



Voluntary Carbon Standard 2007.1 Final Validation Report

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Validation Report:

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“Wind Power Project at Anthiyur, Tamil Nadu”	Rainer Winter
Client:	Project Title:
M/s. Nuziveedu Seeds Limited	“Wind Power Project at Anthiyur, Tamil Nadu”
Summary:	

VCS 2007 Validation Report

VCS 2007.1 Validation Report of the GHG emission reduction project entitled “Wind Power Project at Anthiyur, Tamil Nadu”.

M/s. Nuziveedu Seeds Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project “Wind Power Project at Anthiyur, Tamil Nadu” with regard to the relevant requirements of VCS 2007.1 Standard as well as criteria for consistent project operations, monitoring and reporting.

The project activity generates electricity which will be supplied to the Southern Grid of India and then distributed to the connected end users.

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

A risk based approach has been followed to perform this validation. In the course of the validation 5 Corrective Action Requests (CAR) and 2 Clarification Requests (CR) were raised and successfully closed out.

The validation is based on the VCS PD, proof of title, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validators by project proponent.

As a result of the validation, the validators confirm that:

The project fulfils criteria of VCS 2007.1 provided.

- The project additionality is sufficiently justified in the PD.
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of AMS. I.D./version 14.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 293,210 tCO₂e (total) is most likely to be achieved during the chosen 10 years renewable crediting period which will be renewed once.

No restrictions or uncertainties were identified related to the validation.

Work carried out by:	Number of pages:
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1 Introduction

1.1 Objective

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

- The requirements of VCS 2007.1 program guidelines;
- Requirements of the CDM Approved methodology, AMS.I.D./ version 14, which is approved by VCSA;
- To assess the project's compliance with other relevant rules, including the project country (India) legislation and
- Other relevant rules, of VCS sustainability criteria are validated in order to confirm that the project design as documented is sound and reasonable and meet 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 Verified emission reductions (VERs/VCUs¹) without any double counting.

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based AMS.I.D./version 14: "Grid connected renewable energy generation") which are included in the PD and other relevant supporting documents.

The items covered in the validation are described below:

- VCS 2007.1 & Project Country Criteria
 - To meet the requirements of VCS 2007.1 guidelines requirements, in particular,
 - Project country requirements / criteria
- VCS Project Description
 - Project design
 - Project boundaries and Predicted VCS project GHG emissions
- Project Baseline
 - Baseline methodology
 - Baseline GHG emissions

¹ As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after successful registration in an approved VCU Registry

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- Monitoring Plan
 - Monitoring methodology
 - Indicators/data to be monitored and reported
 - Roles and Responsibilities
- Project Additionality
- Background investigation and follow up interviews
- Draft validation reporting with CARs, CRs & FARs, if any
- Final validation reporting

The information included in the PD^{/PD2/} and the supporting documents were reviewed against the requirements and criteria mentioned above. The TÜV NORD CERT GmbH JI/CDM CP has employed a risk-based approach in the validation, focusing on the identification of significant risks for project implementation and the generation of VERs. 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 participant. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 VCS project Description

The project activity is located near Anthiyur Village of Udumalpet and Pollachi Taluks of Coimbatore District in Tamil Nadu. The project activity involves installation of 9 X 1.65 MW capacity Wind turbines totalling to an aggregated capacity of 14.85 MW. Six wind turbines are located in Pollachi Taluk & three wind turbines are located in Udumalpet Taluk of Coimbatore district (10°36'39.6" N & 77° 09'15.3" E)². The electricity generated in the project activity is exported to Tamil Nadu Electricity Board (TNEB) in the State of Tamil Nadu, which is a part of Southern Grid in India. The project activity generates energy from wind resources thereby displacing, electricity generated using existing fossil fuel based power plants and/or future capacity additions in the State of Tamil Nadu.

The estimated electricity supplied to the grid from the project activity is about 31.634 GWh per year. The GHG emission reductions that are projected to be achieved is about 293,210 tCO₂e during the chosen ten year crediting period.

² <http://www.satsig.net/maps/lat-long-finder.htm>

1.4 Level of assurance

The validation report is based on VCS PD/^{PD1 to PD2}/, financial spreadsheet/^{XLS1 to XLS2}/, supporting documents made available to the validation team and information collected through performing interviews and during the on-site assessment. The validation opinion is assured provided the credibility of all above.

2 Methodology

The validation of the project was carried out from July 2009 to October 2009.

Preparations: 2008/07/22 to 2009/10/28

On-site validation: 2009/08/13

(Draft) Reporting: 2009/08/25

(Final) Reporting: 2009/10/28

The validation consisted of the following three phases:

- a desk review of the project design and the baseline and monitoring methodology
- follow-up interviews
- the resolution of outstanding issues and the issuance of the final validation report and opinion

2.1 Review of Document

The draft PD^{PD1}/ submitted by the M/s. Nuziveedu Seeds Limited in July 2009 and supporting background documents related to the project design and baseline were reviewed on 2009/07/22. 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.

The documents that were considered during the Validation process are given in chapter 5 of this report. They are listed as follows:

- Documents provided by the project proponent (Table 5-1)
- Background investigation and assessment documents (Table 5-2)
- Websites used (Table 5-3).

2.2 Follow-up Interviews

On 2009/08/13, the TÜV NORD JI/CDM CP performed validation site visit at the project locations at Udumalpet and Pollachi Taluks of Coimbatore District in Tamil Nadu.

During this visit, as well as earlier and after, interviews with the project proponent, the consultant, project stakeholders and with local authorities were carried out to confirm selected information and to resolve issues identified in the document review.

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

Table 2: Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel /IM01/	- Desk review findings - General aspects of the project - Project design, Commissioning and implementation
2. Consultants /IM02/	- Technical equipment and operation of the project - Performance of the project - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring and measurement equipment - QA/QC Testing and calibration procedures - Monitored data management - Data quality, archiving and reporting procedures - Data uncertainty and residual risks - GHG calculation - Procedural aspects of the verification - Apportioning of energy to the bundled proponents

A detailed list including the functions or designations of the interviewed persons is given in chapter 5 (see Table 5-4). This table also includes reference codes to be used in the validation protocol.

2.3 Resolution of any material discrepancy

A few discrepancies were found during the validation and the validation report containing a set of CARs & CRs were submitted to the project proponent. The project design document was revised addressing the CARs & CRs issued by TÜV NORD JI/CDM CP.

After reviewing the revised and resubmitted project documentation^{/PD2/}; resolving the CARs & CRs raised and outstanding concerns, TÜV NORD JI/CDM CP issues this final validation report and opinion.

5 CARs and 2 CRs were found during Validation. Please refer to Section 3, table 3.

3 Validation Findings

The findings of validation are summarised in table 3:

Table 3: Summary of CARs, CRs and FAR issued:

Validation topic	No. of CAR	No. of FAR	No. of CR
D- Project Design	-	-	01
B- Baseline and additionality	04	-	-
M- Monitoring plan	-	-	01
C- Calculation of GHG emissions	01	-	-
E- Environmental Impact	-	-	-
L- Local Stakeholder Comments	-	-	-
SUM	05		02

For an in-depth analysis/evaluation of all CARs and CRs refer the sections from 3.1 to 3.6.

3.1 Project Design

The proposed project utilizes wind energy for electricity generation. Total installed capacity of the project is 14.85 MW (9x1.65 MW). The estimated electricity supplied to the grid is about 31.634 GWh per year. This project is equipped with the WTGs developed by M/s. Vestas Wind Technology (formerly, NEG Micon India Pvt. Ltd) make of 1.65 MW wind turbine generators for power generation.

Supporting documents like purchase orders^{/PO/} of the WTGs by the investor were made available to the TÜV NORD JI/CDM CP. It was found that the purchase order^{/PO/} issued by the suppliers of the WTGs specifies the technical details for the WTG that has been installed. Information was also collected through performing interviews with the PP and during the on-site assessment.

Technical details and equipment specifications used in the project are as detailed below:

Table 3-1: Technical details of the wind turbines

Operational conditions

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Calculated lifetime	20 years
Cut in wind speed	3.5 m/s
Cut out wind speed	20m/s
Maximum rotational speed	14.4 rpm
Main specification	
Rotor Diameter	82m
Number of Blades	3
Rotational speed (synchronous)	14.4 rpm
Rotor	
Rotor Diameter	82m
Tilt angle	5°
Swept area	5281 m ²
Generator	
Nominal Power	1650 kW
Rotational Speed	1012 rpm at rated power
Control system	
Manufacture	VESTAS control systems
Type	Microprocessor based

The project duration is: 20 years.

Start date of the project is 26/03/2005

Crediting period for the project activity: 01/04/2006 to 31/03/2016.

M/s. Nuziveedu Seeds Limited has ownership of the proposed project. Proof of title was submitted to the DOE. Power Purchase Agreements^{/PPA1- PPA9/} and purchase order^{/PO/} copies of each WTG is treated as proof of title. Refer to Table 5-1.

The emission reduction has not been double counted. The project has not applied for carbon benefits under any other mechanism. There is no rejection history for the project activity.

However, following CR was raised and successfully closed out.

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR D1 Specific geographical coordinates of the project area (including minutes), which delineate the unique identification of this project activity have to be provided under section 1.5 of PD.	/PD1/	The geographical coordinates of the project area are provided in the revised PD.	/PD2/	Revised PD contains the geographical coordinates of the project area in the table provided under Section 1.5 and these have been verified during sit-visit. They are found to be OK. CR D1 is closed.

3.2 Baseline

The proposed project adopts CDM approved methodology AMS I.D. /Version 14: Grid Connected Renewable electricity Generation, which is approved under VCS 2007.1.

The project satisfies all criteria for AMS I.D. The application of baseline methodology is assessed as correct. There is no methodology deviation or revision.

The baseline is the kWh produced by the project activity multiplied by an emission coefficient of the connected grid. The selection of baseline scenario is assessed appropriate.

The project participant used AMS. I.D./ version 14 approach to determine the emission coefficient of the indicative simplified baseline and monitoring methodologies for selected small scale CDM project activity which states as per paragraph 9 of the methodology that the baseline is "the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner". The selection of baseline scenario is assessed to be appropriate.

The project proponent has calculated the Simple Operating Margin (OM) based on the latest three year statistics data

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(year of 2005-06, 2006-2007, 2007-08) as per Central Electricity Authority guidelines version 4.0 October 2008 and the Operating Margin Emission Factor is 0.9981 tCO₂/MWh, which is average of the three year data. The value for Build Margin (BM) for 2007-2008 is directly used, i.e., 0.7133 tCO₂/ MWh and a weightage factor of 75% & 25% is used for OM and BM to arrive at the Combined Margin value of 0.9269 tCO₂/MWh.

The Combined Margin (weighted average of Simple Operating Margin and Build Margin) is estimated based on three years averages (2005-06, 2006-07 and 2007-08) of Simple Operating Margin and Build Margin which is in line with steps of "Tool to calculate the emission factor for an electricity system". Both the values of Simple Operating Margin and Build Margin are selected under ex-ante approach. The grid boundary w.r.t the connected grid is in Southern Grid of India.

The project proponent has used the published data of CEA, Version 4 October 2008 to calculate the Simple Operating Margin (OM). For wind and solar projects, "Tool to calculate the emission factor for an electricity system" allows the usage of the default weights which are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$. Using the above values the combined margin emission factor is valued at 0.9269 tCO₂/MWh.

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, transparent and conservative.

The additionality has been assessed using project test. The implementation barrier, investment barrier & common practice have been established to demonstrate the additionality.

Step as per VCS 2007.1	Argument	Assessment
Step 1: Regulatory Surplus	• Local or National Legislation does not require the production of the underlying	Validation team has checked all the National

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Step as per VCS 2007.1	Argument	Assessment
	service or product with the chosen technology. - There is no legal requirement on the choice of a particular technology for power generation. - The applicable Environmental Regulations do not restrict the use of wind energy for power generation. • 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. • Project Proponent has been issued with all required regulatory clearances before commissioning.	Regulations and Local legal requirements. It was found that there is no legal requisite in India and at the local level which restricts the implementation of wind power generating projects. Hence the argument is appropriate for this project activity. ☒ Step passed ☐ Step not passed ☐ Not applicable
Step 2: Investment Barrier	The project faces capital or investment return constraints that can be overcome by the additional revenues associated with the generation of VCU. So the PP has chosen Benchmark Analysis to demonstrate the additionality of the project. Weighted average costs of capital (WACC) has been considered as the benchmark for the project activity.	Investment Barrier: Various elements have been checked during the additionality assessment. Validation team has checked the identified financial indicator (Project IRR),

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Step as per VCS 2007.1	Argument	Assessment
	To arrive at this benchmark risk free rates from month-wise yield to maturity rate for various residual maturities published by the RBI starting from November 2003 to October 2004 were analyzed in which maturity rate on Central Government securities in August 2004 was chosen. BSE Sensex 500 details from February 1999 to November 2004 were also evaluated to understand the market returns. The difference in this annual market return and the maturity rate on Central Government Securities as of August 2004 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, Prime Lending Rate of five major banks of 10.25% (range of 10.25-10.75% was provided and the lowest value 10.25% was selected as conservative) on the debt as on 25/12/2004 published by RBI and cost of equity calculated using Capital Asset Pricing Model (CAPM) have been added together to arrive at benchmark WACC of 13.57%. Since the Project IRR is chosen as the financial indicator to demonstrate the additionality; WACC is one of	which is most suitable for the project type and decision context. In order to verify the relevant benchmark value of WACC, validation team has referred all necessary supportive data and found OK. Project proponent has demonstrated through the investment analysis that the financial returns of the project activity are below the requisite benchmark. TUV-NORD considers the benchmark chosen as appropriate for the project activity. Using the investment analysis, the project proponent has demonstrated that the project IRR without VCS

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Step as per VCS 2007.1	Argument	Assessment
	the appropriate benchmarks as per the Guidance on Investment Analysis EB 41, Annex 45, and version 2.	revenues and over the life time of the project activity is 8.80% which is very low compared to the benchmark WACC of 13.57%. Thus, the established investment barrier has been assessed to be correct. The arguments with supporting spreadsheets^{/XLS2} / provide proof for the non-viability of the project. The input data and assumptions for calculation of IRR like (profit/loss after tax, Gross cash flow, depreciation each year, term loan & salvage value) were verified with references^{/PO/, /LSL/, /PPA1-PPA9/, /O&M/} provided by PP. The considered benchmark is appropriate. The estimated

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Step as per VCS 2007.1	Argument	Assessment				
	A sensitivity analysis also has been carried out and the same is provided as below: <table><tr><td>Inves</td><td>10%</td><td>Base</td><td>10%</td></tr></table>	Inves	10%	Base	10%	annual electricity is based on the PLF of 25.20% which is considered as per the "Assessment of the Energy Production of the Anthiyur Wind Farm", an independent analysis conducted for this project before erection of WTGs by an independent organization called M/s Vishakam Electrical Works based on the wind data of the project location and site specific power curve. The PLF was calculated for actual annual generation of 36.42 GWh. Hence the PLF considered for this project activity is acceptable. The project revenue is sensitive to the electricity generation.
Inves	10%	Base	10%			

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Step as per VCS 2007.1	Argument				Assessment
	tor	increase in Project IRR	Case (Project IRR)	decrease in Project IRR	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 carbon benefits. The sensitivity analysis has also been provided for the investor with increase in the generation to a tune of +/- 10% and it has been verified that the Project IRR does not cross the bench mark. ☒ Step passed ☐ Step not passed ☐ Not applicable
	M/s Nuziveedu Seeds Limited	10.75%	8.80%	7.73%	

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Step as per VCS 2007.1	Argument	Assessment
Step 3: Common Practice approach	Common practice analysis has been carried out with the publicly available data. The statistics published in the Annual Grid Report 2007-08 ³ by the Southern Regional Load Dispatch Centre gives the scenario of 'Growth of installed capacity of southern region during past eleven years' from 1997-98 to 2007-08 under Section-5 of 'Generating Capacity'. As per this report as provided under table 5.3, the installed power generation capacity in the Southern region in the year 2003-04 is 30794.23 MW and the installed wind power generating projects contributes to 263.12 MW, which is about 0.85% of the total installed power generation capacity in the Southern region. Hence, the contribution of wind energy in the Southern region was very less during the period. It has been sufficiently demonstrated that the development of wind power project without VCS revenues is not a viable option.	By the Annual Grid Report 2007-08 published by the Southern Regional Load Dispatch Centre, it has been established that the contribution towards installation of wind power projects in the Southern region of India was very low. As a result of existence of the analysis of the barriers, the project activity has been concluded as not a common practice scenario in the region. The argument is hence found OK. ☒ Step passed ☐ Step not passed ☐ Not applicable

Thus the validation team arrived at the opinion that the project activity is assessed to be additional.

³ <http://www.srldc.org/var/ftp/reports/yearlyrep/2007-08-year.pdf>

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However, following CARs were raised and consequent upon the satisfactory response received from the project promoter, the issues have been closed out.

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR B1 PLF considered for the project activity should be mentioned in the PD and Proof for consideration of the PLF needs to be provided	/PD 1/	The PLF considered for the project activity is mentioned in Section 1.8 of the revised VCS PD (version 02, dated 23 October 2009). The proof for the same is also provided to the DOE for reference.	/PD 2/	The PP has chosen an estimated PLF of 25.20% based on the independent third party Micro siting study report dated 2004-12-24 by M/s. Vishakam Electrical Works for 9 WTGs of combined capacity of 14.85 MW of M/s Nuziveedu Seeds Limited in Anthiyur wind farm. The report gives the wind data with the site specific power

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				curve and the production estimate for the Anthiyur wind farm. The report mentions an estimated generation of 36,42,408 kWh per year per WTG. Hence the chosen PLF of 25.20 % is acceptable. The report was verified by the validation team and found satisfactory. Hence, CAR B1 is closed.
CAR B2				
a) O&M cost has been provided from the 3 rd year	/XLS1/ & /PD1/	a) The O&M cost has been provided from the 2 nd year onwards as per the	/XLS2/, /PD2/ & /CR1/- /CR9/	a) The O&M cost provided on the

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
onwards irrespective of the commencement date of generation by WTG. This has resulted in not providing for O&M cost for 7 WTGs for 6 days in the 2 nd year & providing full year depreciation for the balance 2 WTGs though commenced generation on 3 rd April and 17 th May 2006.		date of commissioning of each turbine. The O&M cost for 7 WTGs has been provided in the 2 nd year for a period of 13 days for all the 7 WTGs combined. The 2 WTGs commissioned in 2005-2006 are commissioned on 29 th April 2005 and 17 th May 2005. The depreciation for the 7 WTG has been accounted for in the year 2004-2005 and for the rest 2 WTGs, the accounting for depreciation started only in the year 2005-2006. This principle of accounting is as per the Income Tax Act.		'P&L' sheet for the second year for 7 WTGs and third year onwards for all the 9 WTGs in the revised XLS have been verified with the respective commissioning certificates of the WTGs and the O&M agreements. This is found to be OK. Accounting of depreciation for 7 WTGs in the year 2004-05 and the all the 9 WTGs from the year 2005-06 on the

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
b) Providing IT depreciation on the entire investment does not appear to be in conformity with IT Act. Details of project cost should be furnished and the IT depreciation should be provided on assets as per Appendix I of Income Tax Rules.	/XLS1/	b) The total cost for supply of WTG as per the purchase order is 8032.05 lakhs. The cost of land, 17.72 Lakhs is also negated from 8032.05 Lakhs to arrive at the depreciable amount of 8014.33 lakhs. The same has been depreciated in the revised IRR sheet.	/XLS2/, /PO/ & /LSL/	'Depreciation' sheet of the revised XLS is found to be OK. b) The values under 'Depreciation as per Income Tax Act' on the 'Tax calculation' sheet of the revised XLS have been arrived after deducting the land cost from the purchase order value of the WTGs. This has been verified with the purchase orders and the land purchase

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
c) Since 2 WTGs commenced generation in 2005-06, providing IT depreciation in respect of investment made in those WTGs in 2004-05 does not conform to IT Act. Moreover, providing IT depreciation at 80% on 7 WTGs, which became operational in March 2005, does not conform to the provisions of Sec. 32 of IT Act.	/XLS1/	c) The 7 WTGs which are commissioned in the year 2004-2005 are accounted for 40% depreciation in their first year and 80% depreciation from the 2 nd year onwards as per Income Tax act. The 2 WTGs commissioned in the year 2005-2006 are accounted for 80% of depreciation from their 1 st year onwards and this is in conformity with the provisions of sec.32 of IT Act.	/XLS2/ & /CR1/- /CR2/	value mentioned in the loan documents submitted by the PP. This is found to be OK. c) The 'Depreciation values mentioned for each year' on the 'Depreciation' sheet of the revised XLS have been arrived after considering the commissioning dates and the number of WTGs which fall under respective financial years from

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				2004-05 and the percentage of depreciation under 'Depreciation rate' are as per the provisions of IT ACT. This has also been verified with the commissioning certificates of the WTGs. This is found to be OK. CAR B2 is closed.
CAR B3 IRR computation does not appear to be correct for the following reasons: a) cash inflow does not include salvage value. b) considering the fact that	/XLS1/	a) Salvage value has been included in the Cash inflow b) The investment has been made in 2004-05. The IRR	/XLS2/	The corrections in response to a) & b) by including

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
the orders were placed in December 2004, payment would have been made in 2004-05 only, whereas for IRR computation, the investment is shown to have taken place in 2003-04. Since there is a cash inflow during 2004-05, the year in which investment had taken place, the cash outflow should be netted out in 2004-05		computation was carried out accordingly and the cash outflow has been netted out in 2004-05)		salvage value in the Gross Cash flow and netting out of the cash outflow from cash inflow have been verified from the 'Gross Cash Flow' on the 'P&L' sheet of the revised XLS. This is found to be OK. CAR B3 is closed.
CAR B4 Benchmark calculations seem to suffer from following inadequacies: a) Bank rate has been taken as proxy for Rf. Reference from any standard text book or articles published in reputed finance	/WACC XLS1/	a) The yield to maturity rate as provided by the RBI has been taken as a proxy for Rf.	/WACC XLS2/	a) The risk free rate, which is of August 2004, from the yield to maturity transaction

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
journals advocating the use of bank rate as proxy for Rf may be submitted;				details provided by the Reserve Bank of India from November 2003 to October 2004 has been verified and found OK
b) Reasons for including only private companies in the computation of beta have not been explained		b) The public as well as private companies have been included in the companies considered for the calculation of beta value.		b) Beta value has been computed after considering public as well as private sector companies, applicable tax rate and debt & equity ratio in the revised XLS. This is found to be OK.
c) Neither the screenshots of beta nor the		c) The screenshots as well as the calculation sheet		c) The screenshots of all

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
calculation worksheet have been submitted d) The return on equity arrived at using the CAPM formula is in excess of 16% pre-tax return recommended by TNERC and therefore cannot be considered conservative		have been submitted. d) The IRR for the project activity was carried out at the time of conceptualization in the year 2004-2005 and the TNERC order is issued in the year 2006. Therefore, the project proponent was not aware of the 16% pre-tax return and went ahead with CAPM method for the calculation of cost of equity.		the companies considered for calculation of beta have been provided. As well, the calculation of beta is provided on the 'beta' sheet of WACC calculated revised XLS d) The decision taken for investing in this project activity was in December, 2004 and the purchase order was also placed in the month of December, 2004. But the TNERC order was

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
e) In WACC calculations, interest rate applicable to the company seems to have been taken, which does not seem to satisfy the Additionality Tool requirement		e) The Prime Lending Rate provided by the RBI has been taken in the revised WACC calculation sheet and the same is provided to the DOE for reference.		issued in May, 2006, which is after the investment. Hence the pre-tax return recommended by the TNERC order is not applicable to this project activity. This is found to be OK. e) Prime Lending Rate of five major banks of 10.25% (range of 10.25-10.75% was provided and the lowest value 10.25% was selected as conservative) on

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				the debt as on 25/12/2004 published in the Weekly Statistical Supplement by RBI has been chosen for the cost of debt in the revised WACC XLS sheet. This has been verified with the web-link of RBI provided on the same by the PP. This is found to be OK. CAR B4 is closed.

3.3 Monitoring Plan

The proposed project uses CDM approved methodology AMS I.D. /Version 14: Grid Connected Renewable electricity Generation, which is approved under VCS 2007.1.

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The project satisfies all criteria for AMS I.D. The application of monitoring methodology is assessed as correct.

The monitoring plan^{/PD2/} provides detailed information related to the collection and archiving of all relevant data needed to:

- Estimate or measure emissions occurring from GHG sources, sinks and reservoirs
- Determine the baseline emissions
- Estimate changes in emissions from the site

The parameters to monitor are electricity exported to the grid, electricity imported from the grid and net electricity generated.

The evacuation facility of the project activity to deliver the power to grid is maintained by the state utility (TNEB).

Four main meters are located at each of the nine WTGs having reference to HTSC Nos.690, 751 - 755, 788, 728 & 808 at the project site. These energy meters are two-way meters to record the export of power generated by the wind mill to the grid and to record the import of TNEB's power from the grid. The main meters are of 0.5% accuracy class as per standard industry norms. The quantities of electricity exported and imported are measured by these meters on a continuous basis. The difference between the two parameters (export and import) is the net power exported.

The export and import readings of main meters are recorded on a monthly basis by the Tamil Nadu Electricity Board officer in the presence of operation and maintenance personnel of M/s. Vestas (India) Pvt. Ltd (formerly know as NEG Micon (India) Pvt. Ltd). All the readings are jointly recorded^{/JMR/}. Thus the project conforms to the requirement of clause 16 of AMS.I.D, version 14. The transmission and distribution losses and the minimum reactive power consumption are taken into account as per TNERC guidelines- on 'Orders on fixation of tariffs for Tamil Nadu electricity board from 16.3.2003' dated March 15, 2003. The actual quantum of power exported is calculated and is duly signed by the officer.

A daily generation report is also prepared by the operation and maintenance personnel and sent to Project Participant via server.

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Based on the daily generation report and monthly meter reading report duly signed by the TNEB officer, the project proponent, M/s Nuziveedu Seeds Limited raise an invoice on the TNEB at the rates stipulated in the PPA^{/PPA1-PPA9/} for such quantities as determined to have been exported and copies of such invoices are maintained as part of monitoring records. A comparison of such invoiced quantity of power serves as a check for the net monthly power exported to the grid based on which the emission reductions are calculated.

The on-site visit was carried out on 2009/08/13. One member of the Validation team attended the site visit.

Before and during the on-site visit the Validation team performed interviews with the project participants to confirm selected information and to resolve issues identified in the document review.

During the onsite-visit the information above was verified by the joint meter reading^{/JMR/} reports which have been duly signed by the representatives of TNEB submitted by the PP. This was found to be in line with the monitoring plan^{/PD2/} & the PPA^{/PPA1-PPA9/} signed for the project and deemed to be OK. The meters are calibrated at least once in a year by the TNEB officials.

Responsibilities related to monitoring are clearly defined in the monitoring plan and were assessed and found to be OK.

However, following CR was raised and successfully closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR M1 Copies of following documents need to be provided. a) Operation and Maintenance agreement	/O&M/, /PPA1/- PPA9/, /PO/, /CR1- CR9/, /LSL/ & /SCM/	All necessary proofs have been submitted to the DOE	/O&M/, /PPA1/- PPA9/, /PO/, /CR1- CR9/, /LSL/ & /SCM/	Documents pertaining to O&M of all the WTGs, PPAs signed between TNEB and the investor, Commissioning certificates of all the

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
b) Power purchase agreements d) Copy of Commissioning Certificates for all the WTGs e) Loan sanction letter f) Copy of minutes of Stakeholders consultation process				WTGs, Loan sanction letter from the Canara bank and minutes of the Stakeholder consultation process have been checked. They are found to be OK. Hence, CR M1 is closed

3.4 Calculation of GHG Emissions

GHG emission reduction achieved by the project activity is calculated as the difference between the baseline emission and the project emission as well as the leakage emission. There are no GHG emissions arising from the project being a green power project. Hence, the project emissions are zero. As the project activity does not involve transfer of energy generating equipment from another activity or the existing equipment is transferred to another activity, the leakage due to the project activity is not applicable as per AMS.I.D.

Following the AMS.I.D. methodology, the combined margin (CM) was calculated using the approved consolidated baseline Methodological tool (Version 01) "Tool to calculate the emission factor for an electricity system". Ex-ante was chosen to calculate the baseline emission factor.

Baseline emission is equal to Net Electricity export by the project to the grid by the project activity (EG_y) multiplied by the grid emission factor ($EF_{grid, CM, y}$). Also refer section 3.2.

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The baseline emission factor is equal to the CM, which is applying the default weights are as follows: $w_{OM} = 0.75$ and $w_{BM} = 0.25$ for operating margin emission factor (EF OM, y) and the build margin emission factor (EF BM, y).

The calculation method of the OM and BM is derived from the guide of OM and BM calculation issued by CO₂ Baseline Database for the Indian Power Sector, User Guide (Version 4, Date: October, 2008) issued by CEA.

The validation team has checked the underlying input values as well as the computation in the emission reduction spreadsheet^{/ER/}. The estimation of the emission reduction was realized in a transparent and conservative manner and is well documented under section 4.2 – 4.4 of the PD.

As per the final PD^{/PD2/} this project is expected to reduce emissions of 293,210 tCO₂e over a 10 year crediting period.

However, following CAR was raised and successfully closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR C1 The emission reduction from the project activity mentioned under Section 1.3 of the PD is at variance with the emission reduction stated under Section 4.2. Provide annual estimated emission reduction for each year over the 10 years of crediting period in a tabular format	/PD1/ 1.3	Necessary corrections made in the revised VCS PD.	/PD2/	The emission reduction from the project activity i.e., 293,210 tCO ₂ e has been stated consistently through out the revised PD and the annual emission reduction over the 10 years of crediting period have been provided

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
along with the start date and end date of the crediting period under section 1.3 of the PD.				in a tabular format with the start and the end date of the crediting period under section 1.3 of the revised PD. This is found to be OK. Hence, CAR C1 is closed.

3.5 Environmental Impact

As per the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated 27 January 1994 and further modified on 14th September 2006, 38 Categories of project activities are required to undertake environmental impact assessment studies. The details of these activities are available at:
<http://envfor.nic.in/legis/eia/so1533.pdf>

Small wind projects of this scale doesn't fall under the list of activities requiring EIA as it will not involve any negative environmental impacts and the WTGs installed for generation of power use wind (cleanest possible source of renewable energy). However, the clearance from electricity board and the stakeholders' meeting proceedings have been submitted by the project promoter and verified by the DOE. They are found to be in order.

3.6 Comments by stakeholders

A stakeholder consultation meeting of the project was conducted on 2008/04/21 at wind farm site office, Anthiyur village in Coimbatore district, Tamil Nadu. Stakeholders' meeting notification was provided to the local Gram Panchayats and farmers in the villages. A summary of the stakeholder comments^{/SCM/} have been included in the VCS PD. All comments were positive and it has been verified that all comments sufficiently have been addressed.

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The statutory stakeholders, such as the TNEB, concerned Land Revenue authorities have issued the necessary licenses for the project activity. These have been verified and found to be in order.

4 Validation conclusion

M/s Nuziveedu Seeds Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project - "Wind Power Project at Anthiyur, Tamil Nadu", with regard to the relevant requirements of VCS 2007.1 Standard as well as criteria for consistent project operations, monitoring and reporting. The project activity generates electricity which will be supplied to the Southern Grid of India and then distributed to connected end users. The review of the VCS PD and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders have provided TÜV NORD JI/CDM CP with sufficient evidence to validate the fulfilment of the stated criteria. A risk based approach has been followed to perform this validation. In the course of the validation 5 Corrective Action Requests (CAR) and 2 Clarification Requests (CR) were raised and successfully closed out. The validation is based on the VCS PD, proof of title, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validators by project proponent.

As a result of the validation, the validators confirm that:

The project fulfils criteria of VCS 2007.1 provided.

- The project additionality is sufficiently justified in the PD.
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of AMS ID Version 14.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 293,210 tCO₂e (total) is most likely to be achieved within the 10 years renewable crediting period which will be renewed once.

No restrictions or uncertainties were identified related to the validation.



Mr. Ma. Paa. Puratchikkanal
Verification Team Leader
Bangalore, 2009-10-28



Rainer Winter
Final approval
Essen, 2009-11-15

5 References

Table 5-1: Documents provided by the project proponent

Reference	Document
/PD1/	VCS PD dated at 2009/07/21, Version 1
/PD2/	VCS PD dated at 2009/10/27, Version 2
/PHT/	Photographs of the Project Site
/TD/	Technical specification of the WTGs.
/XLS1/	Financial calculation sheet corresponding to VCS /PD1/
/XLS2/	Financial calculation sheet corresponding to VCS/PD2/
/WACC XLS1/	WACC calculation sheet corresponding to VCS /PD1/
/WACC XLS2/	WACC calculation sheet corresponding to VCS /PD2/
/ER/	Emission reduction calculation sheet corresponding to VCS/PD2/
/CR1/-/CR9/	Commissioning certificates of all the 9 WTGs from the TNEB
/PPA1/- /PPA9/	Power Purchase Agreements between TNEB and the PP for all the 9 WTGs
/UD-LET/	Letter from the PP regarding creation of no other form of environmental credit by this project activity
/PO/	Purchase orders for all the 9 WTGs
/SCM/	Minutes of the stakeholders’ consultation meeting
/JMR/	Joint meter reading reports for all the 9 WTGs
/LSL/	Loan sanction letter from the Canara bank
/O&M/	Operation & Maintenance agreement for all the 9 WTGs between the investor and the WTG supplier, M/s. Vestas (India) Pvt. Ltd (formerly know as NEG Micon

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Reference	Document
	(India) Pvt. Ltd).

Table 5-2: Background investigation and assessment documents

Reference	Document
/AMS ID/	Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories (Version 14)
/IPPC-RM/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book

Table 5-3: Websites used

Reference	Link	Organisation
/vcs/	www.v-c-s.org	VCS website
/unfccc/	www.unfccc.int	UNFCCC website
/cea/	www.cea.nic.in	Central Electricity Authority
/rbi/	www.rbi.org.in	Reserve Bank of India
/MoEF/	http://envfor.nic.in/legis/eia/so1533.pdf	Ministry of Environment and Forests, GoI, India
/SRLDC/	http://www.srlc.org/var/ftp/reports/yearlyrep/2007-08-year.pdf	Southern Regional Load Dispatch Centre
/satsig/	http://www.satsig.net/maps/lat-long-finder.htm	Satellite Signal

Table 5-4: Interviewed Persons

Reference		Name	Organisation / Function
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Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	S. S. Murali	DGM-Projects, M/s. Nuziveedu Seeds Limited
/IM02/	☒ Mr. ☐ Ms.	Kapil Suresan	Senior Consultant, E&Y, Secunderabad
/IM03/	☒ Mr. ☐ Ms.	Rama Anil kumar Palla	Associate Consultant, E&Y, Secunderabad
/IM03/	☐ Mr. ☒ Ms.	T. Divya Vaishnavi	Associate Consultant, E&Y, Secunderabad