



VALIDATION REPORT

GRACE INFRASTRUCTURE PVT LTD

**“31 MW Wind energy project in, India by
Grace Infrastructure Pvt Ltd”**

Report No: 8000361389- 08/130

TÜV NORD CERT GmbH
JI/CDM Certification Program
Langemarckstrasse 20
45141 Essen, Germany
Phone: +49-201-825-3335
Fax: +49-201-825-3290
www.tuev-nord.de
www.global-warming.de

Date: 2009-July-30

Date of first issue: 2009-07-30	Project No.: 8000361389 – 08/130
Approved by: Mr. Rainer Winter	Organisational unit: TÜV NORD JI/CDM Certification Program
Client: M/s Grace Infrastructure Pvt Ltd	Client ref.: Mr. L.M.Shah, Managing Director

Summary/Opinion:

Grace Infrastructure Pvt Ltd has commissioned the TÜV NORD JI/CDM Certification Program to validate the project: “31 MW Wind energy project in, India by Grace Infrastructure Pvt Ltd”, with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords), and the relevant decisions by COP/MOP and CDM Executive Board.

The purpose of this project activity is to generate electricity using renewable sources (wind) and export to respective state grid, thereby displacing the grid generated electricity.

In the course of the validation 12 Corrective Action Requests (CARs), 1 Clarification Requests (CRs) were raised and successfully closed. The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfillment of the stated criteria.

In detail the conclusions can be summarised as follows:

- The project is in line with all relevant host country criteria (India) and all relevant UNFCCC requirements for CDM project activity approval has been obtained from National CDM Authority as DNA of India vide the Letter of Approval (HGA) F.No.4/20/2007-CCC, dated 17/03/2008
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 677,280 t CO₂e is most likely to be achieved within the 10 years (fixed) crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

Report No.: 8000361389-08/130	Subject Group: Environment
Report title: 31 MW WIND ENERGY PROJECT IN, INDIA BY GRACE INFRASTRUCTURE PVT LTD	
Work carried out by: Ma. Paa. Puratchikkanal K. V. Sudharsan B.J.M. Amarnath, S. Stalin N. Premjit Singh A. Kirthika	Technical Review Alexandra Nebel
Work approved by: Rainer Winter	
Date of this revision: 2009/07/30	Rev. No.: 0
Number of pages: 78	

Indexing terms

**Climate change
CDM
Validation
Kyoto Protocol**

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

☐ Limited distribution

☐ Unrestricted distribution

Abbreviations

BAU	Business as usual
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CO₂	Carbon dioxide
CO_{2e}	Carbon dioxide equivalent
CP	Certification Program
CR	Clarification Request
DNA	Designated National Authority
EB	CDM Executive Board
EIA	Environmental Impact Assessment
FAR	Forward Action Request
GHG	Greenhouse gas(es)
Govt.	Government
IETA	International Emissions Trading Association
INR	Indian Rupees
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
ISO	International Standards Organisation
Kg	Kilogram
kW	Kilowatt
kWh	Kilowatt hour
m	Meter
MNRE	Ministry of New and Renewable Energy, Government of India
MoEF	Ministry of Environment and Forest, Government of India
MoV	Means of Verification
MT	Metric Tonne
MU	Million Units (of electricity)
MVP	Monitoring and Verification Plan
NGO	Non Government Organisation
ODA	Official Development Assistance
PDD	Project Design Document
QC/QA	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change

Table of Contents	Page
1 INTRODUCTION	5
1.1 Objective	5
1.2 Scope	5
1.3 GHG Project Description	6
1.3.1 Project Scope	6
1.3.2 Project Parties	6
1.3.3 Project Entities	7
1.3.4 Project location	7
1.3.5 Technical project description	8
2 VALIDATION TEAM.....	9
3 METHODOLOGY.....	10
3.1 Validation Protocol	10
3.2 Review of Documents	12
3.3 Follow- Up Interviews	12
3.4 Resolution of Clarification and Corrective Action Requests	13
3.5 Public Stakeholder Comments	13
3.6 Finalising the report	13
4 PRE-VALIDATION FINDINGS	14
4.1 Participation Requirements	15
4.2 Project design	15
4.3 Baseline and Additionality	16
4.4 Crediting Period	24
4.5 Monitoring Plan	24
4.6 Calculation of GHG Emissions	24
4.7 Environmental Impacts	25
4.8 Comments by Local Stakeholders	25
5 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS	26
6 VALIDATION OPINION	27
7 REFERENCES	28
ANNEX: VALIDATION PROTOCOL.....	32

1 INTRODUCTION

M/s.Grace Infrastructure Pvt Ltd has commissioned the TÜV NORD JI/CDM Certification Program (CP) to validate the project:

“31 MW Wind energy project in, India by Grace Infrastructure Pvt Ltd”

With regard to the relevant requirements for CDM project activities.

1.1 Objective

The purpose of this validation is to have an independent third party assess the project design. In particular the project's baseline, the monitoring plan (MP), and the project's compliance with

- the requirements of Article 12 of the Kyoto Protocol; the CDM modalities and procedures as agreed in the Marrakech Accords under decision 17/CP.7; the annex to the decision; subsequent decisions made by COP/MOP & CDM Executive Board,
- other relevant rules, including the host country legislation and sustainability 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 seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of Certified Emission Reductions (CERs).

1.2 Scope

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based on ACM 0002/Version 07: Consolidated methodology for grid-connected electricity generation from renewable sources) which are included in the PDD and other relevant supporting documents.

The items covered in the validation are described below:

- **UNFCCC and Host Country Criteria**

- UNFCCC/Kyoto Protocol requirements, in particular, the requirements of the CDM as set out in decision 17/CP.7 (Marrakech Accords), the present annex, the simplified modalities and procedures for small scale CDM project activities of annex II to decision 21/CP.8 and relevant decisions by COP/MOP and CDM Executive Board
- Host country requirements / criteria

- **CDM Project Description**

- Project design
- Project boundaries
- Predicted CDM project GHG emissions

- **Project Baseline**
 - Baseline methodology
 - Baseline GHG emissions
- **Monitoring Plan**
 - Monitoring methodology
 - Indicators/data to be monitored and reported
 - Responsibilities
- **Background investigation and follow up interviews**
- **Global Stakeholder Consultation**
 - Publishing the PDD on TÜV NORD website
 - Review of comments
- **Draft validation reporting with CARs, CRs and FARs, if any**
- **Final validation reporting.**

The information included in the PDD and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV NORD JI/CDM CP has, based on the recommendations in the Validation and Verification Manual^{VVM}, 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 based on the information made available to TÜV NORD JI/CDM CP and on the contract conditions.

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

1.3 GHG Project Description

1.3.1 Project Scope

The considered GHG project can be classified as a CDM project in the sector given in Table 1-1 (according to List of Sectoral Scopes of UNFCCC).

Table 1-1: Project Scope(s)

No.	Project Scope
1	Energy Industries (renewable - / non-renewable sources)

1.3.2 Project Parties

India is the host party involved in the project activity.

1.3.3 Project Entities

The following entities are involved in the developing of the project:

Project Proponent Grace Infrastructure Pvt Ltd
A-5 Industrial Estate
Thatanchavady
Pondicherry-605009

Contact person: L.M.Shah
Managing Director
mail@fastenex.co.in
+91-413-2249154(Fax)
+91-413-2248225(Tel)

1.3.4 Project location

The project activity is situated at Tirunelveli and Kanyakumari districts in Tamilnadu, India. The details of the project location are given in table 1-2:

Table 1-2: Project Location

25 MW (20X1250kW) in Tirunelveli district, Tamilnadu

No.	Project Scope
Host Country	India
Region	Tamil Nadu
Project location address	Balabathirapuram,Kadanganeri,Vairankottai, Vadakkukavalakuruchi,Sundankuruchi,Ukkarankottai Kavakuruchi Villages
Latitude	As per the PDD in Appendix - 2
Longitude	As per the PDD in Appendix - 2

6MW (4X1500kW) in Kanyakumari district, Tamilnadu

No.	Project Scope
Host Country	India
Region	Tamil Nadu
Project location address	Udayathur Village
Latitude	As per the PDD in Appendix - 2
Longitude	As per the PDD in Appendix - 2

1.3.5 Technical project description

The project activity involves installation of 20 WTGs capacity of 1250kW and 4 WTGs capacity of 1500KW. The details of ownership, location and number of WTGs are presented in the table 1-1 below. The electricity generated from the WTGs is supplied to the TNEB Grid, which forms part of the Southern Grid. The project activity is expected to generate approximately 72.93 GWh electricity per year. This power from GHG free source will displace power from state grid which is primarily fossil fuel based and hence will effect reduced emissions in power generation from Southern Grid.

The estimated amount of emission reductions over the chosen 10-year “non-renewable crediting period” for the project activity is 677,280 tCO₂e. The key parameters of the project activity are given in table 1-4.

Table 1-3: Ownership, location, capacities and numbers of WTGs

Ownership	Location	Capacity (kW)	Numbers	Total Capacity (MW)
M/s Grace Infrastructure Pvt Ltd	Balabathiramapuram, Kadanganeri, Vairankottai, Vadakkukavalakuruchi, Sundankuruchi, Ukkarankottai Kavakuruchi Village Tirunelveli district, Tamil Nadu	1250	20	25
	Udayathur Village	1500	4	6
Total			24	31

Table 1-4: Key parameters of different make Wind Turbine Generators.

Description	Specifications	
	1250kW	1500kW
Make	SUZLON	SUZLON
Rating in KW	1250	1500
Rotor diameter	64m	82m
Rotor Swept area	3218 m ²	5281 m ²
Type of tower	Lattice tower	Lattice tower
No of blades	3	3
Voltage	690 V	690 V
Frequency	50 Hz	50 Hz
Protection class	IP 56	IP 54
Rotational speed	Rated 1010/1515 rpm	1511 rpm

2 VALIDATION TEAM

The validation team is led by:

- **Mr. Ma. Paa. Puratchikkana**, TÜV Nord -Bangalore, India. Mr. Kanal, B.E. Civil & Environmental Engineering and Masters in Water Resources, Currently he is Head CDM – South India for TÜV NORD India operation. He has also done an EMS and Calibration Course GHG Auditor Course. He is an appointed assessor for TÜV NORD JI/CDM CP and performed validation and verification of several CDM projects. He is a certified GHG Auditor, CDM Validator and CDM Verifier and has validated and verified many CDM, VCS, Gold Standard and WCD based projects.

For this validation he was assisted by:

- **Mr. Mohinder Amarnath** Mr. Amarnath is CDM Expert of TUV NORD-Chennai. He is B. Tech. (Chemical) and engaged with TÜV India operation. He is an appointed expert for JI/CDM certification program of TÜV NORD CERT GmbH. He has participated in several CDM/ VER project validation and verification also has substantial experience in CDM Project development and Energy auditing.
- **Mr. K.V. Sudarshan** is CDM expert from TUV NORD, Bangalore. He has completed his B.E. in Chemical Engineering and is a certified ISO 14001:2004 and GHG Auditor. He has worked on more than 35 projects as an On-Call GHG auditor for Det Norske Veritas, besides having implemented Environmental Management System at large industrial groups such as Raymond and Reliance among others, and at Karnataka State Police Housing Corporation, a pioneer of Green Building in the public Sector.
- **S. Stalin, N. Premjit Singh, A. Kirthika**, joined the team as trainees.

The technical review was carried out by:

- **Ms Alexandra Nebel**: She works at TÜV NORD in the JI/CDM Certification program and is appointed as an expert.

The final validation report is approved by:

- **Mr. Rainer Winter**. Mr. Winter works at TÜV NORD as ISO 9001/ 14001 Auditor and environmental verifier for EMAS. He is also an approved emission verifier within the European Emission Trading Scheme. Mr. Winter is an authorized JI/CDM Senior assessor and is in charge of the JI/CDM Certification Program of TÜV NORD CERT GmbH.

3 METHODOLOGY

The (pre-) validation of the project was carried out from March '08 to April '08. The validation consisted of the following three phases:

- A desk review of the PDD (incl. Annexes) and supporting documents with the use of a customised validation protocol according to the Validation and Verification Manual;
- Back ground investigation and follow-up interviews with personnel of the project proponent, the consultant, legal authorities and other stakeholders;
- Reporting of validation findings taking into account the public comments received on TUV NORD website.

The report includes Corrective Action Requests, Clarification Requests and Forward Action Requests (CAR, CR and FAR) identified in the course of this validation.

A **Corrective Action Request** is established if

- mistakes have been made in assumptions or the project documentation which directly will influence the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or
- there is a risk that the project would not be registered by the UNFCCC or that emission reductions cannot be verified and certified.

A **Clarification Request** is issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

The final validation started after issuance of proposed corrective action (CA) of these CARs and CRs by the project proponent. The validator has assessed the proposed CA with a positive result and after the closure of these CARs and CRs the project proponent has issued the final version of the PDD. On the basis of this the final validation report and opinion were issued.

3.1 Validation Protocol

In order to ensure consideration of all relevant assessment criteria, a validation protocol was used. The protocol shows, in a transparent manner, criteria and requirements, means of verification and the results from pre-validating the identified criteria. The validation protocol serves the following purposes:

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

The validation protocol consists of three tables: Table 1 (Mandatory Requirements); Table 2 (Requirement Checklist); and Table 3 (Resolution of Corrective Action and Clarification Request) as described in Figure 1.

The completed validation protocol is enclosed in Annex I to this report identifying 11 Corrective Action Requests, 5 Clarification Requests.

Validation Protocol Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the Validation report.</i>	<i>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.</i>

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>The various requirements in Table 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.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.</i>	<i>The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.</i>	<i>This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question (See below). Clarification is used when the validation team has identified a need for further clarification.</i>

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

Figure 1: Validation protocol tables

3.2 Review of Documents

The draft PDD submitted by M/s Grace Infrastructure Pvt Ltd in May 2008 and supporting background documents related to the project design and baseline were reviewed.

Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

3.3 Follow- Up Interviews

On 25th June 2008, the TÜV NORD JI/CDM CP performed the on-site interviews with the project proponent, project developer, plant operating personnel to confirm selected information and to resolve issues identified in the document review.

The key interviewee and main topics of the interviews are summarised in Table 2-1.

Table 2-1 Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
Project proponent representatives ^{/IM01/}	<ul style="list-style-type: none"> - General aspects of the project - Project boundary - Technical details of the project realisation - Approval procedures and status - Environmental Policy - Quality and Environmental Management System - Involved personnel and responsibilities - Additionality - Monitoring and measurement equipment - Baseline study assumptions - Environmental impacts - Socio economic impacts on the local population - Details of emissions reduction calculation - Operational data - License, operation & maintenance authority and responsibility - Monitoring and measurement control and QA/QC procedure - Legal aspects of the project
Consultant ^{/IM02/}	<ul style="list-style-type: none"> - Editorial aspects of PDD - Methodology selection aspects - Base line study, leakage and additionality - Details of emission reduction calculation

3.4 Resolution of Clarification and Corrective Action Requests

In order to remedy any mistakes, problems or any other outstanding issues which needed to be clarified for positive conclusion on the project design, CARs and CRs were raised. These requests can be resolved or “closed out” by the project proponent by providing the corresponding response in the column 3 of the table three as meant in Figure 1 and submission of revised PDD and supporting documents, if requires in timely manner.

In this validation report 12 CARs, 1 CRs were raised.

The CAR(s) / CR(s) are documented in Annex I and addressed in section 4.

3.5 Public Stakeholder Comments

According to the modalities for the validation of CDM projects, TÜV NORD JI/CDM CP published the draft PDD on its website www.global-warming.de on 29 February 2008 and invited comments within 30 days (until 30 March 2008) by interested parties, stakeholders and UNFCCC accredited non-governmental organizations. No comment was received.

3.6 Finalising the report

The draft validation report will be submitted to the project proponents. After reviewing the revised and resubmitted project documentation; resolving the CRs & CARs raised and outstanding concerns TÜV NORD JI/CDM CP will issue the final validation report and opinion.

4 PRE-VALIDATION FINDINGS

In the following protocol the findings from the desk review of the draft PDD, visits, interviews and supporting documents are summarised.

The results are shown in table 4-1:

Table 4-1: Summary of CARs, CRs and FARs issued

Validation topic ⁽¹⁾	No. of CAR	No. of CR	No. of FAR
General description of project activity (A) - Project boundaries - Participation requirements - Technology to be employed - Contribution to sustainable development	4	1	-
Project baseline (B) - Baseline Methodology - Baseline scenario determination - Additionality determination - Calculation of GHG emission reductions Project emissions Baseline emissions Leakage - Emission reductions - Monitoring Methodology - Monitoring of Project emissions Baseline emissions Leakage Sustainable development indicators / environmental impacts - Project management planning	5	-	-
Duration of the Project / Crediting Period (C)	2	-	-
Environmental impacts (D)	-	-	-
Stakeholder Comments (E)	1	-	-
SUM	12	1	-

(1) The letters in brackets refer to the validation protocol

For an in depth evaluation of all validation items it should be referred to the validation protocol (Annex). This annex also includes all CARs, CRs (Table 3).

4.1 Participation Requirements

India as a non Annex-I party meets all relevant participation requirements. In the Letter of Approval^{/HGA/} dated 17/03/2008, the Indian DNA, National CDM Authority under Ministry of Environment and Forests confirmed the voluntary participation of M/s. Grace infrastructure Pvt Ltd as Project Participant in the CDM project activity.

An Annex-I party will be identified by the project participant in due time, as per the post registration involvement by Annex I party provisions (no. 57) made in 18th EB meeting.

This type of project activity is in line with sustainable development policies of the country and national regulation / policy on Environmental Protection, Electricity and Non Conventional Energy.^{/HGA/}. Nevertheless in the Host Government Approval it is stated that project proponent has to comply with the following conditions:

- Grace infrastructure Pvt Ltd shall not sell the CERs to any agency/ company/ organization which purchases the CERs using ODA Funds
- Grace infrastructure Pvt Ltd shall inform the national CDM Authority regarding all transaction details of CERs including the name and address of the party to which CERs were sold within 30 days of transfer of the CERs
- Grace infrastructure Pvt Ltd shall furnish expeditiously any information, during the lifetime of the project as requested by the National CDM Authority.
- Grace infrastructure Pvt Ltd shall obtain all statutory clearances and other approvals as required from the competent authorities for setting up of the project
- All transaction shall be subject to supervision of the Executive Board of the CDM, under the authority and guidance of the COP/MOP

4.2 Project design

The objective of this project activity is to use the Kinetic energy to generate electricity by installation of the Wind Turbine Generators which use the state of art technology developed by M/s Suzlon Energy Pvt Ltd. The salient features and the technical specifications of the WTGs are described in section A.4.2 of the PDD. The high velocity wind possesses considerable kinetic energy; when it passes over the blades of the wind turbines, it is converted into mechanical energy and rotates the wind blades. When the wind blades rotate, the connected generator also rotates, thereby producing electricity with the help of generator. The technology is a clean technology since there are no GHG emissions associated with the electricity generation. The project activity comprises of twenty (20) Nos of 1250kW and four (4) Nos of 1650kW wind turbine generators aggregating to 31 MW installed capacity. The WTGs are located in districts Tirunelveli and Kanyakumari in Tamilnadu in India.

During the ten years of crediting period the project activity is likely to export 72.93 GWh/Year of net generated electricity to the Tamilnadu State Electricity Board (TNEB) which is interconnected to Southern regional grid of India. The host country also agrees to this fact that technology of harnessing wind power through windmills is

environmentally safe and sound and hence does not ask for Environmental Impacts Assessment for this type of project.

The project activity would be incorporating technology for such kind of turbines which is well established and available in India and the project activity does not involve any transfer of technology. The technology being used is environmentally safe and sound. According to sustainable development various social, economic and environmental benefits are achieved. The project activity would result in green house gas emission reductions, while also enhancing the employment of the local people during the construction and operation phases of this wind based power plant. Based on the financial information furnished by the project participants, no ODA contributes to the financing of the project. The 10 years fixed crediting period and 20 years operational lifetime are clearly defined under section C of revised PDD.

Nevertheless, CAR A2, CAR A3, and CR A1 has to be raised in the course of the validation and were successfully closed (ref Annex: Validation Protocol - Table 3).

4.3 Baseline and Additionality

The project activity is grid connected renewable energy generation through wind electricity generators. The purpose of the project activity is to generate electricity through renewable resources (wind) and displace equivalent amount of electricity in the regional grid which is predominantly fossil fuel based. The selected baseline methodology is approved baseline methodology for “consolidated baseline methodology for grid-connected electricity generation from renewable sources” (ACM0002 Ver.07).

The baseline under the adopted methodology ACM 0002 is calculated by multiplying the grid emission factor (kgCO₂/kWh) and the net electricity exported (in kWh) by this project activity consisting 31 MW WTGs to the Southern Grid.

ACM0002 (Version 7) states that Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”. In this case the Combined Margin (weighted average of Simple Operating Margin and Build Margin) is estimated based on three years average (04-05, 05-06 and 06-07) of Simple Operating Margin and 20 % Build Margin of current year (06-07) is in line with steps of “Tool to calculate the emission factor for an electricity system”. Both the value of Simple Operating Margin and Build Margin are selected under ex-ante approach. The grid boundary w.r.t the connected state grid is Southern Grid of India.

In accordance with “Tool to calculate the emission factor for an electricity system”, ‘Dispatch Data Analysis’ is the first methodological choice out of four options of calculating OM emission factor. Nevertheless the “Dispatch data analysis operating margin” is ruled out in India due to lack of necessary dispatch data of the grids. The same fact is also considered by the Central Electricity Authority ^{/cea/} (Ref the user

guide for CO₂ Baseline Database for the Indian Power Sector version 3, December 2007).

Out of other 3 options of calculating OM Project Participant has rightly selected simple OM emission factor calculation as the share of low cost / must run resources of the selected grid over the three most recent years (04-05, 05-06 and 06-07) is < 50% of the gross grid generation^{/cea/}. For wind and solar projects, "Tool to calculate the emission factor for an electricity system" allows the usage of the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$. Using the above values the combined margin emission factor is valued at 0.9286296125 kgCO₂/kWh.

The calculation of EF_y is current and publicly available and published by the Central Electricity Authority on its web-site^{/cea/}. The validation team is convinced of the result of the emission coefficient calculation. It is deemed to be adequate and transparent.

The annual exportable power generation is estimated to 72.93 GWh. The estimated annual electricity is based on the PLF of 27% for 1250kW and 32% for 1500kW the same is derived from guaranteed performance as given by the suppliers of WTGs and seems to be realistic and conservative.

Altogether the project activity reduces emissions of 677,280 tCO₂e over the ten year fixed crediting period.

Nevertheless, CAR B1, CAR B3 had to be raised and was successfully closed (ref Annex: Validation Protocol – Table 3).

Additionality

In accordance with ACM0002, the additionality was demonstrated according to the version (ver 05.2) of the "Tool for demonstration and assessment of additionality".

The arguments to justify the additionality were summarized in table 4-2. This table also includes the assessment of the validation team.

Table 4-2: Additionality assessment

Step ¹⁾	Argument	Assessment
1a	<p>Define alternatives to the project activity:</p> <p>Alternative1-The proposed project activity not undertaken as a CDM project activity. This alternative is in compliance with all applicable legal and regulatory requirements and may be a part of the baseline scenario.</p> <p>Alternative 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.</p> <p>The “no project option” where in the equivalent amount of energy would have been produced by the project grid electricity system through its currently running power plants and by new capacity additions (which are mostly thermal) is the most plausible alternative as baseline option for the project. Thus, suitable grid mix (southern grid) has been selected as baseline option and therefore for calculation of baseline emissions.</p>	<p>The alternative 2 could be justified as a realistic and credible alternative to the PP. The other alternative given in the step 1a cannot be considered as realistic alternative as alternative 1 is analysed further in PDD and faces barriers as given in steps 2.</p> <p><input checked="" type="checkbox"/> Step passed <input type="checkbox"/> Step not passed <input type="checkbox"/> Not applicable</p>
1b	<p>Consistency with mandatory laws and regulations:</p> <p>All the above alternatives are in compliance with all applicable legal and regulatory requirements as follows:</p> <ul style="list-style-type: none"> The implementation of project activity is a voluntary initiative and it is not mandatory or a legal requirement. For power generation, the electricity act 2003 does not restrict or empower any authority to restrict the fuel choice, the applicable environmental regulations do not restrict the use of wind energy and there is no legal requirement on the choice of a particular technology. 	<p>All alternatives are in line with the national regulations.</p>

2a	<p>Investment analysis: Determine appropriate analysis method</p> <p>As the electricity generated from the project activity will be sold to TNEB it will generate financial benefits in terms of revenues from the sale of electricity. Thus simple cost analysis (option I) cannot be applied to the proposed CDM project activity.</p> <p>Amongst the other two options – investment comparison analysis (option II) and benchmark analysis (option III), the benchmark analysis has been adopted wherein the Internal Rate of Return (IRR) of the project activity serves as a benchmark to assess the financial attractiveness of the project activity. Option III assesses if the project's returns are sufficient for investors to make the initial investment and further bear the associated costs of successfully operating the project activity over the crediting period of the project.</p>	<p>PP has chosen option III: Benchmark analysis for determining wheather the project activity is not economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).</p>	<input checked="" type="checkbox"/> Step passed <input type="checkbox"/> Step not passed <input type="checkbox"/> Not applicable
2b	<p>Apply benchmark analysis</p> <p>An investment analysis of the project activity was conducted with the post tax project Internal Rate of Return (IRR) as the financial indicator. In accordance with the additionality tool, benchmark analysis is applied by comparing the project IRR (financial indicator) of the project activity with the required rate of return calculated based on the Weighted Average of Capital cost (WACC). The Benchmark IRR for the project activity using WACC works out to 14.01%.</p>	<p>In accordance of additionality tool while validating the application of additionality tool, Validation team has made systematic use of information to identify source and estimate the associated risk. Various elements have been checked during the additionality assessment. Validation team has checked the identified financial indicator (Project IRR), which is most suitable for the project type and decision context. In order to verify the relevant benchmark value, validation team has referred all necessary supportive data the same has been referenced in Table 4 and found OK.</p>	

2c	<p>Calculation and comparison of financial indicators</p> <p>Since the projects was installed based on the availability of funds (loan sanctions) the different parameters like equity debt ratio, repayment, interest rate, land rate, machinery cost etc varies hence investment analysis has carried out for individual groups. The IRR for the proposed project activity without CDM revenue was computed for a period of 20 years, corresponding to the lifetime of the 31 MW wind farm based on the assumptions presented in the PDD. The IRR calculations of project activity exhibit that the IRR of the project without CDM revenue for all the groups is below the required rate of return (RRR) calculated as 14.01% based on the Weighted average costs of capital (WACC) and the same has been considered as the benchmark for the project activity The project IRR for all the groups is as mentioned below.</p> <table><tr><th>Group</th><th>IRR</th></tr><tr><td>G1</td><td>10.00</td></tr><tr><td>G2</td><td>10.00</td></tr><tr><td>G3</td><td>8.27</td></tr><tr><td>G4</td><td>8.27</td></tr><tr><td>G5</td><td>8.47</td></tr></table> <p>The IRR for the project activity for all the groups is found to be lower than the benchmark without CDM revenues</p>	Group	IRR	G1	10.00	G2	10.00	G3	8.27	G4	8.27	G5	8.47	<p>PP has computed IRR for the project activity on post tax basis and compared the same with post-tax project IRR, which is the benchmark. The cost (expected return) of equity has been arrived at using the well accepted bench mark based on Weighted average costs of capital (WACC). PP has established that IRR is less than the benchmark and hence the project is additional. The argument is Convincing.</p>																																				
Group	IRR																																																	
G1	10.00																																																	
G2	10.00																																																	
G3	8.27																																																	
G4	8.27																																																	
G5	8.47																																																	
2d	<p>Sensitivity analysis</p> <p>The purpose of the sensitivity analysis is to demonstrate the sensitivity of the return on project due to uncertainty in Generation. The generation wholly depends on wind pattern and the infrastructure facility of the off-taker. From the above analysis it is apparent that there is significant risk associated with the project activity that impacts the viability of the project as highlighted through the sensitivity analysis.</p> <table><tr><th rowspan="2">Group</th><th colspan="2">Tariff</th><th colspan="2">Generation</th><th colspan="2">O&M</th></tr><tr><th>-10%</th><th>+10%</th><th>-10%</th><th>+10%</th><th>-10%</th><th>+10%</th></tr><tr><td>G1</td><td>7.64</td><td>12.31</td><td>7.64</td><td>12.31</td><td>10.34</td><td>9.66</td></tr><tr><td>G2</td><td>7.64</td><td>12.31</td><td>7.64</td><td>12.31</td><td>10.34</td><td>9.66</td></tr><tr><td>G3</td><td>6.05</td><td>10.42</td><td>6.05</td><td>10.42</td><td>8.64</td><td>7.89</td></tr><tr><td>G4</td><td>6.05</td><td>10.42</td><td>6.05</td><td>10.42</td><td>8.64</td><td>7.89</td></tr><tr><td>G5</td><td>6.24</td><td>10.62</td><td>6.24</td><td>10.62</td><td>8.82</td><td>8.12</td></tr></table> <p>From the above it is evident that all the groups having lower returns while comparing benchmark without CDM revenue.</p>	Group	Tariff		Generation		O&M		-10%	+10%	-10%	+10%	-10%	+10%	G1	7.64	12.31	7.64	12.31	10.34	9.66	G2	7.64	12.31	7.64	12.31	10.34	9.66	G3	6.05	10.42	6.05	10.42	8.64	7.89	G4	6.05	10.42	6.05	10.42	8.64	7.89	G5	6.24	10.62	6.24	10.62	8.82	8.12	<p>The project revenue is sensitive to the electricity generation Hence the sensitivity analysis has been carried out by the PP for the above variable. The calculation has been reviewed and it is concluded that the project activity has an IRR less than the benchmark value, clearly indicating that the project is financially not feasible without CDM benefits.</p> <p>The investment analysis step is thus passed.</p>
Group	Tariff		Generation		O&M																																													
	-10%	+10%	-10%	+10%	-10%	+10%																																												
G1	7.64	12.31	7.64	12.31	10.34	9.66																																												
G2	7.64	12.31	7.64	12.31	10.34	9.66																																												
G3	6.05	10.42	6.05	10.42	8.64	7.89																																												
G4	6.05	10.42	6.05	10.42	8.64	7.89																																												
G5	6.24	10.62	6.24	10.62	8.82	8.12																																												

4a	<p>Analyze other activities similar to the proposed project activity:</p> <p>The statistics pertaining to wind power in Tamilnadu is as follows as per Installed wind power capacity during 2002-2007 :2618 MW Wind power projects under CDM pipeline :2009MW Reference: 1. http://www.teda.gov.in/page/growth%20of%20wind%20mills.pdf 2. http://cdm.unfccc.int/Projects/registered.html 3. http://cdm.unfccc.int/Projects/validation.index.html</p>		
4b	<p>The growth of wind power capacity in the state over the years is given in the PDD. It is to be noted that India had signed the Kyoto Protocol in the year 2002 and subsequently there was the introduction of Electricity Act 2003. Based on the above data it is clear that there has been a wind power capacity addition of about 2618 MW in the period 2002-2007 of which 2009 MW (76% of the capacity) are CDM project activities also under validation process. Thus based on the above it can be inferred that the project activity is not a common practice and CDM revenues is the major contributor in promoting wind power.</p> <p>As discussed above the project activity is not a common practice being followed in the region. Due to the unattractive returns associated with the project activity, it is being carried out only after taking CDM revenues into consideration. The approval and registration of the proposed project activity as a CDM project would lead to additional revenue thereby improving the returns from the project activity alleviating investment and regulatory policy risk to a certain extent. The successful registration also provides an incentive for other entrepreneurs to invest in wind power projects. Thus the CDM revenue acts as a risk mitigation tool in overcoming barriers and imparting viability to the project.</p>	<p><input type="checkbox"/> Argument not justified <input type="checkbox"/> Argument not convincing <input type="checkbox"/> Argument justified but not decisive <input checked="" type="checkbox"/> Argument justified significant</p>	<p><input checked="" type="checkbox"/> Step passed <input type="checkbox"/> Step not passed <input type="checkbox"/> Not applicable</p>
Assessment of the validation team		<p><input checked="" type="checkbox"/> Project is additional <input type="checkbox"/> Project is not additional</p>	

¹⁾ acc. to Additionality Tool

The additionality of the project has been demonstrated by the "Investment Analysis" route. In that PP has chosen benchmark analysis for determining whether the project activity is not economically or financially feasible, without CDM benefits. The arguments with supporting spreadsheets^{/IRR/} proof the viability of the project. The input data and assumptions for calculation of Project IRR like (hours of operation, Generation, Tariff, energy sale revenue, CER revenue, interest on term loan, O&M expenses, insurance charges, interest on working capital, book depreciation and income tax) are verified with references provided by PP. The benchmark analysis along with sensitivity analysis (variables being the Generation, tariff and O&M)^{/IRR/}

confirms that the project activity (without CDM benefits) generates returns less than the benchmark value and hence is financially not attractive. Weighted average costs of capital (WACC) has been considered as the benchmark for the project activity. To arrive at this benchmark risk free rate from Indian Government bond rates published by the RBI for various years till the date of placement of first purchase order of the project have been analyzed. Sensex details for various years till the project start date was also evaluated to understand the market returns. The difference in this annual market return and the interest rate on Central Government Securities available from RBI has been used to arrive at the market risk premium for the project. Beta calculation for seven power generating industries has been carried out to arrive at the average beta applicable to this project activity. Along with this, RBI PLR of average 10.25% on the debt, cost of equity and applicable rate of tax have been added together to arrive at benchmark WACC of 14.01%. Since the Project IRR is chosen as the financial indicator to demonstrate the additionality; WACC is one of the appropriate benchmarks as per the Guidance on Investment Analysis EB 41, Annex 45, and version 2. The benchmark value works out 14.01%. Hence the approach by the project proponent in choosing the benchmark value is deemed to be conservative. The barrier is thus assessed as a significant barrier.

The Common practice analysis based on the actual statistics presented under steps 4a) and 4b) of the PDD clearly indicates that CDM is one of the main considerations for investing in WTG(s). This argument is assessed to be significant by the validation team. Hence it can be concluded that WTG(s) projects is not a common practice, without considering CDM benefits, at the time of the PDD preparation.

According to the PDD the impact of CDM registration of the Grace Infrastructure Pvt Ltd helps in overcoming the barriers identified as above. The financial incentive due to CDM revenues would attract more independent parties for the development of the identified wind power projects existing in the region giving a boost towards the development of the renewable projects in remote terrain and help in the reduction of anthropogenic greenhouse gas emissions.

Nevertheless, CAR B2 had to be raised and was successfully closed (ref Annex: Validation Protocol – Table 3).

Serious Consideration of CDM:

Evidence of Management Decision

The extract of resolution passed by the board of directors of Grace infrastructure Pvt Ltd on 21/06/2004 (prior to starting date^(SD)) which declares that the company intends to invest in the renewable energy sources and set up wind power projects under clean development mechanism “CDM” activity and resolves to avail benefits from CDM to mitigate the risks of uncertainties involved in Wind Power project installation was evidenced to the validation team. It was envisaged by the PP that this project would be carried out in three phases because the Board has decided it safe to go in for a phased approach to ensure that the supplier capabilities and the financial strategy could be well balanced by the staggered approach. The analysis of the same revealed that the proposed WTG project was decided for implementation with serious consideration of CDM benefits.

Chronology of events of the project activity along with CDM milestones:

Event	Date
Formation of Grace infrastructure	17/06/2004
Board Meeting on Grace CDM Project	21/06/2004
Review for Project Scheduling- Initial	28/07/2004
Initial correspondence with consultants request for proposals	11/08/2004
Project Starting Date – date of PO	11/08/2004
Construction starting date	07/09/2004
Commissioning date of first WTG	12/10/2004
Planned Date of completion of Phase I	31/03/2005
Actual Date of completion of Phase I	20/07/2005
Review for Project Scheduling – I	29/07/2005
Clarifications to consultants on capacity of project	19/08/2005
Communication to consultant still the capacity is not fixed	14/12/2005
Planned Date of completion of Phase II	31/03/2006
Actual Date of completion of Phase II	20/03/2006
Review for Project Scheduling – II	31/03/2006
Communication to consultant that the capacity is fixed	25/04/2006
Contracting Process Started with URS for PDD and CDM project structuring	20/05/2006
Preparation of PIN by the consultant	20/06/2006
Contracting With URS	01/01/2007
Planned Date of completion of Phase III	31/03/2007
Discussion With the DOEs- TUV Nord , BVQI	01/04/2007
Actual Date of completion of Phase III	08/04/2007
PDD Version 1	30/06/2007
Discussion with the DOEs, DNV, SGS and TUV Nord.	29/09/2007
Enquiry for proposals by Urs on behalf of Grace Infra structure	30/09/2007
Tentative quotes from DOEs	08/10/2007
Clarification with DOEs	17/10/2007
Application for Host Country Approval	22/10/2007
Interview for Host Country approval	21/11/2007
Proposals from TUV Nord	5/12/2007
Contract with TUV Nord	13/12/2007
Host Country Approval	17/03/2008
Initial Submission of PDD to DOE	5/2/2008
Hosting for Public comments	16/05/08 to 15/06/08

Thus the validation team verified that the correspondence and documents related to steps taken for appointment of consultant and DOE.

4.4 Crediting Period

The intended crediting period of the project is fixed 10 years. The starting date of the crediting period is date of registration of PDD in accordance with § 12 of CDM Modalities and procedures.

In the context of crediting period and start date CAR C1, CAR C2 was raised and successfully closed (ref Annex: Validation Protocol – Table 3).

4.5 Monitoring Plan

The project applies the monitoring methodology ACM0002 for Grid connected renewable electricity generation from renewable source.

This methodology stipulates that monitoring shall consist of metering the net electricity exported (to the grid) by the renewable technology. State electricity board is certifying agency for joint meter reading. Joint meter reading is certificate for electricity generated by WTGs for the month being taken by State electricity board in presence of project proponent representative. The net electricity supplied to the grid would be calculated ex-post by added values of all WTGs meter readings. The detailed procedure to calculate the net electricity generated by the 24 WTGs is explained in section B.7 of the PDD.

Calibration, periodical testing and maintenance procedures of monitoring equipment are clearly mentioned in the section B.7.2 of the PDD

Nevertheless, CAR B5 had to be raised and was successfully closed (ref Annex: Validation Protocol – Table 3).

4.6 Calculation of GHG Emissions

Methodologies for calculating emission reductions are documented. The project intends to reduce carbon dioxide (CO₂) emissions by generating electricity from a renewable energy wind project, which would be exported to the southern grid. Emissions by sources of GHGs due to the project activity within the project boundary are zero, since wind power is a GHG emission free source of energy. As per the methodology ACM0002, there are no emissions related to leakage in this project. GHG emission reduction by project activity is product of grid emission coefficient and net electricity supplied to the grid by project activity.

The calculations of the project emission as well as baseline emission are documented in section B.6.3. of PDD. For assessment of baseline emission please refer to section 4.3

Nevertheless, CAR B4 had to be raised and was successfully closed (ref Annex: Validation Protocol – Table 3).

4.7 Environmental Impacts

Social & environmental impacts of the project have been sufficiently addressed. No adverse environmental impacts as well as transboundary impacts have been envisaged from this project activity.

4.8 Comments by Local Stakeholders

Stakeholder Consultation meet was conducted with the identified stakeholders (local villagers, site in charge, the maintenance personnel and the land owners of the wind mill sites). During meeting among local stakeholders, project proponent and project operator held on 01/10/2007^{/LSC/} and stakeholders have been asked to share there views on the project activity.

A summary of the comments received is included in the PDD. All comments were positive in nature.

Nevertheless, CAR E1 had to be raised and was successfully closed (ref Annex: Validation Protocol – Table 3).

5 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

According to the modalities for the validation of CDM projects, TÜV NORD JI/CDM CP published the draft PDD on its website www.global-warming.de on 16 May 2008 and invited comments within 30 days (until 15 June 2008) by interested parties, stakeholders and UNFCCC accredited non-governmental organizations. No comment was received.

6 VALIDATION OPINION

Grace infrastructure Pvt Ltd has commissioned the TÜV NORD JI/CDM Certification Program to validate the project: *"31 MW Wind energy project in, India by Grace Infrastructure Pvt Ltd"*, with regard to the relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting. UNFCCC criteria include article 12 of the Kyoto Protocol, the modalities and procedures for CDM (Marrakech Accords), and the relevant decisions by COP/MOP and CDM Executive Board.

The purpose of this project activity is to generate electricity using renewable sources (wind) and export to respective state grid, thereby displacing the grid generated electricity.

In the course of the validation 12 Corrective Action Requests (CARs), 1 Clarification Requests (CRs) were raised and successfully closed.

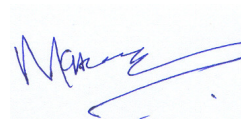
The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders and NGOs have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfillment of the stated criteria.

In detail the conclusions can be summarized as follows:

- The project is in line with all relevant host country criteria (India) and all relevant UNFCCC requirements for CDM project activity approval has been obtained from National CDM Authority as DNA of India vide the Letter of Approval (HGA) F.No.4/20/2007-CCC, dated 17/03/2008.
- The project additionality is sufficiently justified in the PDD.
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 677,280 tCO₂e is most likely to be achieved within the 10 years (fixed) crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.

Essen, 2009-07-30



Ma. Paa. Puratchikkanal

Team Leader

TÜV NORD JI/CDM Certification Program



Rainer Winter

Final approval

7 REFERENCES

Table 7-1: Documents provided by the project proponent

Reference	Document
/BEN/	<p>Work sheet for calculation of Benchmark using Weighted Average Capital Cost (WACC).</p> <ul style="list-style-type: none"> • http://www.rbi.org.in/scripts/WSSView.aspx?Id=9359) for cash reserve ratio and interest rates of Reserve Bank of India • http://www.bseindia.com/scrpssearch/scripts.aspx?myScrip=gip&flag=sp&Submit=GO • http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf • http://www.bseindia.com/histdata/hindices.asp
/CR/	Letters from respective electricity Distribution circle regarding commissioning of 24 WTGs
/HGA/	Host Government Approval from Ministry of Environment & Forests, Govt of India, 17/03/2008.
/LSC/	Proof of local stake holder consultation process (dt.01/07/2007) and relevant communication.
/DEP/	Depreciation Rate as per schedule. XIV of Companies Act. http://www.caclubindia.com/forum/message_display.asp?group_id=9689&offset=7 .
/MD/	Management decision by M/s Grace infrastructure Pvt Ltd with serious consideration of CDM benefits on 21/06/2004.
/PO/	<p>Purchase Order No.1to 10 dated 11/08/2004 issued to M/s. Suzlon Energy Ltd, Pondicherry for the supply, Installation and commissioning of 10 nos of Suzlon S6-1250kW WTGs by M/s Grace Infrastructure Pvt Ltd.</p> <p>Purchase Order No.GPL/SEL/PO 01to 10/2005-06 dated 12/09/2005 issued to M/s. Suzlon Energy Ltd,Pondicherry for the supply, Installation and commissioning of 10 nos of Suzlon S6-1250kW WTGs by M/s Grace Infrastructure Pvt Ltd.</p> <p>Purchase Order Ref :GIPL/SEL/25-28INC/06-07/L106,L139,dated 20/02/2007 issued to M/s. Suzlon Energy Ltd,Pondicherry for the supply, Installation and commissioning of 4 nos of Suzlon 1500 kW WTGs by M/s Grace Infrastructure Pvt Ltd.</p>
/PDD/	Draft PDD: "31 MW Wind Energy Project In India by Grace Infrastructure Pvt Ltd". (Hosted for public comments during 16/05/2008 to 15/06/2008).
/IP/	Investment Proof – Sanction Letters of Term Loan from State Bank of Hyderabad, HDFC, State Bank of India, Pondicherry.

Reference	Document
/SD/	Proof of starting date of the project activity- Purchase Order No.1to 10 dated 11/08/2004 issued to M/s. Suzlon Energy Ltd,Pondicherry for the supply, Installation and commissioning of 10 nos of Suzlon S6-1250kW WTGs by M/s Grace Infrastructure Pvt Ltd.
/CAP/	Technical details of WTGs - Purchase Order No.1to 10 dated 11/08/2004 issued to M/s. Suzlon Energy Ltd,Pondicherry for the supply, Installation and commissioning of 10 nos of Suzlon S6-1250kW WTGs by M/s Grace Infrastructure Pvt Ltd.
/XCS/	Baseline and Emission Reduction Calculations (Excel Sheets)
/IRR/	Financial analysis with all supporting documents
/BP/	Bankers view on the project
/SC/	Statuary clearances – NOC from TNEB along with the Commissioning Report
/OMP/	Operation & Maintenance Contract / Procedure-For starting 2 Years contract between M/s Suzlon Energy Ltd and M/s Grace Infrastructure Ltd in Purchase Order No.1 to 10 11/08/2004.
/PPA/	Power purchase agreement for all WTGS
/ORG/	Organizational chart
/CALR/	Calibration Report of Energy Meters.

Table 7-2: Background investigation and assessment documents

Reference	Document
/ACM 0002/	Consolidated methodology for grid connected electricity generation from renewable sources (Version 07, 19th May 2006)
/AT/	Tool for the demonstration and assessment of additionality
/CPM/	TÜV NORD JI / CDM CP Manual (incl. CP procedures and forms)
/GCP/	UNFCCC: Guidelines for completing CDM-SSC-PDD and CDM-SSC-NM (Version 05)
/IPCC-GP/	IPCC Good Practice Guidance & Uncertainty Management in National Greenhouse Gas Inventories, 2000

Reference	Document
/IPPC-RM/	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Reference Manual.
/KP/	Kyoto Protocol (1997)
/MA/	Decision 17/CP. 7 (Marrakesh – Accords & Annex to decision 17/CP.7)
/VVM/	IETA, PCF Validation and Verification Manual 2006 (Dec.)

Table 7-3: Websites used

Reference	Link	Organisation
/cea/	www.cea.nic.in	Central Electricity Authority
/dna-i/	www.cdmindia.nic.in	The National Clean Development Mechanism (CDM) Authority
/imef/	www.envfor.nic.in	Indian Ministry of Environment and Forest
/imp/	www.powermin.nic.in	Indian Ministry of Power
/ipcc/	www.ipcc-nggip.iges.or.jp	IPCC publications
/mnes/	www.mnes.nic.in	Ministry of New and Renewable Energy
/wpi/	www.windpowerindia.com	Wind Power India
/unfccc/	http://cdm.unfccc.int	UNFCCC

Table 7-4: List of interviewed persons

Reference	Mol ¹		Name	Organisation / Function
/IM01/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	P.Rajasekar	Senior Executive, Grace infrastructure Pvt Ltd
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	K.Selvaraj	Urs productivity Consultant
/IM02/	V	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	M.Raja Chidambaram	Urs productivity Consultant

¹⁾ Means of Interview: (Telephone, E-Mail, Visit)

ANNEX

- 1 Validation Protocol
- 2 Certificates

ANNEX: 1 VALIDATION PROTOCOL

Table 1: Mandatory Requirements for (CDM) Project Activities

Requirement	Reference	Conclusion
Parties		
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	The project is unilateral type. The post registration involvement by Annex I party will be as per provisions (decision no 57) made in 18 th EB meeting.
The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	The project is a unilateral project and has received a Letter of Approval from the Indian government ^{/HGA/} . The document contains all relevant elements defined for such documents

Requirement	Reference	Conclusion
		(see EB 16 annex 6).
The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK
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
Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
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
Additionality		
Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	Refer B.3.1. of Table 2. CAR B2. OK

Requirement	Reference	Conclusion
CDM project activity.		
Forecast emission reductions and environmental impacts		
The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	Ref CAR B1, CAR B3 & CAR B4) OK
Environmental impacts (only for large scale projects)		
Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
Stakeholder involvement		
Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	Ref CAR E1 OK
Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies	CDM Modalities and Procedures	Ref CAR B1, CAR

Requirement	Reference	Conclusion
and circumstances.	§45c,d	B3 & CAR B4) OK
The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK.
Requirements for small-scale projects only		
The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakech 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	NA
The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and use the simplified baseline and monitoring methodology for that project category.	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22e	NA
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	NA

Table 2: Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
A.1.1. Are the project's spatial boundaries (geographical) clearly defined?	/PDD/ (A.4.)	DR	The Unique identification of the project activity for all the WTGs is clearly defined in the PDD. The format for latitude and longitude is not in line, the same should be represented in xx° xx' xx" format.	CAR-A1	OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/PDD/ (B.3.) /CR/ /SC/	DR	The Project system boundaries consist of all WTGs, Transformers, substations and southern grid.	OK	
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the	/PDD/ (A.3.)	DR	The project is a unilateral in kind and India is a host party.		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
project?	/HGA/		As per the Letter of Approval from the Indian government ^{/HGA/} the only project participant is M/s. Grace Infrastructure Pvt Ltd	OK	
A.2.2. Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/PDD/ (A.3.) /HGA/ /IM01/	DR, I	Host country letter of approval dated 17/03/2008 is issued to the private project participant – M/s Grace Infrastructure Pvt Ltd	OK	
A.2.3. Do all participating Parties fulfil the participation requirements as follows: – Ratification of the Kyoto Protocol – Voluntary participation – Designated a National Authority	/PDD/ / HGA / /unfccc /	DR	India is a Party to the Kyoto Protocol and has ratified the Protocol on 26 Aug 2002.	OK	
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/PDD/ (A.4.5, Annex 2) /IM01/	DR, I	The Project does not involve any public funding from Annex 1 country.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect current good practices?	/PDD/ (A.4.3.) /CON/ /PPA/ /IM 01/	DR, I	<p>Yes. The company has installed WTGs for generating electricity using the wind energy available. The project activity has involved commissioning of WTGs which is the 1250 kW and 1500kW capacity supplied by M/s Suzlon Energy Ltd.</p> <ul style="list-style-type: none"> In Section A.4.3 of PDD should also include a description of how environmentally safe and sound technology and Know how is being applied by the project activity. In section A.4.3 the average plant load factor of 1250 kW capacity of WTG is mentioned as 27% whereas in emission calculation of excel sheet 27.46 % has been mentioned as CUF. Datas and units should be consistent. Moreover the CUF of 1500 kW WTG is not mentioned in the PDD. In this regard revision is requested in the estimation of generation and emission reductions. 	CAR A3	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			In Section A.4.3 generated power is stepped up to 33 KVA from 400 volts and the HT transmissions are connected to 110KVA substations. Clarify in both cases; the units are volts or the capacities of the transformers.	CR-A1	OK
A.3.2. Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/PDD/ (A.4.2.) /IM 01/	DR	The Wind Turbine Generators (WTGs) used in the project are on par with the prevailing technology across the world. All the requisite number of WTGs are supplied by renowned manufacturer, M/S Suzlon Energy Ltd.	OK	
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/PDD/ (Annex -4) /IM 01/ /O&M/	DR, I	Grace infrastructure Limited had an O&M agreement with Suzlon Energy Ltd The personnel responsible for maintenance are academically qualified and have adequate knowledge of these procedures also well trained and follow reproducible routines. The competency of personnel performing work is enhanced by appropriate training.	OK	
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/HGA/	DR	Yes, HGA confirms that the project assists it in achieving sustainable development.	OK	
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	PDD (A-2)	DR	The project creates Technological, economic benefits in addition to environmental or social benefits & GHG emission reductions. The project	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			activity will provide direct as well as indirect job opportunities to the local population for various activities involved in construction, commissioning, operation and maintenance		
Small scale project activity <i>Is it assessed whether the project qualifies as small-scale CDM project activity</i>					
A.4.3. 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?	PDD (A-2)		Not applicable	OK	
A.4.4. Is the small scale project activity not a debundled component of a larger project activity?	PDD (A.4.5.)		Not applicable	OK	
A.5. General Topics					
A.5.1. Has the PDD been duly filled?	PDD	DR	<p>The PDD has been duly filled, nevertheless there were some inconsistencies</p> <p>In Section A.2 of PDD states that the expected electricity generation as 72.93 GWh which contradicts with the value used in the spread sheet and clarification is requested. In this context consistency of electricity generation and units is missing.</p> <p>In section A.4.4 of PDD years mentioned in the table is not correct. It should be mentioned as a</p>	<p>CAR A2</p> <p>CAR A4</p>	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			calendar year as per the PDD guidelines. And also in section A.4.4 and the B.6.4 the value in the text indicating the emission reductions in the ten years is not inline with the value given in the table below. Furthermore the total estimated emission reduction needs to be rounded down.		
A.5.2. Has all necessary information been made available to the validator?	Documents provided by the project participants. /IM 01/	I	Yes, all necessary information has been made available to the DOE.	OK	
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.1.1. Does the project apply an approved methodology and the correct version thereof?	/PDD/ (B.1) /unfccc /	DR	The project activity applies an approved methodology ACM 0002 version 7 which is valid from 30 November 2007.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/PDD/ (B.2.) /ACM0 002/	DR	The project activity satisfies all the applicability criteria mentioned in the approved methodology	OK	
B.2. Baseline Scenario Determination <i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
B.2.1. What is the baseline scenario?	/PDD/ (B.4.)	DR	<p>The baseline scenario for the project activity is "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, as reflected in the combined margin (CM) calculations" as it is not a modification or retrofit of an existing electricity generation facility.</p> <p>In section B.4 all data used to determine the baseline emissions (variables, parameters, data sources etc.) is not neither presented in a tabular form CDM –PDD guidelines) nor referred to other section of the PDD.</p>	CAR-B1	OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most	/PDD/ (B.4.)	DR	<p>The chosen alternatives are</p> <ol style="list-style-type: none"> 1. The proposed project activity not undertaken as a CDM project activity. and; 		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
likely one?			2. Continuation of the current situation– grid electricity Refer B.2.1,CAR B1	CAR B1	OK
B.2.3. Has the baseline scenario been determined according to the methodology?	/PDD/ (B.4.)	DR	In the absence of the project activity, equivalent amount of power would have been drawn from the grid which is the baseline scenario. Calculations are based on data from the Central Electricity Authority (CEA), an autonomous body under the Ministry of Power, Government of India. The CEA has published on its website (http://www.cea.org). The value of emission coefficients for each regional grid arrived at by considering conservative values. Yes, However refer B.2.1,CAR B1	CAR B1	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/PDD/ (B.4.)	DR	In order to arrive at the baseline scenario, the regional grid has been considered, which is conservative and in line with the EB directives in this regard. Refer B.2.1,CAR B1	CAR B1	OK
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/PDD/ (B.5.)	DR	Yes, relevant national / state level circumstances relevant to the baseline are summarised in PDD section B.5. In spite of a national policy to focus more on renewable energy projects, the percentage of implemented projects in renewable energy generation both at the State and at Central levels, is low. Greater interest is being evinced in renewable energy projects as a result of its eligibility for	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			registration under CDM.		
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/PDD/ (B.4.)	DR	Yes, the project has used the values calculated and published by CEA and the corresponding URL reference has been provided. CEA has cited sources for all information used by it to arrive at the emission factor of the grid. Refer B.2.1,CAR B1	CAR B1	OK
B.2.7. Have the major risks to the baseline been identified?	/PDD/ (B.4.)	DR	The baseline factor is calculated <i>ex-ante</i> and no retrospective risks are foreseen which could impact the value of the calculated data. Refer B.2.1,CAR B1	CAR B1	OK
B.3. Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
B.3.1. Is the project additionality assessed according to the methodology?	/PDD/ (B.5.)	DR	The project additionality was assessed according to the methodology, since it is a large scale project proponent has used "Tool for the demonstration and assessment of additionality" to demonstrate additionality. However there were some gaps mentioned below in fulfilling the requirements in the Hosted PDD 1. Additionality Tool referred in section B.5 of PDD is version 4 whereas the latest available is version 5 accordingly relevant section of PDD need to be revised.	CAR B2	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>2. The justification for chosen credible alternative to the project activity and its consistency with mandatory laws and regulations is missing`. Its needs to be explained with proper justification.</p> <p>3. The benchmark considered is not a suitable financial Indicator for the project activity (cp EB 40 report). Accordingly the relevant sections (Step 2c) of the PDD need to be revised.</p> <p>4. As per "Guidance on the Assessment of Investment Analysis" (EB 39 Annex 35) only variables, including the initial investment cost, Generation (PLF) that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. Moreover the sensitivity analysis should at least cover a range of +10% and – 10%.</p> <p>5. The arguments in step 4 need to be substantiated with correct reference. Moreover the compiled data regarding to the projects gone for CDM need to be furnished.</p> <p>6. The power tariff assumed is at variance with ERC orders. This may be substantiated with documentary evidence.</p> <p>7. Maintenance cost is more than what TNERC has recommended. It works out to 1.8% as against 1.1% recommended by TNERC.</p>		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>8. B.5: Common practice analysis, sub step 4.b: 40% of total installed capacity in Tamil Nadu is from non CDM projects. It should be better explained why these 40% could have been installed without CDM. What makes the difference between these 40 % and the 60% of CDM based installed capacity? This is more or less in balance but not a clear indication for any common practice.</p> <p>9. There is no statement regarding the serious consideration of CDM benefits while planning the project. This need to be incorporated in the PDD and supported by appropriate Board Resolution Moreover the start mentioned as 12/10/2004, justify the delay in approaching the DOE has to be substantiated with chronology of events and project implementation steps along with CDM process steps. Also Project starting date and the reason for it, Construction starting date and Commissioning date of the first WTG has to be clearly defined. Furthermore explain what is meant by Phase I, II and III</p> <p>10. Appendix 3: Why different values for groups G1, G2, G3 and G4 have been applied? Explain why the financial parameters are different for the four groups as all wind mills have the same capacity and are cited in the same region.</p> <p>11. As mentioned in IRR spread sheet give explanation for the following</p>		

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> a. Give an explanation for the different interest rates (8-12.75%). b. Why can it be assumed that the tariff for electricity is fixed over the crediting period c. In parameter summary sheet Cell D22: On which assumption is the "availability" of 97% based on? And Cell E22: On which assumption is the "import" of 1 % based on? d. In G1 to G5 sheets Electricity generation per annum: What is the reason for the decrease of electricity generation of 1% after year 10 until the end of the crediting period? And O&M: How is the 5% increase of O&M costs justified? 		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/PDD/ (B.5.)	DR	Refer the comment on B.2.6 and B.3.1	CAR-B1 CAR-B2	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/PDD/ (B.5.)	DR	Refer the comment on B.2.6 and B.3.1	CAR-B1 CAR-B2	OK
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/PDD/ (C.1.1.) /SD/ /MD/ /IM 01/	DR, I	The project starts date 2004/08/11 (Purchase Order No.1 dated 11/08/2004 issued to M/s. Suzlon Energy Ltd, Pondicherry for the supply, Installation and commissioning of Suzlon S6-1250kW WTG by M/s Grace Infrastructure Pvt Ltd.) which was earlier to the date of the validation.		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Refer the comment on B.3.1	CAR B2	
B.4. Calculation of GHG Emission Reductions – Project emissions <i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.6.)	DR	As per the provision given in the methodology no project emissions is to be accounted.	OK	
B.4.2. Have conservative assumptions been used when calculating the project emissions	/PDD/ (B.6.)	DR	Refer the comment in B.4.1	OK	
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/PDD/ (B.6.)	DR	Refer the comment in B.4.1	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.5. Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.6.)	DR	<p>Yes, the calculations has been done as per the methodology is complete and transparent manner.</p> <p>The source of data for the parameters mentioned in section B.6.2. of PDD states that the same is calculated based on ACM0002, As per the methodology the emission factor has to be calculated based on 'Tool to calculate the emission factor for an electricity system' in this context clarification is requested.</p> <p>Moreover the values taken for calculating the OM and BM values in section B.6.1 of PDD are not exactly matching for the respective years in the CEA database. The values need to be described more accurately and the same should be applied in the emission reduction calculations</p> <p>In section B.6.3 the transparent ex-ante calculation of baseline emission (or, where applicable, direct calculation of emission reduction expected during</p>	<p>CAR-B3</p> <p>CAR-B4</p>	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			the crediting period applying all relevant equations provided in the approved methodology is missing		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions	/PDD/ (B.6., Annex- 3) /IM 02/ /IM 03/	DR, I	Refer CAR B1 and B3 ,B4	CAR-B1 CAR-B3 CAR-B4	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/PDD/ B.6.)	DR	Refer CAR B1 and B3 B.5.1	CAR-B1 CAR-B3 CAR-B4	OK
B.6. Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.6.) /AMS I C/	DR	As per the provision given in the methodology no leakage emission is to be accounted.	OK	
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/PDD/ (B.6.) /AMS I C/	DR	Refer the comment on section B.6.1	OK	
B.6.3. Are uncertainties in the leakage emission estimates properly	/PDD/ (B.6.)	DR	Refer the comment on section B.6.1	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
addressed?	/AMS I C/				
B.7. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/PDD/ (B.6.)	DR	Emission reductions caused as a result of the project activity are real, measurable and do contribute to mitigation of climate change. However, the accuracy and acceptability of the calculations are to be demonstrated as referred in B.5.1.	CAR-B3 CAR-B4	OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/PDD/ (B.7.)	DR	Yes, the monitoring plan has been documented according to the methodology in a complete and transparent manner in PDD.	OK	
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/PDD/ (B.7., Annex -4)	DR, I	<ul style="list-style-type: none"> The storage period of data monitored and required for verification and issuance is not mentioned in section B.7. of PDD (Cp CDM-PDD guidelines). B.3 and monitoring plan: Please make clear if all WTGs are connected to the same substation, as WTGs from two different Cities are involved (Kanyakumari and Tamilnadu). Make this transparent in the schematic diagram. Please 	CAR-B5	OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			include the position of the meter(s).		
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/PDD/ (B.7.)	DR	No project emission applies for WTG projects. Hence no monitoring is required for project emissions.	OK	
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/PDD/ (B.7.)	DR	Refer the comment in B.9.1	OK	
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/PDD/ (B.7.)	DR	Refer the comment in B.9.1	OK	
B.9.4. Is the measurement equipment described and deemed appropriate?	/PDD/ (B.7.)	DR	Refer the comment in B.9.1	OK	
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/PDD/ (B.7.)	DR	Refer the comment in B.9.1	OK	
B.9.6. Is the measurement interval	/PDD/	DR	Refer the comment in B.9.1	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
identified and deemed appropriate?	(B.7.)				
B.9.7. Is the registration, monitoring, measurement and reporting procedure defined?	/PDD/ /IM01/	DR, I	Refer the comment in B.9.1	OK	
B.9.8. Are procedures identified for maintenance of monitoring equipment and installations? Are the calibration intervals being observed?	/PDD/ /IM01/	DR, I	Refer the comment in B.9.1	OK	
B.9.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/PDD/ /IM01/	DR, I	Refer the comment in B.9.1	OK	
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/PDD/ (B.7.)	DR	Monitoring plan in section B.7.1 of PDD provides all necessary information related to the collection and archiving of all relevant data. Also Refer the comment in section B.8.2	CAR-B5	OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/PDD/ (B.7.)	DR	The choice of parameters are reasonable and conservative. The only GHG is CO2.	OK	
B.10.3. Is the measurement method clearly stated for each baseline indicator to	/PDD/ (B.7.)	DR	Yes, the measurement method clearly stated for each baseline indicator to be monitored and also is	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
be monitored and also deemed appropriate?			deemed appropriate.		
B.10.4. Is the measurement equipment described and deemed appropriate?	/PDD/ (B.7.)	DR	The electricity being generated is monitored by using an electronic Trivector Export Import meter of 0.05% accuracy which is installed and owned by TNEB	OK	
B.10.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/PDD/ (B.7.)	DR	Yes, the measurement accuracy is addressed and is appropriate and procedures are in place to deal with erroneous measurements.	OK	
B.10.6. Is the measurement interval for baseline data identified and deemed appropriate?	/PDD/ (B.7.)	DR	The exported electricity is measured and recorded every month as joint meter readings and is duly signed by the representatives of power producing company and the power purchasing company (TNEB)	OK	
B.10.7. Is the registration, monitoring, measurement and reporting procedure defined?	/PDD/ (B.7.)	DR	Yes, the registration and monitoring procedures are defined.	OK	
B.10.8. Are procedures identified for maintenance of monitoring equipment and installations? Are the calibration intervals being observed?	/PDD/ (B.7.)	DR	Yes, the procedures for maintenance and installations of monitoring equipment are defined in section B.7.1 and Annex 4 of the PDD.	OK	
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/PDD/ (B.7.) /O&M/	DR	The operation and maintenance contract in between Grace Infrastructure Ltd and Suzlon clearly defines the day-to-day record generated and their handling. Also refer Section B.7.1 and Annex 4 of the PDD.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/PDD/ (B.7.)	DR	Energy generating equipment is not transferred from another activity or the existing equipment is not transferred to another activity hence leakage is not considered.	OK	
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/PDD/ (B.7.)	DR	Refer the comment in section B.11.1	OK	
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/PDD/ (B.7.)	DR	Refer the comment in section B.11.1	OK	
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1. Is the monitoring of sustainable development indicators/ environmental impacts warranted	/PDD/ (A.2. /E.1.)	-	Monitoring of the sustainable development indicators is not warranted by legislation in the host country. Environmental impacts are to be monitored	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
by legislation in the host country?			only in case the project has a significant adverse impact. No such significant adverse impacts have been identified.		
B.12.2. Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/PDD/ (B.7.)	-	Refer the comment in section B.12.1	OK	
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/PDD/ (B.7.) /HCA/	-	Host Country Approval is submitted to DOE.	OK	
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/PDD/ /ORG/ /IM 01/	DR, I	The project team and planning is adequately described in section B.7.1 and Annex 4 of the PDD.	OK	
B.13.2. Are procedures identified for training of monitoring personnel?	/PDD/ /ORG/ /IM 01/	DR, I	The company follows the systematic training plan and accordingly the monitoring personnel are trained.	OK	
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/IM 01/	I	Yes, emergency procedure is in place.	OK	
B.13.4. Are procedures identified for review of reported results/data?	/IM 01/	I	Yes, the procedures for review of reported results are identified.	OK	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/IM 01/	I	Yes, the procedures are identified for corrective actions for accurate monitoring and reporting.	OK	
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/PDD/ (C.1.) /SD/	DR	The start date mentioned in the PDD section C.1.1 as 12/10/2004 and the commissioning date of first WTG as mentioned in Appendix 2 is same as per Glossary of CDM terms starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins. In this regard start date should be revised.	CAR C1	
C.2. Is the start of the crediting period clearly defined and reasonable?	/PDD/ (C.2.)	DR	Crediting period start date stated as 01/09/2008 and the validation process in the intermediate stage. Hence the PDD needs appropriate modification in the relevant sections.	CAR C2	
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.	Has an analysis of the environmental impacts of the project activity been sufficiently described?	/PDD/ (D.1.)	DR	As per the Environmental Impact Assessment Notification S.O. 60 (E), dated 27/01/1994, Ministry of Environment and Forests (MoEF), Govt. of India. Environmental Impact Assessment (EIA) need not to be done for this kind of project activity.	OK	
D.2.	Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/PDD/ (D.1.)	DR	No, host party requirements for EIA.	OK	
D.3.	Will the project create any adverse environmental effects?	/PDD/ (D.1.)	DR	No, the project does not create any adverse environmental impacts.	OK	
D.4.	Are transboundary environmental impacts considered in the analysis?	/PDD/ (D.1.)	DR	No Trans-boundary impact has been envisaged from this project activity.	OK	
D.5.	Have identified environmental impacts been addressed in the project design?	/PDD/ (D.2.)	DR	No adverse environmental impacts have been envisaged.	OK	
D.6.	Does the project comply with environmental legislation in the host country?	/PDD/ (D.1.)	DR	Yes, the project complies with environmental legislation.	OK	
For Small-scale projects						

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.7. Does host country legislation require an analysis of the environmental impacts of the project activity?			No, the host country legislation does not require an analysis	OK	
D.8. Does the project comply with environmental legislation in the host country?			Refer the comment on section D.5	OK	
D.9. Will the project create any adverse environmental effects?			Refer the comment on section D.5	OK	
D.10. Have environmental impacts been identified and addressed in the PDD?			Refer the comment on section D.5	OK	
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1. Have relevant stakeholders been consulted?	/PDD/ (E.1.)	DR	Yes, relevant stakeholder has been consulted	OK	
E.2. Have appropriate media been used to invite comments by local stakeholders?	/PDD/ (E.1.) /LSC/	DR V, I	The process of invitation to the local stakeholders and the explanation to the stake holder to understand the project activity taking into account confidentiality provisions of the CDM modalities and procedures is missing in section E.1 of PDD. (Cp CDM-PDD guidelines)	CAR-E1	OK
E.3. If a stakeholder consultation			Not required for the project activity.	OK	

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?					
E.4.	Is a summary of the stakeholder comments received provided?	/PDD/ (E.2.) /LSC/	DR	Refer the comment in section E.2	CAR-E1	OK
E.5.	Has due account been taken of any stakeholder comments received?	/PDD/ (E.3.), /LSC/	DR	Refer the comment in section E.2	CAR-E1	OK

Table 3: Resolution of Corrective Action and Clarification Requests: 31 MW Wind energy project in India by Grace Infrastructure Pvt.Ltd

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR A1 The format for latitude and longitude is not in line, the same should be represented in xx° xx' xx" format.	A.1.1	This has been changed in the revised PDD.	The revised PDD is modified accordingly. CAR A1 is closed
CAR A2 In Section A.2 of PDD states that the expected electricity generation as 70 GWh which contradicts with the value used in the spread sheet and clarification is requested. In this context consistency of electricity generation and units is missing.	A.3.1	The changes have been incorporated in the IRR sheet and revised PDD.	The estimated electricity generation is based on the CUF which is assured by the suppliers of WTG. The estimated annual generation is considered as 72.93GWh in the revised PDD accordingly the value of the emission reduction has changed in the IRR calculation sheets is found to be OK. CAR A2 is closed
CAR A3 <ul style="list-style-type: none"> In Section A.4.3 of PDD should also include a description of how environmentally safe and sound technology and Know how is being applied by the project activity. 	A.3.1	Necessary modifications have been made in section A.4.2 of corrected PDD.	The technology used in the project is a clean technology since there are no GHG emissions associated with the electricity generation. The revised PDD is modified accordingly

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> In section A.4.3 the average plant load factor of 1250 kW capacity of WTG is mentioned as 27% whereas in emission calculation of excel sheet 27.46 % has been mentioned as CUF. Datas and units should be consistent. Moreover the CUF of 1500 kW WTG is not mentioned in the PDD. In this regard revision is requested in the estimation of generation and emission reductions. 		<p>The CUF for 1250kW and 1500kW of WTG has taken as 27% and 32% respectively as per the suppliers estimates. The proof for the same has been provided to the DOE during validation. The estimated generation is corrected and the same has been applied to all the relevant sections and also the financial spreadsheets.</p>	<p>The documentary evidence from the suppliers states that the CUF for 1250kW and 1500kW of WTG as 27% and 32% respectively. The same has been addressed in the revised PDD, all relevant sections and financial calculation sheets.</p> <p>CAR A3 is closed</p>
<p>CAR A4</p> <ul style="list-style-type: none"> In section A.4.4 years mentioned in the table is not inline with the PDD guidelines accordingly relevant sections of PDD needs to be revised. And also in section A.4.4 and the B.6.4 the value in the text indicating the emission reductions in the ten years is not inline with the value given in the table below. Furthermore the total estimated emission reduction needs to be rounded down. 	A.5.1	<p>It has been changed as per the CDM-SSC-PDD guidelines in section A.4.4 of corrected PDD. As per the revised calculation the emission reduction values has been changed in the revised PDD.</p>	<p>The table provided in section A.4.4 is in line with the PDD guidelines. The emission reductions has been rounded down to 67728 tCO₂ and it is consistent with all the sections and excel sheets provided by the Project proponent. The same has been verified and found OK</p> <p>CAR A4 is closed</p>
<p>CAR B1</p> <p>In section B.4 all data used to determine the baseline emissions (variables, parameters,</p>	B.2.1 to B.2.7	<p>The necessary changes have been incorporated in the revised PDD.</p>	<p>The references used to determine the baseline emissions in the section</p>

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>data sources etc.) is not neither presented in a tabular form (CDM –PDD guidelines) nor referred to other section of the PDD.</p> <p>Moreover emission factors have to be taken from recent version of CEA, i.e. version 4, September 2008</p>		<p>The emission factors have been updated as per latest CEA data version 4, September 2008 in the revised PDD.</p>	<p>B.4 is given in the revised PDD.</p> <p>The latest version of CEA is updated .</p> <p>CAR B1 is closed</p>
<p>CAR B2(related to additionality)</p> <p>1. Additionality Tool referred in section B.5 of PDD is version 4 relevant section of PDD need to be revised based on latest available is version</p> <p>2. The justification for chosen credible alternative to the project activity and its consistency with mandatory laws and regulations is missing. Its needs to be explained with proper justification.</p>	B.3.1	<p>The latest version of Additionality tool is adopted for accessing the additionality of the project activity.</p> <p>The arguments under this steps is modified and proper justification has been given in the revised PDD.</p>	<p>The latest tool is used for accessing additionality.</p> <p>The revised PDD includes the justification for the alternative to the project activity and the alternative of continuation of current situation could be justified as a realistic and credible alternative to the PP.</p>

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
3. The benchmark considered is not a suitable financial Indicator for the project activity (cp EB 40 report). Accordingly the relevant sections (Step 2c) of the PDD need to be revised.		The same has been removed in all the relevant sections of the revised PDD. The Weighted average costs of capital (WACC) has been considered as the benchmark for the project activity. The benchmark arrived for the project activity is 14.01%	In order to verify the relevant benchmark value of WACC, validation team has referred all necessary supportive data and found OK. Project proponents have demonstrated through the investment analysis that the financial returns of the project activity are below the requisite benchmark 14.01% is not worthwhile by taking all the risks associated with the project activity. This can be justified as the suitable financial indicator of the project activity also inline with as per the Guidance on Investment Analysis EB 41, Annex 45, and version 2.
4. As per "Guidance on the Assessment of Investment Analysis" (EB 39 Annex 35) only variables, including the initial investment cost, Generation (PLF) that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation. Moreover the sensitivity analysis should at least cover a range of +10% and		The sensitivity analysis has been revised accordingly.	The PP has chosen the variable of ± 10 of total generation of the WTGs. This is the reasonable parameter to justify the financial returns from the project activity under the critical circumstances.

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>–10%.</p> <p>5. The arguments in step 4 need to be substantiated with correct reference. Moreover the compiled data regarding to the projects gone for CDM need to be furnished.</p> <p>6. The power tariff assumed is at variance with Electricity Regulatory commission orders. This may be substantiated with documentary evidence.</p> <p>7. Maintenance cost is more than what TNERC has recommended. It works out to 1.8% as against 1.1% recommended by TNERC.</p> <p>8. B.5: Common practice analysis, sub step 4.b: 40% of total installed capacity in Tamil Nadu is from non CDM projects. It should be better explained why these 40% could have been installed without CDM. What makes the difference between these 40 % and the 60% of CDM based installed</p>		<p>The argument under step 4 has been changed with suitable reference. The necessary supporting documents for projects under CDM pipeline would be submitted to the DOE.</p> <p>The power tariff assumed as per the PPA executed with state electricity board. The proof for the same would be submitted to the DOE.</p> <p>O & M expenses have been considered as per agreement with supplier.</p> <p>Current projects (updated based on the latest data available on the UNFCCC website) are also included in this analysis.</p>	<p>The argument under section 4 is elaborated with reference. The supporting documents provided by the PP has verified and found to be OK.</p> <p>As per PPA the power tariff assumed as Rs 2.70/KWh of generation, the same has been found in financial calculation sheets.</p> <p>The same has been verified with the documents provided by the PP and found to be OK.</p> <p>Now 76% of the projects are CDM projects which clearly indicate the project activity is not a common practice without the CDM revenue.</p>

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>capacity? This is more or less in balance but not a clear indication for any common practice.</p> <p>9. There is no statement regarding the serious consideration of CDM benefits while planning the project. This need to be incorporated in the PDD and supported by appropriate Board Resolution Moreover the start mentioned as 12/10/2004, justify the delay in approaching the DOE has to be substantiated with chronology of events and project implementation steps along with CDM process steps. Also Project starting date and the reason for it, Construction starting date and Commissioning date of the first WTG has to be clearly defined. Furthermore explain what is meant by Phase I, II and III</p>		<p>The detailed chronological order of events explaining the important timelines is provided in the revised PDD.</p>	<p>The project implementation steps along with CDM milestones has been verified with the documents provided by the project participants also they have already participated in a bundled CDM Project activity (UNFCCC Ref.No:1049) and the same was hosted for public comments during 30 Dec 05 - 29 Jan 06 and the same was registered only on 4th June 2007.It was evidenced that CDM benefits has been considered prior to the implementation of the project activity and they are planned to complete the project activity in three phases. During the board meeting it was envisaged that this project would be carried out in three phases. Because the board has decided safe to go in for a phased approach to ensure that the supplier capabilities and the financial strategy could be well balanced by the staggered approach.</p>

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>10. Appendix 3: Why different values for groups G1, G2, G3 and G4 have been applied? Explain why the financial parameters are different for the four groups as all wind mills have the same capacity and are cited in the same region.</p> <p>11. As mentioned in IRR spread sheet give explanation for the following</p> <ol style="list-style-type: none"> Give an explanation for the different interest rates (8-12.75%). Why can it be assumed that the tariff for electricity is fixed over the crediting period In parameter summary sheet Cell D22: On which assumption is the "availability" of 97% based on? And Cell E22: On which assumption is the "import" of 1 % based on? In G1 to G5 sheets Electricity 		<p>The proof regarding the phased and groups has been provided.</p> <ul style="list-style-type: none"> Interest is based on loan sanction letters Tarif is based on PPA Based on supplier agreement and import of 1% is conservative. 1% derating after 10 year based on 	<p>The review documents of the all phases has been verified and found OK.</p> <p>The project was planned in 3 phases as decided in the Board meeting on 21 Jun 2004. Initially, the arrangement was made with the manufacturer that the machines will be bought in sets of ten, with the price validity only for each set. Subsequently the machines were bought in groups of five to enable a better funding strategy and a more convenient payment schedule.</p> <p>a. Applications were made separately to more than one bank as part of the funding strategy for different phases of the project for better fund management. The same has been verified with the loan sanction letters given by the different banks to the project promoters. The applied value is actual and found OK.</p> <p>b. Generally, the tariff in the Power</p>

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>generation per annum: What is the reason for the decrease of electricity generation of 1% after year 10 until the end of the crediting period? And O&M: How is the 5% increase of O&M costs justified?</p>		<p>current practice in the state. And the O&M escalation based on purchase agreement.</p>	<p>Purchase Agreement does not change for the lifetime of the agreement. However, the PP has done the sensitivity analysis on the tariff changes for proving the project is additional.</p> <p>c. The estimated generation calculated based on the machine availability 97% which is given by the suppliers of the WTG. The same has been verified in the purchase order and applied value found OK.</p> <p>Supplier of WTG statement specifies a maximum of 3%. A conservative figure of 1% has been taken by the PP because if they consider the maximum the electricity generation further reduces and which will under estimate the IRR hence the same has been found OK.</p> <p>d. This derating after 10 years of machine use is an accepted practice as confirmed by TNERC guideline order # 3 dated 15 May 2006¹.</p> <p>This values is based on the contract</p>

¹ (Ref: <http://tnerc.tn.nic.in/orders/ncses%20order%20-approved%20order%20host%20copy.pdf>)

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
			between the WTG suppliers and project promoters. as per the agreement O&M cost for the first two year after commissioning date of the WTG is free of cost and third year onwards cost would be 5.00 Rs/million (forG1,G2,G3 WTGs) and 6.00 Rs/million(for G4 WTGs)of the capital cost with 5% escalation in every year. The applied value has been verified with the document provided by the PP and found OK. CAR B2 is closed
CAR B3 The source of data for the parameters mentioned in section B.6.2. of PDD states that the same is calculated based on ACM0002, As per the methodology the emission factor has to be calculated based on 'Tool to calculate the emission factor for an electricity system' in this context clarification is requested. Moreover the values taken for calculating the OM and BM values in section B.6.1 of PDD are not exactly matching for the respective years in the CEA database. The values need to be described more accurately and the same	B.5.1 to B.5.3 B.7.1	The necessary changes have been made in the revised PDD.	The emission factor have been calculated as per 'Tool to calculate the emission factor for an electricity sysytem in the revised PDD. The latest version of the CEA CO ₂ Baseline database is incorporated in the revised PDD and values used in all relevant section have been changed accordingly. CAR B3 is closed

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
should be applied in the emission reduction calculations.			
CAR B4 In section B.6.3 the transparent ex-ante calculation of baseline emission (or, where applicable, direct calculation of emission reduction expected during the crediting period applying all relevant equations provided in the approved methodology is missing.	B.5.1 to B.5.3 B.7.1	The emission reduction calculation equations and necessary changes have been incorporated in the revised PDD.	The emission reduction calculations included in the revised PDD and it found to be inline with the applied methodology. CAR B4 is closed
CAR B5 <ul style="list-style-type: none"> The storage period of data monitored and required for verification and issuance is not mentioned in section B.7. of PDD (Cp CDM-PDD guidelines). B.3 and monitoring plan: Please make clear if all WTGs are connected to the same substation, as WTGs from two different Cities are involved (Kanyakumari and Tamilnadu). Make this transparent in the schematic diagram. Please include the position of the meter(s). 	B.8.2	The same has been addressed in the revised PDD. The same has been addressed in the revised PDD.	The storage period of required will be kept upto 2 years after crediting period addressed in the revised PDD The schematic diagram is modified. Each WTG is connected with a separate HTSC meter. These WTGs are connected to the Southern Grid of India through four (4) substations. And the same is verified during site visit. CAR B5 is closed
CAR C1 The start date mentioned in the PDD section C.1.1 as 12/10/2004 and the commissioning	C.1	The start date has been modified as 11.08.2004 as per the purchase order of the first WTG.	The start date of the project activity is modified accordingly and found to be OK.

Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
date of first WTG as mentioned in Appendix 2 is same as per Glossary of CDM terms starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins. In this regard start date should be revised.			CAR C1 is closed
CAR C2 Crediting period start date stated as 01/09/2008 and the validation process in the intermediate stage. Hence the PDD needs appropriate modification in the relevant sections.	C.2	The changes have been incorporated in the PDD	The revised PDD has been changed accordingly and the revised crediting start date is 01/05/2009. CAR C2 is closed
CAR E1 The process of invitation to the local stakeholders and the explanation to the stakeholder to understand the project activity taking into account confidentiality provisions of the CDM modalities and procedures is missing in section E.1 of PDD. (Cp CDM-PDD guidelines)	E.2	The process of local stakeholders consultation and outcome of the meeting is described in the section E.1 of the revised PDD	The revised PDD now includes the concerns of some local stakeholders meeting on 11/10/2007 and no negative comments have been received. CAR E1 is closed
CR A1 In Section A.4.3 generated power is stepped up to 33 KVA from 400 volts and the HT	A.3.1	The units have been changed in the PDD	OK CR A1 is closed



Draft report clarification requests and corrective action requests by validation team	Ref. To checklist question in table 2	Summary of project owner response	Validation team conclusion
transmissions are connected to 110KVA substations. Clarify in both cases; the units are volts or the capacities of the transformers.			
Additional remarks / minor or editorial mistakes			

Table 4: Validation Table for Assessment of Financial Parameters

Parameter	Value applied	Unit	Source Information of (please indicate document and page)	Reference	DOE ASSESSMENT		
					Correctness of value applied	Appropriateness of information source	Comment
Net annual expected electricity supply to grid.	72.93	GWH	Calculated based on CUF	/PO/ /CUF/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	The estimated electricity generation is based on the CUF which is assured by the suppliers of WTG. The estimated annual generation is derived from the same and considered as 72.93 GWh. The value is valid and reasonable.
Total cost of the project	Refer Parameter summary in Grace Base IRR spread sheet	INR Million	Purchase order	/PO/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	The total investment consists of WTG cost, land cost, infrastructure cost, charges to EB. WTG cost is taken from purchase order to the supplier by project participant. The cost of the same is provided in the spread sheet for all the groups.
Electricity tariff	2.70	Rupees/kWh	Power Purchase agreement	/PPA/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	This is based on the agreement between the project promoters and electricity board. The same has been verified with the registered project ref no 1049 ² which is located in the same region i.e. Tamilnadu. The applied tariff is fixed and there is no escalation. The same has been verified in the power purchase agreement. Thus the applied tariff is valid and reasonable.

² <http://cdm.unfccc.int/UserManagement/FileStorage/TW7B0AWSBQH8PMNM8WXFW5QE5I9546>

Parameter	Value applied	Unit	Source Information of (please indicate document and page)	Reference	DOE ASSESSMENT		
					Correctness of value applied	Appropriateness of information source	Comment
Operational and Maintenance Expenses	Refer Parameter summary in Grace Base IRR spread sheet, with 5% yearly escalation	INR Million	Purchase order, Quotation and O&M agreement	/PO/ & /OMP/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	This value is based on the contract between the WTG suppliers and project promoters. as per the agreement O&M cost for the first two year after commissioning date of the WTG is free of cost and third year onwards cost would be 5.00 Rs/million (for G1,G2,G3 WTGs) and 6.00 Rs/million (for G4 WTGs) of the capital cost with 5% escalation in every year. The applied value has been verified with the document provided by the PP and found OK.
Depreciation Rate	4.75	%	As per Sch. XIV of Companies Act.	/DEP/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	The same has been verified from the following weblink http://www.caclubindia.com/forum/mes sage_display.asp?group_id=9689&offset=7 . and the applied value is valid and reasonable.
Capacity Utilization Factor	27 & 32	%	Letter from suzlon energy Ltd dated on 30/06/2004	/CUF/ /TNERC/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	27% for 1250kW and 32% for 1500kW WTGs based on the suppliers communication to the project participant. The CUF is verified for the same location with similar capacity of WTGs from publicly available document "Power purchase and allied issues in respect of Non-Conventional Energy Sources based Generating

Parameter	Value applied	Unit	Source Information of (please indicate document and page)	Reference	DOE ASSESSMENT		
					Correctness of value applied	Appropriateness of information source	Comment
							Plants and Non-Conventional Energy Sources based Co-Generation Plants" dated 15/05/2006. The considered value is higher than the value given in the document (http://tnerc.gov.in/orders/nces%20order%20approved%20order%20host%20copy.pdf)
Interest	Refer Parameter summary in Grace Base IRR spread sheet	%	Loan Sanctioned Letter from the Financial institutions	/IP/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	The same has been verified with the loan sanction letters from the State Bank of Hyderabad, HDFC, State Bank of India, Pondicherry for the project activity. The applied value is found to be OK
Installed capacity	31	MW	Purchase order	/PO/ /CR/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	The capacity is assessed from the Purchase Order and physically verified during the site visit.
Benchmark Value	14.01	%	WACC Analysis Work sheet.	/BEN/	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	To arrive at benchmark risk free rate from Indian Government bond rates published by the RBI for various years till the date of placement of first purchase order of the project have been considered. Sensex details for

Parameter	Value applied	Unit	Source Information of (please indicate document and page)	Reference	DOE ASSESSMENT		
					Correctness of value applied	Appropriateness of information source	Comment
							various years till the project start date was also evaluated to understand the market returns. The difference in this annual market return and the interest rate on Central Government Securities available from RBI has been used to arrive at the market risk premium for the project. Beta calculation for seven power generating industries has been carried out to arrive at the average beta applicable to this project activity. Along with this, RBI PLR of average 10.25% on the debt, cost of equity and tax is considered as zero (since the comparison is for pre tax IRR) have been added together to arrive at benchmark of 14.01%. The chosen benchmark is appropriate and the calculation found to be ok.

ANNEX: 2 CERTIFICATES



CERTIFICATE OF APPOINTMENT

Mr. Ma Paa Puratchikkana
born on 1971-09-21

satisfies the requirements as specified in the TÜV NORD
JI/CDM CP directives and is hereby appointed as

TÜV NORD CDM Assessor

For the following scopes: 1, 2, 3, 4, 7, 12, 13

The present appointment will terminate on 2011-06-16
Certification registration No. 08 06 02 - 79

Essen, 2008-06-17


Head of TÜV NORD JI/CDM Certification Program
of TÜV NORD CERT GmbH



CERTIFICATE OF APPOINTMENT

Mr. B. J. Mohinder Amarnath
born on 1975-07-29

satisfies the requirements as specified in the TÜV NORD
JI/CDM CP directives and is hereby appointed as

TÜV NORD JI/CDM Expert

For the following scopes: 1, 5, 10, 12, 13

The present appointment will terminate on 2011-04-13
Certification registration No. 08 04 01 - 53

Essen, 2008-04-14


Head of TÜV NORD JI/CDM Certification Program
of TÜV NORD CERT GmbH



CERTIFICATE OF APPOINTMENT

Mr. K. V. Sudarshan
born on 1952-04-15

satisfies the requirements as specified in the TÜV NORD
JI/CDM CP directives and is hereby appointed as

TÜV NORD CDM Expert

For the following scopes: 1, 4, 5, 11, 13

The present appointment will terminate on 2011-07-21
Certification registration No. 08 07 01 - 78

Essen, 2008-07-22


Head of TÜV NORD JI/CDM Certification Program
of TÜV NORD CERT GmbH

