained necessary approvals for installation of windmills. No dislocation of people is involved in the course of the project activity.
- There is no inconvenience to the local community due to the transmission lines. The locals have benefited economically through land sales. The project activity helps the upliftment of skilled and unskilled manpower in the region. The project will be providing employment opportunities not only during the construction phase, but also during its operational lifetime. The project activity improves employment rate and livelihood of local populace in the vicinity of the project. Moreover, the project generates eco-friendly, GHG free power, which contributes to sustainable development of the region.

VALIDATION REPORT

In view of above positive impacts and contribution towards the country's goal of sustainable development and improvement in quality of life of local population, the development and implementation of systems for 'Wind power project by HZL in Gujarat.' were recommended by the Hindustan Zinc Limited management. The clearance of this CDM initiative by Hindustan Zinc Limited would facilitate the process of sustainable energy production.

3.6 COMMENTS BY LOCAL STAKEHOLDERS

Local stakeholder consultation meeting to discuss stakeholder concerns on the proposed Clean Development Mechanism (CDM) project –'Wind power project by HZL in Gujarat 'of Hindustan Zinc Limited at was held at time on 11/04/2007 at Windfarm site Samana.

Project participant has maintained the list of participants, the notice inviting participation to interested stakeholders & record of the stakeholder meeting proceedings along with photographs.

The stakeholders viewed the company name project as contributing to local environmental benefits and socio-economy. Overall, there was agreement that the project activity was a beneficial project from the local sustainable development. The local stakeholders interviewed during the site visit of the validation activity endorsed these views. Stakeholders also expressed their expectation from project participants during the meeting with validators during site visit. These were mainly related to more participative approach from project participants so that villagers know the progress about the project as well as they can contribute by offering suggestions for the benefit of the villages.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the Validation of CDM projects, the validator shall make publicly available the project design document and receive, within 30 days, comments from Parties, stakeholders and UNFCCC accredited non-governmental organisations and make them publicly available.

Bureau Veritas Certification published the project documents on the UNFCCC CDM website (<http://cdm.unfccc.int>) on and invited comments within 30/03/2007 to 28/04/2007 by Parties, stakeholders and non-governmental organisations.

Comments were received from Hiral Mehta during the commenting period on 28/04/2007. Response from Project participant on the same as well as remarks from DOE is attached as Appendix B of this Draft Validation Report.

5 VALIDATION OPINION

Bureau Veritas Certification has performed a validation of the Hindustan Zinc Limited's 'Wind power project by HZL in Gujarat.' M/s. Hindustan Zinc Limited (hereafter called "the project") located in site Samana, Villages Methan, Dhun Dhoraji, Sadodar, Laloi, Narmana, Haripar mevasa, Bagadhara and Jamwadi, Taluk: Kalavad, Jamjodhpar, , District Jamnagar, Gujarat, India The validation was performed on the basis of UNFCCC criteria and host country criteria



 VALIDATION REPORT

and also on the criteria given to provide for consistent project operations, monitoring and reporting.

The validation consisted of the following three phases: i) a desk review of the project design and the baseline and monitoring plan ii) follow-up interviews with project stakeholders iii) the resolution of outstanding issues and the issuance of the Draft Validation Report and opinion.

By generating electricity from wind the project is expected to result in reductions of GHG emissions partially displacing electricity that would have otherwise been generated from the grid. An analysis of the investment, technological & other barriers demonstrates that the proposed project activity 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. Given that the project is implemented and maintained as designed, the project is expected to achieve the estimated amount of emission reductions.

Review of the project design documentation (version 02, dated 06/01/2008) and the subsequent follow-up interviews have provided Bureau Veritas Certification with sufficient evidence to determine the fulfillment of stated criteria. In our opinion, the project correctly applies and meets the relevant UNFCCC requirements for the CDM and the relevant host country criteria.

The validation is based on the information made available to us and the engagement conditions detailed in this Validation Report.

6 REFERENCES

Category 1 Documents:

Documents provided by Hindustan Zinc Limited that relate directly to the GHG components of the project.

- /1/ Host country Approval dated 15/02/2008
- /2/ PDD Initial Version – Version 1, 26/03/2007 dated & Final version 2, dated 06/01/2008

Starting date and Evidence of CDM Consideration

- /3/ Contract agreement – Contract No. HZL/PROJ/WPP-UMBRELLA/07 dated 15/01/2007 between HZL and EIL for Wind Energy Farm at Samana - 48 nos. Enercon make E48 – 800 KW rating WEC.
- /4/ Letter from HZL dated 04/05/2006 written to EIL enquiring about the eligibility of renewable energy projects under CDM.
- /5/ Letter from HZL dated 04/05/2006 written to Suzlon Energy Limited enquiring about the eligibility of renewable energy projects under CDM.
- /6/ Communication by HZL with various consultants during May – June 2006
- /7/ Presentation dated November 2006 made by Mr. Naveen Singhal to the management on investment in wind power and necessity of revenue from CDM for financial viability of the project.
- /8/ Board Resolution dated 30/11/2006 stating that company should plan for wind power installations and take all necessary steps for registering the project as CDM Project.

Approvals & Contracts relevant to Project

- /9/ Permission for setting up 38.4 MW wind farm issued by Gujarat Energy Development Agency vide letter – GEDA/HZL/PWF/SADODAR/2006-07/7934 dated 22/02/2007



VALIDATION REPORT

- /10/ Permission for setting up 37.6 MW wind farm issued by Gujarat Energy Development Agency vide letter – GEDA/HZL/PWF/SADODAR/07-08/1535 dated 30/06/2007
- /11/ Permission for setting up 8.8 MW wind farm issued by Gujarat Energy Development Agency vide letter – GEDA/HZL/PWF/Jamwadi/2007-08/3808 dated 27/11/2007
- /12/ Permission for setting up 4.0 MW wind farm issued by Gujarat Energy Development Agency vide letter – GEDA/HZL/PWF/Laloi/2007-08/5758 dated 01/02/2008
- /13/ Contract agreement – Contract No. HZL/PROJ/WPP-UMBRELLA/07dated 15/01/2007 between HZL and EIL for Wind Energy Farm at Samana - 48 nos. Enercon make E48 – 800 KW rating WEC.
- /14/ Contract agreement – Contract No. HZL/PROJ/WPP-UMBRELLA-2 /07dated 01/03/2007 between HZL and EIL for Wind Energy Farm at Samana - 63 nos. Enercon make E48 SL – 800 KW rating WEC.
- /15/ Amendment dated 26/05/2007 to Contract Agreement (HZL/PROJ/WPP-UMBRELLA/07-02) dated 01/03/2007 for commissioning of 50.4MW capacity by Sept'07.
- /16/ Various sub-lease agreements between HZL and EIL on March 2007 – Nos. – KLD/376/1/13/2007, KLD/374/1/11/2007, JJP-1/307/1/17/2007, JJP/309/1/15/2007, JJP-1/311/1/13/2007,
- /17/ Power Purchase agreement dated 23/03/2007 between HZL and Gujarat Urja Vikas Nigam Limited for 48 nos. of WECs
- /18/ Power Purchase agreement dated 04/10/2007 between HZL and Gujarat Urja Vikas Nigam Limited for 47 nos. of WECs
- /19/ O & M contract between HZL & EIL – HZL/WPP/O&M/GUJARAT-001/07.for 48 nos. of WECs.
- /20/ O & M contract between HZL & EIL – HZL/WPP/O&M/GUJARAT-2-001/07. for 63 nos. of WECs.
- /21/ Insurance Policy 242500/5/00000/11/2007/00468 dated 05/04/2007issued by The Oriental Insurance Company Limited for Wind Farm.

Stakeholders' Consultation Process

- /22/ Invitation letter dated 11/04/2007 for inviting villagers to attend the meeting about 'Clean Development Mechanism'
- /23/ Records of stake holders' meeting dated 11/04/2007

Other relevant documents

- /24/ Daily generation reports – Few Samples of exiting WECs of HZL.

Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents.

- /1/ Kyoto Protocol to the United Nations Framework Convention on Climate Change, United Nations, 1997
- /2/ Guidelines for completing CDM-PDD - Version 06, dated 28/07/2006
- /3/ Approved Methodology –ACM 0002 - Version 6 –19/05/2006
- /4/ Tool for demonstration and Assessment of Additionality –Version 4



VALIDATION REPORT

Persons interviewed:

List persons interviewed during the validation, or persons that contributed with other information that are not included in the documents listed above.

- /1/ Mr. Srikanth Sarangapani – HZL - A.G.M – Wind Energy Project.
- /2/ Mr. Ajey Mohatkar – HZL - Associate Manager – Wind Power Project -
- /3/ Mr. Sunil Bohra – HZL – Financials, IRR working
- /4/ Mr. Ajeet Modi - HZL - Financials, IRR working
- /5/ Mr. G. K. Chaudhari – EIL - Head Business Development & Operations –
- /6/ Mr. K.D. Baria – EIL - Regional Service In-charge
- /7/ Mr. Kishor Vasara – EIL - Area Service In-charge
- /8/ Mr. S.P.Gaopande – EIL - Substation and external electrical In-charge –
- /9/ Mr. Dinesh Sharma – EIL - Project execution In-Charge
- /10/ Mr. Paritosh Desai – EIL - Land Officer
- /11/ Mr. Dheeru Bhai - Village Moti-Vavdi
- /12/ Mr.Narsingh Bhai – Village Methan
- /13/ Mr.Magan Bhai – Village Jamwadi
- /14/ Mr. Arjun Bhai – Village Moti-Vavdi
- /15/ Mr. Vallabh Bhai – Village Dhun-Dhoraji
- /16/ Mr. Haneef Bhai – Village Mevasa
- /17/ Mr. Ramesh Lakum- Village Haripar
- /18/ Mr. N.A. Patil – Village Haripar
- /19/ Mr. Dost Mohammed – Village Mevasa
- /20/ Mr. Ramji Bhai – Village Hakumati Sarvaniya
- /21/ Mr. Mahendra Arjan - Village Dhun-Dhoraji
- /22/ Mr. Iqbal Noor Mohammed - Village Haripar

- o0o -

VALIDATION REPORT

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

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
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	Yes	Table 2, Section E.4.1
2. 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, Marrakesh Accords, CDM Modalities §40a	Yes	Table 2, Section A.3 Host country approval has been received.
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	Yes	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authorities of each party involved, including confirmation by the host party that the project activity assists it in achieving sustainable development	Kyoto Protocol Art. 12.5a, Marrakesh Accords, CDM Modalities §40a, §28, Annex 3 of the Resolução Interministerial 01/03	Yes	HCA dated 15 th February 2008 is available
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	Yes	Table 2, Section E
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of	Kyoto Protocol Art. 12.5c, Marrakesh	Yes	Table 2, Section B.2



VALIDATION REPORT

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Accords, CDM Modalities §43 and 44		
7. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance	Marrakech Accords	Yes	No public funding for the project from Annex1 parties is indicated.
8. Parties participating in the CDM shall designate a national authority for the CDM	Marrakech Accords, CDM Modalities §29	Yes	Ministry of Environment and Forest has been designated national authority by the host country i.e. India.
9. The host country shall be a Party to the Kyoto Protocol	Marrakech Accords, CDM Modalities §30	Yes	Host country, India is a party to the Kyoto Protocol
10. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	Marrakech Accords, CDM Modalities §37b	Yes	Table 2, Section E
11. 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.	Marrakech Accords, CDM Modalities §37c	Yes	Table 2, Section D
12. Baseline and monitoring methodology shall be previously approved by the CDM Methodology Panel	Marrakech Accords, CDM	Yes	Table 2, Section B.6 and B.7



VALIDATION REPORT

REQUIREMENT	REFERENCE	CONCLUSION	Cross Reference / Comment
	Modalities §37e		
13. 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	Marrakech Accords, CDM Modalities §37f	Yes	Table 2, Section B
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	Marrakech Accords, CDM Modalities, §40	Yes	PDD is made available for public comments from 30 March 2007 to 28 April 2007
15. 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	Marrakech Accords, CDM Modalities, §45 b, c, e	Yes	Table 2, Section B.6
16. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	Marrakech Accords, CDM Modalities, §47	Yes	Table 2, Section B.7
17. The project design document shall be in conformance with the UNFCCC CDM-PDD format and fulfilled according to the guidelines for completing CDM-PDD, CDM-NMB, and CDM-NMM	Marrakech Accords, CDM Modalities, Appendix B, EB Decisions	Yes	Guideline for completing CDM PDD – Version 6, dated July 28, 2006

VALIDATION REPORT

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. Title of the project activity, version number and date of the document	1	DR	Wind power project by HZL in Gujarat. Version 02, 06/01/2008	OK	OK
A.2. Description of the project activity					
A.2.1. Is the purpose of the project activity included?	1	DR	Refer section A.2 of PDD. It states 'The proposed project activity is an initiative by Hindustan Zinc Limited to export Wind Electric Generator (WEG) generated renewable electricity to the power deficit western region grid in order to decrease power shortage, diversify the grid and reduce greenhouse gas emissions.	OK	OK
A.2.2. Is the view of the project participants on the contribution of the project activity to sustainable development included?	1	DR	Yes. The view of project participants on contribution of project activity to sustainable development has been detailed in section A.2 of PDD.	OK	OK
A.3. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	-	DR I	Indian legislation allows windmill operations. The Indian and Gujarat state government promotes wind power generation.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
A.3.2. Is the project in line with host-country specific CDM requirements?	-	DR I	Approval from Ministry of Environment & Forests is available.	OK	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	-	DR I	Refer to A.3.2	-	OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	-	DR I	The project is reported to lead to sustainable development. Refer A.2 of PDD.	OK	OK
A.4. Project participants					
A.4.1. Are Party (ies) and private and/or public entities involved in the project activity listed?	1	DR	Yes listed. Refer A.3 of PDD.	OK	OK
A.4.2. Is the contact information provided in annex 1 of the PDD?	1	DR	Yes. Refer A.4.1	OK	OK
A.4.3. Is this information indicated using the tabular format?	1	DR	Yes. Information is provided using tabular format	OK	OK
A.5. Technical description of the project activity					
A.5.1. Location of the project activity					
A.5.1.1. Host country Party(ies)	1	DR	India	OK	OK
A.5.1.2. Region/State/Province etc.	1	DR	Gujarat	OK	OK
A.5.1.3. City/Town/Community etc.	1	DR	District - Jamnagar Taluk – Kalavad, Jamjodhpar Site - Samana Village - Methan, Dhun Dhoraji, Sadodar, Mota Chiroda, Laloi, Narmana, Haripar and Bagadhara.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
A.5.1.4. Detailed description of the physical location, including information allowing the unique identification of this project activity.	1	DR	Refer section A.4.1.4 of PDD. The project activity is located in the Kalavad taluk of Jamnagar district in Gujarat. Kalavad lies between Latitude 21°48' and Longitude 70° 41' at an elevation of 132 m above mean sea level. The Wind Power Density at Kalavad is approximately 212 w/m ² . The nearest airport and railway station are at Jamnagar city, which is located at a distance of approximately 60 kms. from the project activity site.	OK	OK
A.5.2. Category of the project activity					
A.5.2.1. Is the category of the project activity specified?	1	DR	Scope Number 1, Energy Industries (renewable/non renewable sources)	OK	OK
A.5.2.2. Is it justified how the proposed project activity conforms to the project category selected?	-	DR	The proposed project activity being a power generation activity using renewable wind energy, conforms to the category selected	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
A.5.3. 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>					
A.5.3.1. Does the project design engineering reflect current good practices?	-	DR I	Yes Refer A.4.3 Project design engineering reflects current good practices. As per PDD. Total of 111 turbines from M/s. Enercon India Limited are planned to be installed. These turbines feature tubular towers with gearless rotor and generator. At the time of validation, 38.4 MW out of total 88.8 MW was found to be already installed. Remaining is planned to be installed by September 2007.	OK	OK
A.5.3.2. 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?	-	DR I	Refer A.5.3.1 above and section A.4.3 of PDD.	OK	OK
A.5.3.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	-	DR I	Expected operational lifetime of the project activity is 20 years. It is not likely that the project technology will be replaced within this project time.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
A.5.3.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	-	DR I	There is a operation and maintenance contract signed between Project participant and EPC contractor M/s. Enercon India Limited. According to this wind turbines are to be operated and maintained by EPC contractor M/s. Enercon India Limited is a ISO 9001:2000 certified organisation which has a structured training plan. Similarly HZL is also ISO 9001:2000 certified organisation and staff employed by HZL has been trained to understand requirements related to Wind turbines, generation aspects etc.	OK	OK
A.5.3.5. Does the project make provisions for meeting training and maintenance needs?	-	DR I	Refer A.5.3.4.	-	
A.5.4. Brief statement of how anthropogenic emissions of GHG by sources are to be reduced by the proposed CDM project activity					
A.5.4.1. Is it stated how anthropogenic GHG emission reductions are to be achieved?	1	DR	The project itself is a zero emission power project as it is based on wind, a renewable natural source In the absence of the project activity, the electricity authority would have permitted new thermal or other GHG intensive power generation options.	OK	OK
A.5.4.2. Is the estimate of total anticipated reductions of tons of CO ₂ equivalent provided?	1	DR	The estimated emission reductions over the 7-year renewable crediting period would be 1106890 t eCO ₂ .	OK	OK
A.5.4.3. Is this information indicated using the tabular format?	1	DR	Yes. Refer A.4.4 of PDD.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
A.5.5. Public funding of the project activity					
A.5.5.1. Is it indicated whether public funding from Parties included in Annex I is involved in the proposed project activity?	1	DR	The project has not received any public funding from Parties included in Annex I. Refer A.4.5 of PDD.	OK	OK
A.5.5.2. If public funding is involved, is information on sources of public funding for the project activity provided in Annex 2, including an affirmation that such funding does not result on a diversion of official development assistance and is separate from and is not counted towards the financial obligations of those Parties?	1	DR	Not applicable.	-	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. Are the title and the reference of the baseline methodology applicable to the project activity defined?	1 UNF CCC web site	DR I	Yes. Consolidated baseline methodology for grid-connected electricity generation from renewable sources, ACM 0002, Version 06, May 19, 2006.	OK	OK

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
B.1.2. Is the baseline methodology previously approved by the CDM Methodology Panel?	1	DR	Yes. Refer B.1.1		
B.1.3. Does the proposed project activity meet the applicability conditions of the methodology?	1	DR	Yes. This methodology applies to project activities that generate electricity from renewable energy sources.	OK	OK
B.2. Description of how the methodology is applied in the context of the project activity					
B.2.1. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	1 ACM 0002	DR	The approved baseline methodology is applicable to grid-connected renewable power generation project activities. Including capacity additions from wind sources.	-	
B.3. Description of how the anthropogenic GHG emissions by sources are reduced below those that would have occurred in the absence of the proposed project activity					
B.3.1. Is the proposed project activity additional?	1	DR	Refer section B.5 of PDD. Following need to be clarified 1. Latest tool for demonstration and assessment of additionality is version 4, however PDD uses version 2 only. 2. Under step 1 of additionality screen, PDD mentions coal based power plant as one of the alternatives, which is not realistic in the context of project. 3. Technology barriers mentioned in barrier analysis are not specific to project but are generic in nature.	CAR-1	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
B.3.2. Are national policies and circumstances relevant to the baseline of the proposed project activity summarised?	-	I	These are summarized in Step 1b of additionality check.	OK	OK
B.4. Description of the project boundary for the project activity					
B.4.1. Are the project's spatial (geographical) boundaries clearly defined?	1	DR	The spatial extent of the project boundary is limited to the physical, geographical site of 111 nos. of 800 KW WEG's, pooling and the substations.	OK	OK
B.4.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	1	DR	Yes, it includes the wind turbines, pooling and the sub-stations.	OK	OK
B.4.3. Are all the GHGs correctly included in the project boundary ?	1	DR	Yes. CO2 is the only GHG relevant in the context of proposed project. It has been included in section B.3 of PDD.	OK	OK
B.5. Details of the baseline and its development					
B.5.1. Is the date of completion provided?	1	DR	Refer Section B.8 of PDD; The current draft of PDD with baseline completion was completed on 30/12/2007	OK	OK
B.5.2. Is contact information provided?	1	DR	Yes. Contact information for HZL Limited is provided in Annex 1 of PDD.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
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 reasonable?	1	DR	Yes. The PDD mentions starting date to be 15.01.2007 The project activity is expected to be operational for a period of 20 years from the date of commencement of operations.	OK	OK
C.1.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max. two x 7 years or fixed crediting period of max. 10 years)?	1	DR	Renewable crediting period – 7 years & 0 Months. Crediting start date is mentioned to be or after registration.	OK	OK
D. Monitoring Plan <i>The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.</i>					
D.1. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
D.1.1. Does the CDM Methodology Panel previously approve the monitoring methodology?	1	DR	The approved monitoring methodology ACM 0002 called 'Consolidated Monitoring Methodology for zero emissions grid-connected electricity generation from renewable sources' has been used as per current version of the methodology is 06 dated 19 th May 2006.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	1	DR	Refer D.1.1	-	OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	-	DR	Site visit revealed that different HZL machines are connected to different vacuum circuit breakers and then to different feeders. These feeders are then connected to one metering station installed by state authorities i.e. GETCO. Every turbine has display card provided by supplier. In such cases, aspects like data monitoring from individual machines, calibration / verification of display systems, alternative methods of monitoring and measurements, source of data for emission reduction calculations, losses to be considered etc. are not explained in PDD.	CAR-2	OK
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	-	DR	See D.1.2	OK	OK
D.2. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.2.1. 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?	-	DR	Not applicable	OK	OK

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
D.2.2. Are the choices of project GHG indicators reasonable?	-	DR	Not applicable	OK	OK
D.2.3. If the project is hydro power project, are project emissions included based on density of power as required by methodology.	-	DR	Project being power generation through wind, this is not applicable.	OK	OK
D.2.4. Will it be possible to monitor / measure the specified project GHG indicators?	-	DR	Not applicable	OK	OK
D.2.5. Will the indicators give opportunity for real measurements of achieved emission reductions?	-	DR	Not applicable	OK	OK
D.2.6. Will the indicators enable comparison of project data and performance over time?	-	DR	Not applicable	OK	OK
D.3. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	-	DR	No leakage is considered, as per adopted baseline methodology. Not applicable	OK	OK
D.3.2. Have relevant indicators for GHG leakage been included?	-	DR	As per ACM0002 version 6, no need to consider leakage.	OK	OK
D.3.3. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	-	DR	See D.3.1, Not applicable	OK	OK
D.3.4. Will it be possible to monitor the specified GHG leakage indicators?	-	DR	See D.3.1, Not applicable	OK	OK

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
D.4. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	-	DR	As per section B.7.2 of the PDD, only the electricity delivered by the project activity to grid is to be monitored. The baseline emission factors are already determined on ex-ante basis and hence need not be monitored regularly. The monitoring plan therefore is adequate enough for determining the baseline emissions.	OK	OK
D.4.2 Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	-	DR	Yes. Western grid has been considered for baseline emissions.	OK	OK
D.4.3 Will it be possible to monitor the specified baseline indicators?	-	DR	Refer D.4.2 Above	-	OK
D.5. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
D.5.1. Is the authority and responsibility of project management clearly described?	1	DR	Refer section B.7.2, which mentions CDM manual, CDM Manual available during validation clearly reflected responsibilities and authorities of project management.	OK	OK
D.5.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	1	DR	Refer D.5.1.	-	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
D.5.3. Are procedures identified for training of monitoring personnel?	-	I	Refer D.5.1.		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	-	I	Refer D.5.1.		OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	-	I	Refer D.5.1.		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	-	I	Refer D.5.1.		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	-	I	Refer D.5.1.		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	-	I	Refer D.5.1.		OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	-	I	Refer D.5.1. & D.1.3 above.		OK
D.5.10. Are procedures identified for review of reported results/data?	-	I	Refer D.5.1.		OK
D.5.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	-	I	Refer D.5.1.		OK
D.5.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	-	I	Refer D.5.1		OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
D.5.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	-	I	Refer D.5.1.		
E. Calculation of GHG Emissions by Source <i>It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.</i>					
E.1. Predicted Project GHG Emissions <i>The validation of predicted project GHG emissions focuses on transparency and completeness of calculations.</i>					
E.1.1. Are all aspects related to direct and indirect GHG emissions, including leakage, captured in the project design?	-	DR	As per the approved methodology, the project emissions are to be considered as nil hence not applicable.	OK	OK
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	-	DR	See E.1.2 or -E.1.1	-	OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	-	DR	See E.1.2	-	OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	-	DR	See E.1.2	-	OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	-	DR	See E.1.2	-	OK

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
E.1.6. Are uncertainties of external data sources for emissions reduction estimated?	-	DR	See E.1.2	-	OK
E.2. Leakage <i>It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed.</i>					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	-	DR	Not applicable, as per adopted baseline methodology.	OK	OK
E.2.2. Have these leakage effects been properly accounted for in calculations?	-	DR	Refer E.2.1	-	OK
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	-	DR	Refer E.2.1	-	OK
E.2.4. Are the calculations documented in a complete and transparent manner?	-	DR	Refer E.2.1	-	OK
E.2.5. Have conservative assumptions been used when calculating leakage?	-	DR	Refer E.2.1	-	OK
E.2.6. Are uncertainties in the leakage estimates properly addressed?	-	DR	Refer E.2.1	-	OK

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
E.3. Baseline Emissions <i>The validation of predicted baseline GHG emissions focuses on transparency and completeness of calculations.</i>					
E.3.1. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	-	DR	The baseline boundaries are clearly defined.	OK	OK
E.3.2. Are the GHG calculations documented in a complete and transparent manner?	-	DR	Yes. These are documented in complete and transparent manner.	OK	OK
E.3.3. Have conservative assumptions been used when calculating baseline emissions?	-	DR	Refer E.3.2,	OK	OK
E.3.4. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	-	DR	Refer E.3.2,	OK	OK
E.3.5. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	-	DR	The project baseline(s) and the project emissions been determined using the same appropriate methodology.	OK	OK
E.4. Emission Reductions Validation of baseline GHG emissions will focus on methodology transparency and completeness in emission estimations.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	-	DR	The total estimated emission reduction during 7 Years of crediting period would be 1,113,472 t eCO ₂	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
F. Environmental and Social Impacts					
<i>Documentation on the analysis of the environmental and social impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
F.1.1. Has an analysis of the environmental and social impacts of the project activity been sufficiently described?	PDD	I	Section D.1 of the PDD. Host country legislation does not require detail environmental impact analysis.	OK	OK
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	-	I	As per Indian legislation, when the project is below Rs. 1000 Million and is not in the red category industry, EIA is not required and no objection certificate is sufficient.	OK	OK
F.1.3. Will the project create any adverse environmental or social effects?	-	I	Project is not likely to create any adverse environmental impacts.	OK	OK
F.1.4. Are transboundary environmental and social impacts considered in the analysis?	-	I	No transboundary impacts are envisaged on account of the project activity.	OK	OK
F.1.5. Have identified environmental and social impacts been addressed in the project design?	-	I	These are addressed in A.2 of PDD.	OK	OK
F.1.6. Does the project comply with environmental legislation in the host country?	-	I	No specific environmental legislation is applicable for type of the Project Activity	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.</i>					
G.1.1. Have relevant stakeholders been consulted?	-	DR	Refer E.1 of PDD. Relevant stakeholders have been consulted. Evidence of inviting stakeholders for meeting, actual meeting on 11 th April 2007 are available.	OK	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	-	DR	Refer E.1	OK	OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	-	I	The stakeholder consultation process is not required by regulations/laws in India hence stakeholder consultation is not necessary for the projects of type and scale of this project.	OK	OK
G.1.4. Is a summary of the stakeholder comments received provided?	-	DR	Yes. Refer E.2 of PDD	OK	OK
G.1.5. Has due account been taken of any stakeholder comments received?	-	DR	Yes. Refer E.3 of PDD	OK	OK

VALIDATION REPORT

Table 3 Baseline and Monitoring Methodologies : ACM0002 version 6 dated 19/05/2006

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
1. Baseline Methodology					
1. 1. Applicability					
1.1.1. Does the project activity generate electricity from a renewable source?	2	DR I	The project activity involves generation of electricity from wind power.	OK	OK
1.1.2. Is the power connected to the grid?	2	DR I	Yes, the power is exported to the grid	OK	OK
1.1.3 What is the sub-type of the project activity?	2	DR I	Project activity is grid-connected electricity from renewable sources. I.e. wind in this case	OK	OK
1.1.4 Is the baseline methodology used in conjunction with the approved monitoring methodology ACM0002	2	DR I	Yes, ACM 0002. Refer B.1.1	OK	OK
1.1.5. Does the project activity relate to electricity capacity additions from renewable sources?	2	DR I	Yes, it relates to capacity additions from wind power.	OK	OK
1.1.6 If the capacity addition is by hydro electric power projects with reservoir having power density greater than 4 W/m ² ?	2	DR I	Not applicable since this is not a hydro project	OK	OK
1.1.7. Is fuel switch done in the process?	2	DR I	No. There is no fuel switch in the process.	OK	OK
1.1.8. Can the geographic and system boundaries for the relevant electricity grid be clearly identified?	2	DR Inter net	Yes, relevant electricity grid indicated is Western grid.	OK	OK
1.1.9. Is the information on the characteristics of the grid available?	2	DR Inter	Yes, the characteristics of the grid are available.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
		net			
1.1.10. If the electricity generation is from landfill gas capture, is the methodology combined with the approved "Consolidated baseline methodology for landfill gas project activities" [ACM 0001] ?	2	DR	Not applicable	OK	OK
1. 2. Project boundary					
1.2.1. Did the project participant account for the CO ₂ emissions from electricity generation in fossil fuel fired power that is displaced due to project activity?	2	DR	Not applicable as the project activity does not involve geothermal power plant.	OK	OK
1.2.2. Does the spatial extent of the project boundary include the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to?	2	DR	The spatial extent of the project boundary as defined at section B.3 of the PDD includes all power plants connected physically to the electricity system that the CDM project power plant is connected to.	OK	OK
1.2.3. Is the regional project electricity system identified by the spatial extent of the power plants that can be dispatched without significant transmission constraints?	2	DR	Yes identified.	OK	OK
1.2.4. Are the assumptions made in determining the project electricity system defined and justified?	2	DR	There are no assumptions made in defining the project electricity system,	OK	OK
1.2.5. Does the application of this methodology result in a clear grid boundary?	2	DR	Yes	OK	OK
1.2.6. Does the application of this methodology result in a given country specific variations in grid management policies?	2	DR	Yes	OK	OK
1.2.7. If answer to question is no whether DNA	2	DR	No	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
guidance is available for defining the boundary.					
1.2.8. If answer to question is no and if the host country has a layered dispatch system (e.g. state/provincial/regional/national), is the regional grid is used?	2	DR	Yes, Western Region grid is considered.	OK	OK
1.2.9. If the regional grid is not used whether the national grid is used.	2	DR	Not applicable	OK	OK
1.2.10. Have the electricity transfers from connected electricity systems to the project electricity system are defined as electricity imports?	2	DR	Yes	OK	OK
1.2.11. Have the electricity transfers to connected electricity systems to the project electricity system are defined as electricity exports?	2	DR	Yes	OK	OK
1.2.12. For the purpose of build margin, Is the spatial extent to the project boundary limited to project electricity system?	2	DR	Yes	OK	OK
1.2.13. Are recent or likely future additions to transmission capacity likely to significantly increase imported electricity?	2	DR I	Not applicable.	OK	OK
1.2.14. If answer to question is yes whether transmission capacity is considered a build margin source with the emission factor determined as for the OM imports.	2	DR	Not applicable.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
1.2.15. Is the emission factor determined as one of the four options for the OM imports?	2	DR	Project uses OM data from Relevant national authority i.e. Central Electricity Authority (CEA)	OK	OK
1.2.16. For determining the operating margin, is one of the four options chosen to determine the CO ₂ emission factors for net electricity imports within the same host country?	2	DR	Project uses OM data from Relevant national authority i.e. CEA.	OK	OK
1.2.17. If the import of electricity is from another country, is the CO ₂ emission factors for net electricity imports considered as 0 t CO ₂ per MWh.	2	DR	Not applicable	OK	OK
1.3. Identification of alternative baseline scenarios					
1.3.1. Does the project activities modify or retrofit an existing generation facility?	2	DR	No	OK	OK
1.3.2. If the answer is No then Is the baseline scenario the following: electricity delivered to the grid by the project would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources?	2	DR	Yes	OK	OK
1.3.3. If the answer is Yes then in the absence of the CDM project activity, the existing facility would continue to provide electricity to the grid at historical average levels, until the time at which the generation facility would be likely be replaced or retrofitted in the absence of the CDM project activity.	2	DR	Not applicable	OK	OK
1.3.4. If the answer is Yes from that point of time onwards whether the baseline scenario is assumed	2	DR	Not Applicable	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
to correspond to the project activity, and the baseline electricity production is assumed to equal project electricity production and no emission reductions are assumed to occur?					
1.3.5. Where EG-historical is the average of historical electricity delivered by the existing facility to the Grid, whether spanning all data from the most recent available year (or month, week or other time period) to the time at which the facility was constructed, retrofit, or modified in a manner that significantly affected output (i.e., by 5% or more), expressed in MWh per year. A minimum of 5 years (120 months) (excluding abnormal years) of historical generation data is required in the case of hydro facilities.	2	DR	Not applicable	OK	OK
1.3.6. Whether a minimum of three years data is referred and used in case the project is non-hydro?	2	DR	Yes. Relevant data from CEA has been used.	OK	OK
1.3.7. Is it required to estimate the point in time when the existing equipment would need to be replaced in the absence of project activity?	2	DR	It is not necessary to estimate the point in time when the existing equipment would need to be replaced.	OK	OK
1.3.8. If the answer to question is Yes Whether project participants have taken any of the two approached, indicated in the ACM0002 into account?	2	DR	Not applicable	OK	OK
1.3.9. Whether the typical average technical lifetime of the type equipment is determined and documented taking into account common practices in the sector and country e.g. based on industry surveys, statistics, and technical literature?	2	DR	Typical average lifetime is based on data provided by the supplier for wind turbines.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
1.3.10. Whether the common practices of the responsible practices of the responsible company regarding the replacement schedules is evaluated and documented, e.g. based on historical replacement records for such equipment?	2	DR	Not applicable	OK	OK
1.3.11. Whether the baseline emission factor is calculated as a combined margin consisting of the combination of operating margin (OM) and build margin factors according to three steps indicated in the methodology ACM0002?	2	DR	The baseline emission factor is calculated as a combined margin consisting of the combination of the operating margin and the build margin. This data is used from CEA – latest version – December 2007	OK	OK
1.3.12. Whether the weighted average applied by project participant is fixed for a crediting period.	2	DR	Project has applied for combined margin approach to arrive at grid emission factor.	OK	OK
1.3.13 If the project is generation of electricity from wind or solar, whether weighted average takes in to account the default weights as wOM = 0.75 and wBM = 0.25 as required by Version 6 of ACM 0002?	2	DR	Yes. The combined margin calculated by the project participant takes in to account the weights as required by the methodology.	OK	OK
1.3.14. Whether operating margin emission factors calculations are based on one of the four methods described in the methodology ACM 0002?	2	DR	Yes. The simple operating margin method is used for calculating the operating margin emission factor. The simple OM is considered to be calculated using the ex-ante approach and fixed for the crediting period.	OK	OK
1.3.15. Is the most likely baseline scenario 'electricity production from other sources feeding into the grid ?	2	DR	Yes.	OK	OK
1.3.16. Did the project participant provide evidence and supporting documents to exclude baseline options that do not comply with legal and regulatory requirements; or depend on key resources such as fuels, materials or technology that are not available at the project site?	2	I	Project participant has considered the options that are permitted by law and therefore this is not applicable.	OK	OK
1.3.5. If the project activity modifies or retrofits an	2	DR	Not applicable.	OK	OK

VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
existing electricity generation facility, is the guidance by EB08 taken into account?		I			
1.4. Additionality					
1.4.1. Was the additionality of the project activity demonstrated and assessed using the latest version of the "Tool for demonstration and assessment of additionality"?	2	DR	No. Refer B.3.1 above		OK
1.5 Project Emissions					
1.5.1. Are the project emissions considered as zero [0]?	2	DR	The project emissions are considered as zero.	OK	OK
1.6. Baseline Emissions					
1.6.1. Are the baseline emissions determined according to the formula $BE_y = EG_y \times EF_y$?	2	DR	Yes. Equation in PDD uses the following formula for the baseline emissions. $BE_y = EG_y \times EF_y$	OK	OK
1.6.2. Were the Emissions Factor for displaced electricity calculated as in ACM0002?	2	DR	Simple OM approach is selected and justification for the same is given in PDD.	OK	OK
1.7. Leakage					
1.7.1. Are the leakage considered as zero [0]?	2	DR	No leakage is considered	OK	OK
1.7.2. Have any credits been claimed for the project on account of reducing the emissions due to power plant construction, fuel handling and land inundation below the level of the baseline scenario?	2	DR I	No credits claimed on any pre-project activity.	OK	OK
1.8. Emission Reduction					
1.8.1. Did the emissions reductions were determined according to the formula $ER_y = BE_y$?	2	DR	Equation in PDD uses the following formula for calculation of emission reductions. $ER_y = BE_y - PE_y - L_y$ Since the project emissions and leakage are	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
			considered as zero, the emissions reductions will be calculated as $ER_y = BE_y$ Refer E.1.1 above		
1.8.2. Were all values chosen in a conservative manner and was the choice justified?	2	DR I	All values were chosen in a conservative manner and the choice was justified.	OK	OK
1.8.3. Whether an estimate of likely project emission reductions for the proposed crediting period is prepared as part of the PDD?	2	DR	Yes.	OK	OK
1.8.4. Whether the estimate in principle employs the same methodology ACM0002?	2	DR	Yes	OK	OK
1.8.5. Whether the emission factor is determined ex-post during monitoring?	2	DR	No. ex-ante option is chosen.	OK	OK
1.8.6. If yes whether project participants have used models or other tools to estimate the emission reductions prior to validation?	2	DR	Not applicable	OK	OK
2. Monitoring Methodology					
2.1. Applicability					
2.1.1. Does the project activity generate electricity from a renewable source?	2	DR I	Yes. Renewable source-Wind	OK	OK
2.1.2. Is the power connected to the grid?	2	DR I	Yes, the power is connected to a Western grid.	OK	OK
2.1.3. Does the project activity relate to electricity capacity additions from renewable sources?	2	DR I	Yes, the project relates to capacity additions from wind energy source.	OK	OK
2.1.4. Is fuel switch done in the process?	2	DR	No.	OK	OK
2.1.5. Can the geographic and system boundaries for the relevant electricity grid be clearly identified ?	2	DR I	Yes, the geographic and system boundaries for the relevant electricity grid can be clearly identified.	OK	OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
2.1.6. Is the information on the characteristics of the grid available?	2	DR I	The information on the characteristics of the grid is available	OK	OK
2.1.7. If the electricity generation is from landfill gas capture, is the methodology combined with the approved "Consolidated baseline methodology for landfill gas project activities" [ACM 0001] ?	2	DR	Not applicable.	OK	OK
2.2. Monitoring Methodology					
2.2.1. Does the monitoring plan require monitoring of electricity generation from the proposed project activity?	2	DR	Refer B.7.2. PDD states that electricity generation from the proposed project activity will be monitored.	OK	OK
2.2.2. Does the methodology requires monitoring of Data needed to recalculate the operating margin emission factor, if needed, based on the choice of the method to determine the operating margin (OM), consistent with ACM0002?	2	DR	Not applicable as the option of 3-year average, based on the most recent statistics available is chosen	OK	OK
2.2.3. Does the monitoring plan require monitoring of Data needed to recalculate the build margin emission factor, if needed, consistent with ACM0002 ?	2	DR	Not applicable as the option of ex ante is chosen.	OK	OK
2.2.4. Does the monitoring plan require monitoring of data needed to calculate fugitive carbon dioxide and methane emissions and carbon dioxide emissions from combustion of fossil fuels required to operate the geothermal power plant ?	2	DR	Not applicable.	OK	OK
2.3. Quality Control (QC) and Quality Assurance (QA) Procedures					
2.3.1. Did all measurements use calibrated measurement equipment that is regularly checked	2	I	Refer D.3.1 above in Table 2		OK



VALIDATION REPORT

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
for its functioning?					
2.3.2. Are the data double-checked against commercial data?	2	DR I	Refer D.3.1 above in Table 2		OK

Table 4 Legal requirements

CHECKLIST QUESTION	Ref.	MoV ^a	COMMENTS	Draft Concl	Final Concl
1. Legal requirements					
1.1. Is the project activity environmentally licensed by the competent authority?	1	DR I	No environmental Licence required for the type of project activity.	OK	OK
1.2. Are the conditions of the environmental license being met?	1	DR I	Refer 1.1	OK	OK
1.3 Are the conditions of the Designated National Authority being met?	1	DR I	Refer	OK	OK



VALIDATION REPORT

Table 5 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2/3	Summary of project owner response	Validation team conclusion
Refer section B.5 of PDD. Following need to be clarified 1. Latest tool for demonstration and assessment of additionality is version 4, however PDD uses version 2 only. 2. Under step 1 of additionality screen, PDD mentions coal based power plant as one of the alternatives, which is not realistic in the context of project. 3. Technology barriers mentioned in barrier analysis are not specific to project but are generic in nature.	B.3.1 CAR-1	1. The tool for demonstration and assessment of additionality version 4 has been incorporated in the revised PDD under section B.5. 2. The alternative 2 i.e. setting up a coal-based power plant that would produce equivalent units of power as the project activity has been deleted in the revised PDD. 3. The technological barriers listed in the PDD are with respect to the inherent risks that the WEGs with synchronous generators bear. This barrier is particularly important in case of simultaneous aberration in grid parameters viz. voltage and current asymmetry fluctuations as well as frequency variation under which the WEG would not be able to sustain operation. It becomes a more difficult task in the context of very frequent variations over a time scale. As there have been frequent frequency variations in the western grid (In the western region grid, for the year 2005-	1. Verified version 2 dated 06/01/2008 of PDD for the reference and application of version 3 of additionality. 2. Verified version 2, dated 06/01/2008 of PDD for deletion of coal-based power plant that would produce equivalent units of power as the project activity 3. Verified the claims of technology barrier through evidences of literature of gearless technology vis a vis technology with gears. It is correct that wind turbines gearless technologies are more susceptible towards frequency variations, which are prevailing in western grid. However, since the barrier is not so pronounced taking into consideration large number of installations utilising this technology, the barrier is not prohibitive in nature. Since the barrier is removed from the PDD, the CAR is closed.



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2/3	Summary of project owner response	Validation team conclusion
		06, there has been a variation in the grid frequency between 48.5 to 52.02 Hz) this barrier becomes particularly relevant to the proposed project activity. However, this is not the most important barrier faced by the project activity as the barrier analysis rest on investment barrier, prevailing practice barrier and virgin site barrier as the major barriers to demonstrate additionality along with investment analysis as conducted in the PDD.	PDD, the CAR is closed. Based on response to all the mentioned points, <u>Corrective Action Request – CAR-1 is closed.</u>
Site visit revealed that different HZL machines are connected to different vacuum circuit breakers and then to different feeders. These feeders are then connected to one metering station installed by state authorities i.e. GETCO. Every turbine has display card provided by supplier. In such cases, aspects like data monitoring from individual machines, calibration / verification of display systems, alternative methods of monitoring and measurements, source of data for emission reduction calculations, losses to be considered etc. are not explained in PDD.	D.1.3 CAR-2	The WEGs of a single customer (HZL in this case) at a particular site are connected to a Vacuum Circuit Breaker (VCB) which in turn connects to a feeder that ultimately leads to the main GETCO meter at the substation maintained by Enercon India Limited. Data monitoring takes place at all the metering locations mentioned above. The electricity metered at the GETCO meter is proportionally divided among the customers connected to the meter on the basis of the prorata readings taken at the VCB end. The emission reduction calculations are done on the	The explanation provided is found to be satisfactory. Same is evident in revised version of PDD. <u>Corrective Action Request CAR-2 therefore is closed.</u>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2/3	Summary of project owner response	Validation team conclusion
		basis of the Main meter reading and as mentioned in the share certificate issued by GEDA on monthly basis. Furthermore real time data of generation from each WEG on a daily basis will be uploaded online and updated. HZL can access that data online through a dedicated user account of HZL. The calibration of the main GETCO meter will take place yearly. The calibration of the meters installed in an individual WEG will take place on yearly basis in accordance with Enercon's operation & maintenance manual which is consistently followed at all Enercon sites across the world. Also, Enercon is an ISO 9001 company and all procedures for operation and maintenance are in place. The emission reduction calculations will be done on the basis of net electricity	



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2/3	Summary of project owner response	Validation team conclusion
		supplied to the grid after subtracting the losses incurred due to transmission from the WEG to the GETCO feeder. The joint meter readings will serve as the most authentic data source for the same. The revised PDD (version2) incorporates the required information in accordance with observations on site.	

**APPENDIX B : EXPLANATION OF HOW DUE ACCOUNT OF COMMENTS WAS TAKEN BY THE VALIDATION TEAM.****COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS**

According to the modalities for the Validation of CDM projects, the DOE shall make publicly available the project design document and receive, within 30 days, comments from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available.

Bureau Veritas Certification published the project documents on the UNFCCC CDM website (<http://cdm.unfccc.int>) on 30/03/2007 and invited comments within 28/04/2007 by Parties, stakeholders and non-governmental organizations. The comments received are compiled below in tabular format.



VALIDATION REPORT

Sr. No.	Details of the commenter	Date of the comment	Comment	Response by the project participants	Explanation on how account is taken by the DOE
1	Hiral Mehta Environmental Engineer Paryavaran Mitra 502, Raj Avenue, Bhaikakanagar road, Thaltej, Ahmedabad - 380059 Telefax - 079-26851321 e-mail - paryavaranmitra@yahoo.com	28/04/2007	1.The project is claimed to uplift social and economic welfare of surrounding area by direct and indirect employment. Whether company has ensured any direct employment in surrounding villages? Whether any other benefits owing to CDM project are given in surrounding villages? 2.Stakeholder comments section is poorly compiled and written. Give name of all stakeholders who participated in meeting. What were their specific comments? 3.Whether state government was invited in consultation meeting? Whether state government department has	1. Yes, the Wind Power Project has provided employment in surrounding villages as mentioned herewith:- The Wind power project is in the stage of execution & commissioning for which the various agencies involved in project execution have sourced skilled and unskilled labors from the nearby villages for access road and other infrastructure development, for the security of the wind farm and for supplying water and other food items. More specifically the tractors from the villagers are being rented for day-to-day activities in the wind farm. The village people have been informed about the project activity by way of personal meeting of the HZL officials with the elected representatives of the villages (Sarpanches) of almost all the surrounding villages and they were supportive of the initiative along with long term development of the region. After commissioning of the all HZL WTGs it will provide additional indirect employment such as shops, hiring of local vehicles for transportation etc.	The response given by the project proponent is found to be satisfactory. During validation site visit, validators also met a group of stakeholders. There was general satisfaction about the project as well efforts taken by the company. There were few expectations as well. These were mainly related to a constant dialogue by Enercon staff with villagers to receive suggestions from villagers, their views etc. These were noted by concerned Enercon



VALIDATION REPORT

			issued any NOC to this project? 4. Whether HZL has any prior experience in wind based power plant business?	HZL is a socially responsible organization having past record of four decades to initiate social development activities as per the need and requirement of the local people near its existing mining field and smelting plants. HZL believes in working as a catalyst and partner with the local bodies such as local Grampanchayat and district level Government agencies such as Zila Parishad. 2. Relevant contents have already been covered in the stakeholder comments section. It has been further updated in the PDD version 2 incorporating the stakeholder meeting participants along with their specific comments. The recording of stakeholder meeting has been presented to DOE also. 3. The state government has been identified as a stakeholder in terms of its involvement in the project for issuing clearances and agreements. They were not specifically required to be invited for consultation meeting along with other stakeholders. The following	staff during meeting and committed to maintain the dialogue on continuous basis. The stakeholders' names along with their comments is updated in PDD, Version 2, 06/01/2008 HZL does not have any previous experience in Wind Power Projects, since the core business of the firm is Mining and smelting. The proposed project activity in Gujarat is its first initiative in the Wind power sector.
--	--	--	---	---	---



VALIDATION REPORT

				state government agencies are involved in the project activity: GUVNL: the electricity generated from the project activity will be sold to GUVNL under a power purchase agreement which has already been signed for the first phase. GEDA: GEDA is responsible for capacity allotment of the wind power project and approval to set up wind farms. Govt. of Gujarat (GoG) : GoG has allotted the land for 20 years Sub lease / lease basis for development of wind power project. 4. HZL has no prior experience in wind based power plant business. The proposed project activity in Gujarat is its first initiative in the wind energy based electricity generation sector.	
--	--	--	--	--	--



APPENDIX C : CVs of Verifiers

H.B. Muralidhar: He is the Lead auditor for Environmental Management System, Quality Management system and Occupational Health and Safety Management System. He has several years of Industrial work experience in the field of environmental management systems He has undergone intensive training on Clean Development Mechanism. He is the technical expert & conducted Validation / Verification for more than 30 CDM Projects

Mr. S. V. Pendse: He is the Lead auditor in Bureau Veritas Certification for Environment Management System, Quality Management System and Occupational Health and Safety Management System. He has done post graduation in the field of Environmental Science and several years of Industrial work experience in the field of environmental management systems. He has undergone intensive training on Clean Development Mechanism. He is so far has carried out Validation/verification for more than 30 CDM projects.

Mr. R. Seshapathy: He is the Lead auditor for Environmental Management System, Quality Management system and Occupational Health and Safety Management System.. He has several years of Industrial work experience in the field of environmental management systems He has undergone intensive training on Clean Development Mechanism. He is the technical expert & conducted Validation / Verification for more than 20 CDM Projects

Mr. Sushil Budhia: He is a financial analyst and a Chartered Accountant and has extensive experience for conducting statutory and tax audits. He has experience in internal audits and taxation matters. He has done validation of IRR for more than 10 CDM Projects.

End of Draft Validation Report : INDIA-Val/ 101.49/2007/Rev.01