



VALIDATION REPORT

2.5 MW BEL GRID-CONNECTED WIND POWER PROJECT AT DAVANAGERE DISTRICT, KARNATAKA, INDIA

REPORT No.2007-1046

REVISION No. 01

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2007-06-08	Project No.: 46061046
Approved by: Einar Ternes Director	Organisational unit: DNV Certification, International Climate Change Services
Client: Bharat Electronics Limited	Client ref.: K.R. Venkatesh

DET NORSKE VERITAS

DNV Certification AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
<http://www.dnv.com>
Org. No: NO 945 748 931 MVA

Summary:

DNV Certification AS (DNV) has performed a validation of the “2.5 MW BEL grid-connected wind power project at Davanagere District, Karnataka, 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 modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The validation consisted of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion.

In summary, it is DNV's opinion that the project, as described in the project design document version 02 dated 18 May 2007, meets all relevant UNFCCC requirements for the CDM is eligible as category I.D of small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D version 10. Hence, DNV requests the registration of the “2.5 MW BEL grid-connected wind power project at Davanagere District, Karnataka, India” as a CDM project activity.

Report No.: 2007-1046		Subject Group: Environment					
Report title: 2.5 MW BEL grid-connected wind power project at Davanagere District, Karnataka, India							
Work carried out by: Ma-Paa-Puratchikkannal, Michael Lehmann							
Work verified by: C Kumaraswamy							
Date of this revision: 2007-06-08	Rev. No.: 01	Number of pages: 18					
Indexing terms <table border="1"> <tr> <td rowspan="3">Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism</td> <td>Service Area Validation</td> </tr> <tr> <td>Market Sector</td> </tr> <tr> <td>Process Industry</td> </tr> </table>				Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Validation	Market Sector	Process Industry
Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Validation						
	Market Sector						
	Process Industry						
☒ No distribution without permission from the client or responsible organisational unit ☐ free distribution within DNV after 3 years ☐ Strictly confidential ☐ Unrestricted distribution							
© 2002 Det Norske Veritas AS All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.							



<i>Table of Content</i>	<i>Page</i>
1 INTRODUCTION.....	1
1.1 Validation Objective	1
1.2 Scope	1
1.3 Description of Proposed CDM Project	1
2 METHODOLOGY	2
2.1 Review of Documents	4
2.2 Follow-up Interviews	4
2.3 Resolution of Clarification and Corrective Action Requests	4
2.4 Internal Quality Control	4
3 VALIDATION FINDINGS	5
3.1 Participation Requirements	5
3.2 Project Design	5
3.3 Project Baseline	5
3.4 Additionality	6
3.5 Monitoring Plan	7
3.6 Calculation of GHG Emissions	8
3.7 Environmental Impacts	8
3.8 Comments by Local Stakeholders	8
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	8
VALIDATION OPINION.....	10
Appendix A Validation Protocol	

**Abbreviations**

BEL	Bharat Electronics Limited
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EIA	Environment Impact Assessment
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KPTCL	Karnataka Power Transmission Corporation Limited
MP	Monitoring Plan
MIS	Management Information Systems
MNES	Ministry of Non-conventional Energy Sources
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
PLF	Plant Load Factor
SEB	State Electricity Board
UNFCCC	United Nations Framework Convention on Climate Change



1 INTRODUCTION

Bharat Electronics Limited (BEL), has commissioned DNV Certification AS (DNV) to validate the “2.5 MW BEL grid-connected wind power project at Davanagere District, Karnataka, India” (hereafter called “the project”) in India. This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for small-scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Mr. Ma-Paa-Puratchikkanal	DNV, India	Team Leader, GHG auditor.
Mr. C Kumaraswamy	DNV, India	Technical Reviewer.
Mr. Michael Lehmann	DNV, Norway	Sector expert.

1.1 Validation Objective

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

1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project /8/ activities and the relevant decisions by the CDM Executive Board, including the approved small scale methodology AMS-I.D version 10 /10/. The validation team has, based on the recommendations in the Validation and Verification Manual /8/ employed a risk-based approach, 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 project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design

1.3 Description of Proposed CDM Project

The project activity proposed by BEL involved the installation and operation of wind mills, in the wind zone park in the Davanagere District of Karnataka state, India. The total installed capacity of the project activity is 2.5 MW and comprises 5 wind energy turbines (WEG), each with 500 kW capacity. The wind farm is owned by BEL and the turbines are operated and maintained by the manufacturer, Vestas RRB India Limited, under a turnkey contract. Based on the power curve data /7/ for the wind availability regime developed by the supplier for the project location, the project is expected to achieve a PLF of 26.25%. The power generated is used for captive consumption at the BEL premises in Bangalore by a wheeling and banking arrangement with Karnataka Power Transmission Corporation Limited (KPTCL), which forms a



part of the southern regional grid of India. By displacing the electricity from fossil fuel dominated southern regional grid, the project activity leads to reduced greenhouse gas emissions.

The project at a PLF of 26.25% is expected to generate 5.75 GWh of energy per year. The total estimated GHG reduction from the project activity of BEL is 53 604 t of CO₂e for the fixed ten year crediting period starting from 1 September 2007.

2 METHODOLOGY

The validation of the project started in the month of March 2007 with hosting of the PDD on the UNFCCC website and inviting stakeholders' comments.

The validation consists of the following three phases:

- I a desk review of the project design and the baseline and monitoring methodology
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /8/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the "2.5 MW BEL grid-connected wind power project at Davanagere District, Karnataka, India" project is enclosed in Appendix A to this report.

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

- i) mistakes have been made with a direct influence on project results;
- ii) validation protocol requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.



Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities			
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) of risk or non-compliance with stated requirements or a request for Clarification (CL) where further clarifications are needed.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

Validation Protocol Table 2: Requirement 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 seven different sections. Each section is then further sub-divided. 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). A request for Clarification (CL) is used when the validation team has identified a need for further clarification.

Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification			
Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
If the conclusions from the draft 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 Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the 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 Table 2, under "Final Conclusion".

Figure 1 Validation protocol tables



2.1 Review of Documents

The PDD /1/ submitted by BEL (version 02 dated 18 May 2007 and the previous version) and additional background documents related to the project design and baseline such as baseline calculation data, local stakeholders comments and the monitoring plan were assessed during the validation.

2.2 Follow-up Interviews

On 26 April 2007, DNV performed interviews with representatives of BEL to confirm selected information and to resolve issues identified in the document review. The main topics of the interviews are summarised in Table 1.

Table 1 Interview topics

Interviewed organisation	Interview topics
Bharat Electronics Limited	➤ Further clarifications that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: regulatory barriers, barriers due to prevailing practice and other barriers. ➤ Clarifications on establishment of baseline, monitoring plan and emission reduction calculations. ➤ Resources, training needs and procedures for operation and maintenance. ➤ Benefits from CDM registration.

2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The initial assessment identified four corrective action requests and six requests for clarification. These requests were presented to the project participants in DNV's draft validation report and the project participants were invited to provide a response to these requests. The project participants' response, which included the submission of a revised PDD dated 18 May 2007, addressed the corrective action requests and requests for clarification to DNV's satisfaction.

To guarantee the transparency of the validation process, the concerns raised by DNV and the responses given by the project participant are documented in the validation protocol in Appendix A to this report.

2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.



3 VALIDATION FINDINGS

In the following sections the findings of the validation are stated. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation dated 18 May 2007.

3.1 Participation Requirements

The project activity is being proposed as a unilateral project by BEL, who is the sole project participant from the host country India. India meets all participation requirements and the DNA of India has approved the project with a letter of approval dated 22 January 2007 and has provided confirmation that the project assists in achieving sustainable development /2/.

3.2 Project Design

The purpose of the project activity is to harness renewable resources in the Davanagere region, in the state of Karnataka, and thereby enable displacement of non-renewable natural resources. Activities involved are construction, operation and maintenance of wind energy based electric generating stations wheeling electricity to KPTCL for captive consumption.

The aggregated installed capacity of 2.5 MW comprises 5 wind turbines each with 500 kW capacity. All the WEG's in the project have been supplied by Vestas RRB India Limited, who is also responsible for the operation, maintenance, and the management of the project activity. Vestas RRB have also developed a power data curve /7/ for the location, which depicts an energy generation of 5.75 GWh per year by the project activity. DNV has verified the power curve and the purchase order agreement for the plant load factor of 26.25%.

The expected operational lifetime of the project activity is 20 years and a fixed ten year crediting period has been chosen, with the start date of the first crediting period to be 1 September 2007.

3.3 Project Baseline

Since the projects capacity is less than 15 MW, the project is eligible as type I small-scale CDM project activity and can apply the simplified baseline methodology. The project applies the baseline methodology stipulated for category I.D of the "simplified modalities and procedure for small scale CDM project activity" (AMS-I.D version 10). The simplified baseline methodology AMS-I.D is applicable for grid connected renewable electricity generation projects and includes wind power based projects. The application of AMS-I.D is justified as the project generates electricity using wind and it displaces the grid electricity

The emission reductions occurring are calculated as the product of the electricity generation from the project activity and the grid emission factor of the southern regional grid of India. As the project activity is feeding the generated power to the Karnataka state grid, which is a part of the southern regional grid; the baseline for this project activity is the generation mix of southern



regional grid. Baseline emission factor for the southern regional grid is established *ex-ante* based on approved methodology ACM0002 using a combined margin approach.

BEL has used the operating margin (OM) and build margin (BM) data published in the CEA¹ database, for calculating the baseline emission factor. The central electricity authority, Ministry of Power, Government of India has published the database of carbon dioxide emission factors from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database provides information about the OM and BM factors of all the regional electricity grids in India. DNV confirms that the database is an official publication of the Government of India for the purpose of CDM projects and that the OM in the CEA database is calculated *ex ante* using the simple OM approach and the BM is calculated based on 20% most recent capacity additions in the grid based on net generation as described in ACM0002 version 06. The average of the OM for the three years 2002-03, 2003-04 and 2004-05 has been determined and verified to be 1.003 tCO₂e/MWh and the BM to be 0.7179 tCO₂e/MWh. The weighted average of the “operating margin” and the “build margin” emission coefficient for southern regional grid of India has thus been determined to be 0.9323 tCO₂e/MWh (fixed *ex-ante*), using a weight-age of 75:25 as recommended for wind projects in ACM0002, version 06.

3.4 Additionality

The project's additionality has been demonstrated by proving that it faces regulatory and prevailing practice barriers.

Starting date of the project activity:

The start date of the project activity is 24 March 2006, and has been verified by DNV to be the date of purchase order placement to Vestas RRB India Limited for the purchase of the machines. /4/.

The CDM incentive consideration for the project activity has been verified from the minutes of the BEL Engineering Service committee meeting held on 22 December 2003. The minutes of the meeting reveals the statement made by Deputy General Manager that BEL would have to undergo many statutory obstacles as the regulations on wheeling and banking were not clear and as so far no agency have been provided wheeling and banking facility in the state after unbundling of KPTCL in 2002 and enactment of Electricity Act 2003. The minutes of the meeting also states that the decision was made to go ahead with the project due to the availability of benefits through CDM.

Barriers due to prevailing practice:

The prevailing practice barrier has been substantiated on the fact that the Electricity Act 2003 enforced in June 2003 has brought out ‘Open Access’ policy under which the wheeling and banking facilities are to be dealt with. Though KERC had stated that the tariff structure that was prevailing prior to introduction of Electricity Act 2003 could be used, KPTCL decided to wait for the new Open Access regulation. And in 2005 KERC came up with new Open Access regulation; however KPTCL and ESCOMS have not yet complied with the regulation. Due to

¹ CO₂ Baseline Database, <http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>



this situation, post the Electricity Act 2003, the prevailing scenario continues to be a stalemate regarding wheeling and banking tariff structure finalization.

Owing to ambiguity and non finalization of wheeling and banking agreement, BEL had to wait for finalizing the same with KPTCL, since 2004. This has been substantiated from the fact that BEL had approached the Karnataka electricity regulatory commission (KERC) in April 2004 /6/ for finalization of wheeling and banking arrangements. KERC had directed BEL to consider the tariff structure that was in practice before Electricity Act 2003 enforcement to submit its proposal to KPTCL/5/. However this proposal was not processed by KPTCL and reasoned to await a final notification from KERC/4/. Towards this KERC had in December 2004 passed a new 'Open Access' regulation and in June 2005 fixed the wheeling charges at 5% for renewable energy projects. But, even after this, KPTCL has not finalized any wheeling agreements citing that the wheeling charges are below the 34% transmission and distribution losses faced by KPTCL¹.

The barrier of wheeling regulation formulation has been argued by BEL from the fact that it is one of the first two renewable energy projects in Karnataka, who have opted for wheeling facility, and not been granted any. It has also been argued that there still exists the uncertainty on how the wheeling charges would be finalized for renewable energy projects.

DNV is able to confirm that wheeling agreement has not been formulated in the state of Karnataka and also between BEL and KPTCL from the review of the following documents:

- Letter from KERC to BEL dated 10 June 2004
- Letters from KPTCL to BEL dated 29 June 2004 and 19 February 2005.
- Letter from BEL to KERC dated 27 April 2004

DNV is able to conclude from the review of the documents on BEL's apprehensions on facing concerns of regulatory barrier for wheeling and banking having come true. In spite of the apprehensions on the regulatory barrier, BEL has gone ahead with the project, and the arguments presented by BEL are deemed reasonable as the uncertainty still exists in finalizing the wheeling and banking agreement till date.

Other barriers: DNV is able to confirm that BEL's core business is not power generation (BEL is an electronics company involved in manufacturing of electronic products) and BEL being a public limited company has diverged into wind power generation. This has led to invest in new resources in terms of skills and manpower to handle regulatory issues and wind power generation management.

In conclusion, it is deemed likely that the potential risk coverage under CDM would make the project activity more viable. The emission reductions from the project can therefore be deemed additional.

3.5 Monitoring Plan

The selected monitoring methodology is in line with the monitoring methodology for small-scale CDM project activity category I.D – Renewable energy generation for a grid. The monitoring

¹ <http://www.thehindubusinessline.com/2003/02/26/stories/2003022600851700.htm>



will involve metering the electricity generated and supplied to the grid. The CO₂ emission reductions due to the project are directly linked to the electricity generated and supplied by the project to the regional grid. The organisational structure and responsibilities are clearly defined in the CDM manual. Procedure for calibration, records of calibration, and maintenance of monitoring equipment are clearly stated. The authority and responsibilities for measuring, recording, reporting, monitoring, and controlling of the monitored parameters and review of performance are also described in the CDM manual. Tower wise meters have been installed whose readings are recorded daily and compared with the energy meter at the grid which is installed, maintained and calibrated by KPTCL. Monthly aggregate energy supplied to the grid is monitored also by KPTCL and can be cross verified with the billing. Thus, the monitoring methodology will give adequate opportunity for real measurements of achieved emission reductions.

3.6 Calculation of GHG Emissions

The project will partly displace fossil fuel-based electricity generation. The project at a PLF of 26.25% would generate electricity of 5.75 GWh per year. While the project emissions are zero, baseline emissions are equal to the emission reductions due to the project activity and have been estimated to be 5 360 tCO₂ per year, based on an ex-ante fixed baseline emission factor of 0.9323tCO₂/MWh. BEL has used the OM and BM data published in the CEA¹ database, for calculating the baseline emission factor, as described in section 3.3 of this report.

3.7 Environmental Impacts

The proposed project activity contributes to generation of green power and is expected to benefit the economic development of a backward region. Thus, the project activity is expected to have only beneficial impacts and no adverse impacts are foreseen. There is no legislative mandate for carrying out an environmental impact assessment study, as wind power projects are exempt from such requirement. The project activity is in compliance with all current, applicable legislations

3.8 Comments by Local Stakeholders

The Governmental organisations who are the relevant stakeholders in the project activity have accorded their permission for establishment and operation of the project facilities. A community consultation process with the local population was held on 18 October 2006 at Daginakkate village of Chennagiri Taluk, Davanagere District of Karnataka. Comments were invited in the meeting and also through group discussions in the region. The local stakeholders supported the establishment of the project and no adverse comments were received on the project activity.

4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD (version 1) was made publicly available on DNV's climate change website (www.dnv.com/certification/climatechange) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 10 March 2007 to 8 April 2007.

¹ CO₂ Baseline Database, <http://cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm>



No comments were received.



VALIDATION OPINION

DNV Certification AS (DNV) has performed a validation of the “2.5 MW BEL grid-connected wind power project at Davanagere District, Karnataka, India” on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The project participant is Bharat Electronics Limited. The host Party India meets all participation requirements and the DNA of India approved the project.

The validation has confirmed that the project is eligible as category I.D small-scale CDM project activity and correctly applies the simplified baseline and monitoring methodology AMS-I.D version10. The determination of the baseline is well elaborated, transparent and sufficiently supported with facts. The selected baseline scenario is reasonable and an analysis of the barriers facing the project demonstrates that project is not a likely baseline scenario.

The project will contribute to sustainable development by generating renewable energy, providing benefits such as employment generation during construction and operation of the project, ensuring environmental well being and aid in bridging the gap between demand and supply of power. The DNA of India has confirmed that the project assists in achieving sustainable development.

The validation did not reveal any information indicating that the project can be seen as a diversion of ODA funding towards India.

The project results in the reduction of GHG emissions those are real, measurable and give long-term benefits and that are additional to what would have occurred in the absence of the project.

The total emission reductions from the project are estimated to be on the average 5 360 tCO₂e per year during fixed ten year crediting period. The emission reduction forecast has been checked and is deemed likely that the state amount is achieved given that the underlying assumptions do not change.

The monitoring plan makes sufficient provision for monitoring relevant project and baseline emission indicators. Responsibilities and authorities for project management, monitoring and reporting and QA/QC procedures have also been as stated in the CDM manual for the project.

A local stakeholder consultation process has been carried out by the project participant. DNV published the PDD on the DNV climate change web site and comments by Parties, stakeholders and UNFCCC accredited NGOs were invited through the CDM web site. No comments were received.

In summary, it is DNV’s opinion that the project, as described in the project design document of 18 May 2007, meets all relevant UNFCCC requirements for the CDM, is eligible as category I.D small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D. Hence, DNV requests the registration of the “2.5 MW BEL



grid-connected wind power project at Davanagere District, Karnataka, India” as a CDM project activity.

REFERENCES

Documents provided by the project proponent that relate directly to the project:

- /1/ BEL :CDM PDD for “2.5 MW BEL grid-connected wind power project at Davanagere District, Karnataka, India” Project version 2 of 18 May 2007 and its previous version 1 dated 26 February 2007
- /2/ Ministry of Environment and Forest (DNA of India): Letter of Approval dated 22 January 2007.
- /3/ BEL : CER Calculations, *BEL CER Calculation 180507.xls*
- /4/ BEL: KPTCL letters to BEL dated 29 June 2004 and 19 February 2005
- /5/ BEL: Letter from KERC to BEL dated 10 June 2004
- /6/ BEL: Letter from BEL to KERC dated 27 April 2004
- /7/ Vestas RRB: Power data curve and power equations for the project location and power purchase order agreement dated 24 March 2006.

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

- /8/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /9/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories*. Version 06: 20 September 2005.
- /10/ UNFCCC: Approved small scale methodology AMS-I.D Version 10 - “Renewable electricity generation for grid”.

Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:

- /11/ Mr. K.R. Natarajan, BEL, stationed in Bangalore.
- /12/ Mr. K.R. Venkatesh, BEL, stationed in Bangalore
- /13/ Mr. Mr. Shivaramaiah AS, BEL, stationed in Bangalore
- /14/ Mr. Gangadhara Rao, BEL, stationed in Bangalore
- /15/ Mr. Umashankar, TERI, stationed in Bangalore
- /16/ Mr. Madhav Kamath, TERI, stationed in Bangalore

-OOO-



- APPENDIX A

VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES

Table 1 Mandatory Requirements for Small Scale 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	OK	Table 2, Section E.4.1 There is no participation by any Annex I Party in the project.
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, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	GAR-1 OK	Copy of letter of approval for the project accorded by the Ministry of Environment and Fore (MoEF), the Indian DNA, needs to be submitted for verification.
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4. The GHG emission reductions are real, measurable and are expected to provide long-term benefits to mitigation of global warming.

Requirement	Reference	Conclusion	Cross Reference/ Comment
6. Reduction in GHG emissions must 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 greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	In the absence of the project activity, BEL would have continued to draw its entire power requirement from the KPTCL grid. Due to the project activity, which generates renewable energy, anthropogenic emissions of greenhouse gases by sources are proportionately reduced to below that of the baseline.
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK	The project is proposed as a unilateral project. No public funding is involved.
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	National Clean Development Mechanism Authority, under the Ministry of Environment and Forests, is the Designated National Authority of India.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	India has ratified Kyoto Protocol on 26

Requirement	Reference	Conclusion	Cross Reference/ Comment
			August 2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK	The project is proposed as a unilateral project
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK	The project is proposed as a unilateral project
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1. The maximum output capacity of the grid connected renewable energy project is 2.5 MWe and is not a debundled component of a larger project activity.
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and monitoring methodology for that project category	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	OK	Table 2, Section A.1.3, B and D
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	CL-1	Table 2, Section G The promoters have conducted an interview of the stakeholders. A copy of the minutes of the

Requirement	Reference	Conclusion	Cross Reference/ Comment
			interviews may be provided along with the justification for conducting an interview instead of a public hearing.
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F Wind power electrical power generating stations are exempt from carrying out EIA.
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD has been made publicly available at http://www.dnv.com/certification/climatechange/Projects/ProjectDetails.asp?ProjectId=1058 from 09 March 2007 and is open to receive comments from all interested parties during a 30 day period from 10 March 2007 to 8 April 2007.

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A. Project Description The project design is assessed.					
A.1. Small scale project activity It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR	Yes, The installed output capacity of the renewable energy project is 2.5 MWe which is well below the SSC ceiling limit of 15 MWe specified in paragraph 6 (c) of decision 17/C.P.7		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR	The promoters are not part of, and have not requested for registration of, another small scale project activity, and hence the project activity is not a debundled component of a large project activity.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?			The project activity consists of generating electricity by operation of wind turbines, which is a renewable source of energy. The maximum output capacity of the project is 2.5 MWe. The generated power is fed to the KPTCL grid which is part of the Southern Regional Grid. Thus, the project is qualified for consideration under the Sectoral Scope: Energy Industries (Renewable / Non-renewable), Type: I 'Renewable Energy Projects', and Category: I D 'Grid connected Renewable Electricity generation'.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
A.2. Project Design Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR/I	The project is located at survey field No. 17, Basavapatna in Channagiri taluk, Davanagere District, Karnataka State, India. The power generated is stepped up to meet the grid requirements and is fed to the KPTCL grid at Honnali through a 17 KM long transmission line.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR	The project system boundary includes, the wind turbines (5 x 500 KW), step-up transformers, transmission lines, sub-station, and all power plants connected to the Southern regional Grid of which KPTCL grid is a part.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR/I	The turbines (5 x 500KW) proposed to be installed are pitch controlled, upwind type, with active yaw. The rotor has three blades which are made of glass fibre and is connected to the gear box through a main shaft. Provisions for emergency stop are available. All functions and performance of turbines are continuously monitored and controlled by microprocessor based control systems.		OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	No technology transfer is required for the project as adequate technological competence is indigenously available.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period? Does the project make provisions	/1/	DR/I	Yes, the project does need training for operation and maintenance of the wind turbines and associated control equipment. While specific provisions have not been cited in the PDD, the		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
for meeting training and maintenance needs?			promoters being a leading Public Sector Unit and an ISO certified firm, it is reasonable to assume that necessary provisions will be made.		
A.3. Contribution to Sustainable Development The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Besides eliminating carbon dioxide emissions, the project activity results in generation of power with out NO _x and SO _x emissions. It also helps conserve scarce fossil fuel resources. Implementation of the project provides job opportunities for the locals during construction time and long term income generation by creating a demand for security services, transport services for goods and personnel, and canteen facilities for the project personnel. It also provides increased grid stability and attracting more investment in to this renewable energy area by serving as an example of good investment.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR	The project is not expected to create any adverse impacts, either environmental or social.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	As related in A.3.1, the project activity helps in contributing to technical, economic, social well being besides beneficial environmental impacts and thus is held to be in line with the sustainable development of India. This is to be attested to by the DNA of India, the MoEF by its approval, copy of which is required to be submitted.	GAR-1	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/	DR/I	Letters of approval and permission from various statutory bodies like the Karnataka State pollution Control Board's Clearance for Establishment,	GAR-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			approval of plans from Revenue, Forest Departments, Factory and Electrical Inspectorate, clearance from Local Village Panchayat, and Power Purchase Agreement with KPTCL need to be submitted.		
B. Project Baseline The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.					
B.1. Baseline Methodology It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	Approved baseline methodology titled "Grid Connected Electricity generation", Category I.D – Renewable Energy Projects – Version 10, 23 December 2006, is selected for the project activity.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	Potential energy of wind flow, which is a renewable resource, is converted to electrical energy and is fed to the KPTCL grid. The maximum output of the wind powered turbine is 2.5 MWe rendering it eligible for consideration as a SSC activity and hence the selection of the baseline methodology is appropriate. The project at a PLF of 26.25% is expected deliver 5.75 GWh of green energy to the grid.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
B.2. Baseline Determination It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/1/	DR	On an all India basis, total renewable resource based power (including wind based) projects account for only 4.98% of total installed capacity. Between Apr to Dec 2005, Southern Regional Grid handled 121,849.256 GWH of electricity, out of which wind based projects contributed only 2962 GWH (2.4%). This scenario of negligible contribution by renewable resource based power generation continues to prevail in spite of many governmental schemes to attract new investments into this sector; obviously, the incentives offered do not help overcome the barriers entirely and are inadequate. Therefore, we can conclude that in spite of many fillips given by the Government, investment in the wind power sector is not common practice. Power sector reforms have been initiated but are yet to percolate to become a part of regular work practice as a result of which neglect and tardy treatment to efforts of private participation in areas of power generation continues and this constitutes a major institutional barrier. For the promoters, the activity of power generation and wheeling is not the core area of competence. They are motivated to invest in the current power project as it provides the opportunity of contributing	CAR-3	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			to renewable power generation, conservation of fossil fuel, and elimination of green house gas and other air pollutant emissions. However, this has necessitated diversion of financial resources and development of fresh human resources specific to the proposed project activity. This constitutes an organizational constraint. The prospects of CDM registration and the resultant eligibility to accumulate Certified Emission Reduction credits have clearly provided the necessary incentives in the absence of which this would not have been possible. However, the arguments presented in the PDD to prove the additionality of the project need to be strengthened.		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/	DR	In accordance with the guidance of ACM 0002 / Version 06, considering the layered despatch system existing in the country, the Southern Regional Grid is considered as the project system grid, though the generated power is fed to the State grid. This choice is conservative and transparent as there is considerable trade among states. While considering power generated, auxiliary power consumption figures for Government owned plants have been considered to arrive at net power generation; for privately owned power generating units, net quantity of power purchased has been considered. Default values given in the Revised IPCC 1996 Guidelines for National green House Gas Inventories and published data from Central Electricity Authority (CEA) have been Used. Further, instead of weighted average emissions, a	CAR4	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			combination of Simple Operating Margin and Build Margin has been considered. IPCC 2006 values should be used. Local EF values should be the first preference, the use of IPCC default values should be justified.		
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	Yes, the continuously increasing demand for electric power has made it necessary for huge investments to be made in large, profitable, but polluting power generating plants. Plans indicating huge investments in thermal power stations have been announced. Simultaneously, in order to tap renewable energy sources, many fiscal incentives have been announced to attract investments in to this area. However, notwithstanding such incentive plans, investment flowing in to the renewable power sector continues to be negligible.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/	DR	CEA has computed and published values of OM and BM for 2003-2004, 2003-2004 and 2004-2005 in Dec 2006, which compares very well with The values arrived in the PDD.		OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/	DR	BEL has an installed power demand of 10 MW, which hitherto it has been drawing from KPTCL; the grid is highly carbon intensive. Currently, BEL proposes to install wind power generator of 2.5 MW capacity and wheel the power generated for its use at its production facility. As a result of this, the GHG emission component of the power being used by it has been proportionately reduced. In the absence of the project activity, BEL would have continued to use the power from the grid, thus relying on power from a carbon intensive grid, without any		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			amelioration.		
C. Duration of the Project / Crediting Period It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/1/	DR	Yes, the start date of project activity is given as 24 March 2006, with an operational life time of 20 years. However, documentary evidence for the start date of the project needs to be provided.	CL-2	OK
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	Yes. The project has opted for a fixed crediting period of 10 years starting from 1 September 2007.		OK
D. Monitoring Plan The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
D.1. Monitoring Methodology It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/1/	DR	Monitoring methodology as given in "Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories", I.D, Version 10, dated 23 December 2006 is selected. As per the selected methodology, monitoring consists of metering the electricity generated by the renewable technology.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	The proposed project activity is a grid connected renewable energy generation activity with an installed capacity of 2.5 MWe. Thus, the methodology chosen is appropriate.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR	Yes, the power generated is reckoned as the quantum of power fed to the grid and is jointly recorded by the Company representative and the KPTCL (power purchasing agency) in FORM – B.		OK
D.1.4. Will the monitoring methodology give opportunity for real measurements of achieved emission reductions?	/1/	DR	The baseline emission factor of the supply grid is calculated <i>ex-ante</i> . Renewable power wheeled into the grid is directly measured and recorded. The power generated is a direct indicator of the CO ₂ emissions avoided and affords real measurement.		OK
D.2. Monitoring of Project Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
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?	/1/	DR	Since the project is wind energy based, there will be no project GHG emissions.		OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR	As in D.2.1		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR	As in D.2.1		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR	As in D.2.1		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.3. Monitoring of Leakage If applicable, it is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	Since there is no transfer of energy generating equipment from or to any other activity, leakage need not be considered.		OK
D.3.2. Are the choices of leakage indicators reasonable?	/1/	DR	As in D.3.1		OK
D.3.3. Will it be possible to monitor / measure the specified leakage indicators?	/1/	DR	As in D.3.1		OK
D.3.4. Will the indicators give opportunity for real measurements of leakage effects?	/1/	DR	As in D.3.1		OK
D.4. Monitoring of Baseline Emissions It is established whether the monitoring plan provides for reliable and complete project emission data over time.	/1/	DR			
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?	/1/	DR	Yes, the power generated is jointly recorded on a monthly basis and the relevant records are archived till two years after the crediting period as per stipulations.		OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR/I	CO ₂ emissions are the chosen baseline emission indicator. The choice is reasonable as majority of the power plants connected to the grid are fossil fuel based and are highly carbon intensive.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR/I	CO ₂ emissions are directly proportional to the power generated; thus, by measuring and monitoring the power generated from a renewable		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			source, the corresponding reduction in CO2 emissions can be calculated.		
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	As in D.4.3		OK
D.5. Project Management Planning It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?			Not very precisely in the PDD, but BEL is a leading ISO certified Public Sector Unit, and it is expected that such requirements of project management will be suitably taken care of.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR/I	Yes, the monthly meter readings jointly recorded by a designated official of KPTCL and the Company representative is forwarded to the General Manager (Services) after review by Manager (Receiving Station) and Deputy General Manager (Electrical).		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR	As in D.5.1		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR/I	No such emergencies are foreseen which could cause unintended emissions. However, procedures for fire fighting and such emergencies need to be submitted.	CL-3	OK
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR/I	Calibration of the electrical power meters shall be done in accordance with the requirements of PPA with KPTCL. Copy of PPA needs to be submitted.	CAR-2	OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR/I	Maintenance of metering equipment shall be carried out as per the requirements of PPA with	CAR-2	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			KPTCL.		
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR/I	As in D.5.2		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)	/1/	DR/I	Microprocessor based control mechanism has been specified. However, it needs to be clarified as to how and where the periodic process monitoring data is stored, and how process performance is documented.	CL-4	OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR/I	Procedure for dealing with possible data adjustments shall be in accordance with the requirements of the PPA.	CAR-2	OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR/I	Procedure for carrying out internal audits, project performance reviews and implementation of corrective action needs to be submitted.	CL-5	OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR/I	As in D.5.10	CL-5	OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR/I	As in D.5.10	CL-5	OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E. Calculation of GHG emission 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.					
E.1. Project GHG Emissions The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/	DR	Since the project is wind energy based, there will be no project GHG emissions.		OK
E.1.2. Have all relevant greenhouse gases and sources been evaluated?			As in E.1.1		OK
E.1.3. Do the methodologies for calculating project emissions comply with existing good practice?	/1/	DR	As in E.1.1		OK
E.1.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	As in E.1.1		OK
E.1.5. Have conservative assumptions been used?	/1/	DR	As in E.1.1		OK
E.1.6. Are uncertainties in the project emissions estimates properly addressed?	/1/	DR	As in E.1.1		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
E.2. Leakage 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 and estimated ex-ante.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	Since there is no transfer of energy generating equipment from or to any other activity, leakage need not be considered.		OK
E.2.2. Are potential leakage effects properly accounted for in the calculations (if applicable)?	/1/	DR	As in E.2.1		OK
E.2.3. Do the methodologies for calculating leakage comply with existing good practice (if applicable)?	/1/	DR	As in E.2.1		OK
E.2.4. Are the calculations documented in a complete and transparent manner and (if applicable)?	/1/	DR	As in E.2.1		OK
E.2.5. Have conservative assumptions been used (if applicable)?	/1/	DR	As in E.2.1		OK
E.2.6. Are uncertainties in the leakage estimates properly addressed (if applicable)?	/1/	DR	As in E.2.1		OK
E.3. Baseline GHG Emissions The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries	/1/	DR	The Southern Regional Grid has been chosen as		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
clearly defined and do they sufficiently cover sources for baseline emissions?			the project electricity system component thereby covering the source for baseline emissions.		
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR/I	Yes, baseline emissions of the Southern Regional Grid have been captured in the project design.		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR/I	CO ₂ emissions arising from the power plants connected to the grid have been evaluated.		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR/I	Consolidated baseline methodology for grid-connected electricity generation from renewable sources, ACM 0002, Version 06, has been selected for calculating baseline emissions. The weight age for OM (0.75) and BM (0.25) are in accordance with the wind power based power generating activity.		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	Yes, detailed calculations of the OM for 2003-2004, 2004-2005 and 2005-2006, and BM for 2005-2006, and Combined Margin as being equal to sum of 0.75 times OM and 0.25 times BM have been submitted in a separate spreadsheet accompanying the PDD.		OK
E.3.6. Have conservative assumptions been used?	/1/	DR/I	Yes, as in B.2.2		OK
E.3.7. Are uncertainties in the baseline emissions estimates properly addressed?	/1/	DR/I	Baseline emission estimates are based on published data mandated statutorily for such purpose.		OK
E.4. Emission Reductions Validation of ex-ante estimated emission reductions.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/	DR/I	Yes, the project activity consists of generating power from wind power which is a renewable		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			resource, whereas in the baseline scenario, 73% of power generated is based on fossil fuels and hence the project implementation certainly results in fewer GHG emissions.		
F. Environmental Impacts It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR	No. Wind power projects are not listed in Schedule I of S.O. 1533 of the MoEF, which lists project activities requiring an EIA.		OK
F.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR/I	Clearance for Establishment of the project from the Karnataka State Pollution control Board needs to be submitted. Clearance from the same agency needs to be obtained prior to commissioning of the project.	CAR-2	OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR/I	The project activity is wind power based electricity generation. The wind power generators are located in a non-forest area, with no known or recorded eco-sensitivity, or likely damage to flora and fauna. The impact due to noise needs is not mentioned in the PDD.	CL6	OK
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	Yes, environmental, ecological and socio-economic impacts of the establishment of the project have been considered in the PDD.		OK
G. Comments by Local Stakeholder Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?			Yes, the local villagers and other stakeholders have been consulted.		OK

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR/I	The promoters have conducted interviews with the local population of the surrounding villages. It needs to be justified as to why an interview was conducted instead of the prevailing practice of conducting an open hearing of the concerns of the stakeholders.	CL-1	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?	/1/	DR/I	As in G.1.2	CL-1	OK
G.1.4. Is a summary of the comments received provided?	/1/	DR	A summary of the comments received has been provided in the PDD.		OK
G.1.5. Has due account been taken of any comments received?	/1/	DR/I	No adverse comment is reported to have been received.	CL-1	OK

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1: Approval of the project and endorsement of its contribution to sustainable development from the DNA of India shall be submitted for verification	A3.3	Date: 18 May 2007 The original copies of the DNA approval letter and endorsement of project contribution to sustainable development have been shown to validator during site visit. Copies of the same will be submitted to validator.	Accepted. The DNA approval dated 22 January 2007 has been verified. CAR1 is closed.
CAR 2: Letter of approval from the Revenue and Forest Departments, licenses from Factory and Electrical Inspectorates, PPA with KPTCL and clearance from the Local village Panchayat need to be submitted to demonstrate compliance with prevailing legislations.	A.3.4, D.5.5, D.5.6, D.5.9, F.1.2	Date: 18 May 2007 Copies of the relevant approval letters and clearances will be submitted to validator. The energy Department and the State Power procurement committee have given their consent to feed power to the grid. However, the wheeling agreement is under processing stage, pending finalization, as mentioned in section B.5 of the PDD. In the meanwhile, KPTCL has issued 'Form B' wheeling receipts for the power fed to the grid till date from the November 2006, when the generators were commissioned. Copies of these receipts will be submitted to the validator. The copy of the wheeling agreement will be submitted to validator once BEL finalizes the same with KPTCL.	Accepted. The following documents have been verified: • Ministry of Environment and Forestry approval for establishment of wind power project dated September 25, 2006. • Electrical inspectorate approval dated September 29, 2006. • State procurement company letter no. SPPCC/A1/56/2005-06 stating that wheeling shall be permitted until a final wheeling and banking arrangement is approved by the commission. • Ministry of Non- Conventional Energy Sources letter to Karnataka Renewable Energy development Agency Ltd stating that EIA is not required for power projects based on non-

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
			conventional energy sources dated November 20, 1997. • Transfer of 2.5 MW wind power capacity in favour of M/s. BEL dated September 11, 2006 • Agreement between KREDL and BEL to establish the wind Project dated September 2006 The wheeling and banking arrangement needs to be verified during verification. CAR 2 is closed.
CAR 3: The additionality should be more precise. The pre-project scenario on additionality need to be detailed and substantiated.	B.2.1	Date: 18 May 2007 Prior to the conceptualization period of project activity in November – December 2003, the state transmission and distribution utility KPTCL was unbundled into four different Electricity supply companies (i.e. ESCOMS) in 2002 and the new Electricity Act was enforced nationally in June 2003 wherein wheeling was dealt under the new 'Open Access' policy. These developments required new set of interpretations of applicability conditions to wheeling projects among the state utilities and ESCOMS. BEL was aware of these developments and anticipated that it would possibly have to face many new regulatory concerns during setting	Accepted. The arguments have been accepted as the unbundling of KPTCL had occurred and the new electricity Act 2003 was introduced. Subsequent to this the wheeling and banking facility has not been established by the new ESCOMS. KPTCL and the ESCOMS is still to interpret and finalize the regulations on wheeling and banking arrangements, particularly for renewable energy projects, the explanation on the delay of documentation submission for CDM have been accepted. CAR 3 is closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		up and operation of the project. The above pre-project scenario has been detailed in the revised version of the PDD. Copies of the relevant supportives will be submitted to validator. Further, although CDM was considered in 2003, there was a delay in the CDM documentation process till Mar 2006 as there were doubts about setting up of the project itself in view of the regulatory problems faced as detailed in Section B.5 of the PDD.	
CAR 4: IPCC 2006 instead of IPCC1996 values should be used for baseline computations. Local EF values should be the first preference, the use of IPCC default values should be justified in the PDD.	B2.2	Date: 18 May 2007 The baseline emission factor has been revised using the latest published data from the Central Electricity Authority, which is a authorised government body under the Ministry of Power in India. The same is incorporated in the revised version of the PDD.	The CO₂ baseline database provides information about the OM and BM factors of all the regional electricity grids in India. DNV confirms that the OM in the CEA database is calculated ex ante using the simple OM approach and the BM is calculated ex ante based on 20% most recent capacity additions in the grid based on net generation as described in ACM0002. CAR 4 is closed.
CL 1: The minutes of the stakeholders meetings, comments and measures by BEL needs to be provided.	G.1.2, G.1.3, G.1.5	Date: 18 May 2007 The stakeholder meeting was conducted on 18th October 2006. Copies of the minutes of the stakeholder comments will be submitted to the validator.	Accepted. The minutes of the stakeholders meeting have been verified. CL 1 is closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
CL 2: Evidence of start date of the project activity needs to be provided for verification.	C.1.1	Date: 18 May 2007 The start date of the project activity corresponds to the meeting held by the BEL Engineering Services - Electrical Department on 22 December 2003, wherein the decision to go ahead with the project activity considering CDM was taken. Copy of the minutes of the meeting will be submitted to the validator.	Accepted. The minutes of the meeting dated December 2003 considering CDM have been verified and accepted. CL 2 is closed,
CL 3: Procedures for emergency situations, fire fighting and safety needs, record handling are not detailed in the PDD.	D.5.4	Date: 18 May 2007 The major emergency situation foreseen is in case of fire. Towards combating this situation following steps have been taken: a) Provision of Fire extinguishers to fight Electrical & other types of fire. b) Use of Fire redundant & Fire proof materials/Equipment. c) Over temperature protection devices. d) Continuous monitoring through SCADA system e) Adequate Lightning protection systems are installed The other major problem can be storms or high wind situation. If the velocity of the wind exceeds 25 m/s then power generation is stopped for safety purpose. Further, adequate safety measures	Accepted. The emergency situation described and the measures adopted are reasonable and accepted. CL 3 is closed.

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
		have already been integrated during the erection and commissioning stages of the project, supportive copies of which will be submitted to validator. For any emergency occurrences, immediate corrective action steps are laid out. The records of emergency situations, if any, will be archived in paper at BEL office.	
CL 4: A microprocessor based control mechanism has been indicated to continuously monitor process performance. However, please clarify the method and means of storage of such data and documentation of process performance.	D.5.8	Date: 18 May 2007 A controller based on the microprocessor technology with LCD display is incorporated in each WEG for optimum generation of power in all given conditions and protect the system against the various emergencies. The controller will log 200 events of various parameters required for operation and maintenance such as rotor and generator speed, wind speed, hydraulic pressure, temperature, pitch and power and energy production etc. All the records will be store in the electronic form as a soft copy in the system.	Accepted. The storage of data in the electronic format is accepted. CL 4 is closed.
CL 5: Procedure for carrying out internal audits, project performance reviews and	D.5.10, D.5.11, D.5.12	Date: 18 May 2007 BEL is an ISO 9001-2000 and ISO 14001-2004 company with internal	Accepted. As the company is ISO certified and the procedures are a regular pattern in

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
implementation of corrective action are not provided in the PDD.		audit procedures and the same has been implemented for the already established 2.5 MW Wind Energy Power Plant. Copy of GHG monitoring procedure and the GHG internal audit procedure will be submitted to the validator.	accordance with ISO, the explanation is reasonable. The GHG monitoring procedure and audit form have been verified. CL 5 is closed.
CL 6: Parameters and details in the 'Noise' in section D.2. of the PDD is empty.	F.1.3	Date: 18 May 2007 The noise from the individual wind mills is 85 dB (maximum) at a point just below the wind mill. This figure has been incorporated in the revised version of the PDD. However, as there is no habitation in the vicinity, there is no noise pollution to the habitants due to project activity is not an issue.	Accepted. The revised PDD has been verified. CL 6 is closed.

- o0o -

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	Yes	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1, 2, 3 & 9		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0028, AM0034	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0030	Yes
ACM0004	Yes	AM0031	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0032	Yes
ACM0007	Yes	AM0035	Yes
ACM0008	Yes	AM0038	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0041	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0034	Yes
AM0009, AM0037	Yes	AM0043	
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0046	
AM0014	Yes	AM0047	
AM0017	Yes	AMS-II.A-F, AM0044	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes
AM0021	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJi-i1)

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	Yes	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 4 & 5		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0027	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	AM0028, AM0034	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0030	Yes
ACM0004	Yes	AM0031	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0032	Yes
ACM0007	Yes	AM0035	Yes
ACM0008	Yes	AM0038	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0041	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	AM0034	Yes
AM0009, AM0037	Yes	AM0043	
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0046	
AM0014	Yes	AM0047	
AM0017	Yes	AMS-II.A-F, AM0044	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes
AM0021	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Ma-Paa-Puratchikkanal

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-DMJI-i1)

GHG Auditor:	Yes		
CDM Validator:	--	JI Validator:	--
CDM Verifier:	--	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 1 March 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director