



Voluntary Carbon Standard 2007.1 Validation Report

No. 53801808-08/688

Validation Report:

Name of Validation company:	Date of the issue:
TÜV NORD CERT GmbH	2009-11-16
Report Title:	Approved by:
16.65MW Bundled Wind Power Project in Tamilnadu.	Mr. Winter Rainer
Client:	Project Title:
M/s Vestas Wind Technology India Private Limited	16.65MW Bundled Wind Power Project in Tamilnadu.
Summary:	

M/s Vestas Wind Technology India Private Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project - "16.65 MW Bundled Wind Power Project in Tamilnadu", 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 3 Corrective Action Requests (CAR) and 6 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 ACM0002, version-10.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 3,96,420 tCO₂e (total) is most likely to be achieved within the 10 years renewable crediting period.
- No restrictions or uncertainties were identified related to the validation.

Work carried out by:	Number of pages:
Ma. Paa. Puratchikkanal B.J.M. Amarnath S.Stalin N.Premjit Singh A.Kirthika.	30

[Table of Contents]

1	Introduction	4
1.1	Objective.....	4
1.2	Scope and Criteria.....	4
1.3	VCS project Description.....	5
1.4	Level of assurance.....	6
2	Methodology	6
2.1	Review of Document.....	7
2.2	Follow-up Interviews.....	7
2.3	Resolution of any material discrepancy.....	8
3	Validation Findings	9
3.1	Project Design.....	9
3.2	Baseline.....	13
3.3	Monitoring Plan.....	22
3.4	Calculation of GHG Emissions.....	24
3.5	Environmental Impact.....	25
3.6	Comments by stakeholders.....	25
4	Validation conclusion	26
5	References	28

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 monitoring plan (MP), and the project's compliance with the requirements of:

- The requirements of VCS 2007.1 program guidelines
- Requirements of the Approved methodology, ACM002 version 10, EB-47
- To assess the project's compliance with other relevant rules;
- 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).

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 on CDM approved methodology ACM002. /Version 10: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" will be employed for the project), which are included in the VCS PD and other relevant supporting documents.

The items covered in the validation are described below:

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

- Monitoring Plan
 - Monitoring methodology
 - Indicators/data to be monitored and reported
 - 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^{/PDD/} 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 involves installation of 6 WEGs capacity of 1650KW and 9 WEGs of 750kW. The details of ownership, location and number of WEGs are presented in the Table 1 below. The electricity generated from the WEGs is supplied to the TNEB Grid, which forms part of the Southern Grid .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 connected power stations. The proposed project falls under Large-scale methodology ACM002 version 10, of CDM methodologies. The estimated GHG emission reduction is 3, 96,420 tCO₂e (total) or average 39,642 tCO₂e per year for ten years of crediting period.

Table 1: Project location including geographic and physical information allowing the unique identification:

Sl. No.	Project Promoter	Capacity of WEG (MW)	Longitude (N)	Latitude (E)	HTSC No.
1	Dollar Apparels I	1.65	77°12'45.3"	10°35'33.1"	1015
	Dollar Apparels	1.65	77°13'50.2"	10°35'45.3"	1016

	II				
	Dollar Apparels 1	0.75	77°10'00.1"	10°35'39.3"	664
	Dollar Apparels 2	0.75	77°10'13.0"	10°35'36.8"	665
	Dollar Apparels 3	0.75	77°10'12.6"	10°35'49.9"	666
	Dollar Apparels 4	0.75	77°10'08.5"	10°36'14.9"	667
	Dollar Apparels 5	0.75	77°10'21.7"	10°36'03.3"	668
2	Devi Sea Foods 1	1.65	77°11'23.1"	10°37'41.2"	782
	Devi Sea Foods 2	1.65	77°11'60.1"	10°34'37.2"	1283
3	MCTM Global Investments	0.75	77°27'05.7"	8°57'16.6"	1913
4	Srinivasan Raghavan	0.75	77°29'29.9"	8°57'35.8"	1414
5	Thirunavukarasu	0.75	77°29'15.7"	8°57'23.7"	1420
6	Standard Fireworks	1.65	77°28'56.5"	8°58'52.5"	1545
7	Thiagarajar Mills	1.65	77°10'52.9"	10°37'19.0"	833
8	Aditya Marine	0.75	77°29'16.7"	8°57'30.6"	854

1.4 Level of assurance

The validation report is based on VCS PD, site visit interviews and documents provided by the project proponent, as well as information got from on-site visit. The validation opinion is assured and provides the credibility of all above.

2 Methodology

The validation of the project was carried out between July 2009 to November 2009

Preparations : 2009-07-01 to 2009-07-10
 On-site validation : 2009-08-21,
 (Draft) Reporting : 2009-09-30
 (Final) Reporting : 2009-11-16

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^{/PD/} submitted by the project participants in July 2009 and supporting background documents related to the project design and baseline were reviewed. Furthermore, the validation team used additional documentation by third parties like 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 2009-08-21, the TÜV NORD JI/CDM CP performed On-site validation visit with the project proponent.

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 interview and main topics of the interview are summarised in Table 2-1.

Table 2-1 Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1.Projects & Operations Personnel ^{/IMO1/} Venkata Naidu -Service Manager Vestas- Coimabatore Kathirvel-Site Engineer Vestas -Coimbatore	- Technical details of the project activity - WEGs Performance data - Approval procedures and status - Monitoring and measurement - Project activity starting date and commissioning date - Crediting period - VER allocation /ownership

Interviewed Persons / Entities	Interview topics
<p>Chockalingam- Area Service Manager-Vestas Tirnelveli Sathiskumar-site Engineer</p> <p>2. Consultants /IM02/ Arun Kumar Bojan, Sr.Enginner CDM-Vestas</p>	<ul style="list-style-type: none"> - Sustainable development issues - Environmental Impact Assessment - Local stake holder consultation process - Roles & responsibilities, competency and training of the staff members w.r.t project management, monitoring and reporting - Operational Data - technical specification, capacity, estimated life time of the project plant units - Editorial aspects of PD - Baseline study and additionality - Details of emissions reduction calculations - Estimation of net energy (Import / Export) - QA/QC and calibration procedures - Data quality, archiving and reporting procedures - Data uncertainty and residual risks - GHG calculation - Procedural aspects of the verification

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^{/PDD/}; resolving the CARs & CRs raised and outstanding concerns, TÜV NORD JI/CDM CP issues this final validation report and opinion.

The results are shown in Table 2-2:

Table 2-2: Summary of CAR and CR issued

Validation topic 1)	No. of CAR	No. of CR
Project Design (3.1)	0	4
Baseline (3.2)	3	0
Monitoring plan (3.3)	0	1
Calculations of GHG emissions (3.4)	0	1
Environmental Impact (3.5)	0	0
Local Stakeholder Comments (3.6)	0	0
SUM	3	6

1) The letters in brackets refer to the validation protocol

For an in depth analysis/evaluation of all CARs and CRs can be referred to the below sections from 3.1 to 3.6.

3 Validation Findings

3.1 Project Design

The proposed project uses wind power for electricity generation. Total installed capacity is 16.65 MW (6 X 1.65 MW and 9 X 0.75 MW). The estimated electricity supplied to the grid is 42767 MWh^{/ER/} per year after commissioning of the entire WEG's. On the basis of the site visit and the reviewed project documentation it can be confirmed that with respect to the realized technology, the project equipments, as well as the monitoring and metering equipment, the project has been implemented and operated as described in the PD^{/PD/} and the same has been confirmed from the commissioning certificates^{/COM/} of the individual WEG.

Key parameters of the technology used are as follows:

Table 3-1: Key parameters of the wind power project

Salient Features of WEG's

Sl No	Parameters	NM 48/750	NM 82/1650
1	Operational Data		
	Nominal Output	750 KW	1650 KW
	Power Regulation	Stall	Active-Stall™
	Cut-In Speed	4 m/s	3.5 m/s
	Cut-Out Speed	25 m/s	24 m/s
2	Rotor		
	Rotor Diameter	48.2 m	82 m
	Rotor Swept Area	1824 cm ²	5281 m ²
	Number of Blades	3 nos.	3 nos.
3	Brake System		
	Blade tip Air Brake	Hydraulic, fail safe	Full Blade Pitch
	Disc Brake	Hydraulic	Hydraulic Disc Brake
4	Generator		
	Type	Asynchronous	Asynchronous
	Nominal Voltage	690 V	690 V
	Nominal Frequency	50 Hz	50 Hz
	Name Plate Rating	750/200 KW	1650/900 KW
	Cooling	Closed circuit liquid cooling	Closed circuit liquid cooling
5	Tower		
	Type	Conical, Steel, PU Painted	Tubular, Steel, PU Painted
	Hub Height	According to type approvals	According to approvals
6	Controller		
	Type	Computer controlling	Microprocessor based computer control system
	Capacitor Bank	NO LOAD Compensated	Automatic intelligent phase compensation logic, multistage

The project duration is: 20 years.

Project start date is: 2005/01/26 (Which is the earliest commissioning date in the bundled project activity)

Crediting period is: Ten years starting from 2006/03/28.

Vestas Wind Technology India Private Limited has ownership of the proposed project. Proof of title^{/DEC/} was submitted. Vestas Wind technology India Private Limited is the bundling organization^{/BUN/} for the project activity also

entitled for the right to emission reductions for the entire crediting period. Refer to Table 5-1.

The emission reduction was not double counted.

The project was not registered under any other emission trading mechanism and hence there is no rejection history. The same has been declared^{/DEC/} by the project participants of the project activity has been found OK.

However CR 3.1.1 to 3.1.4 was raised.

VCS 2007.1 Validation Report

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
<p>CR 3.1.1 The justification/proof (under taking by promoters) of demonstration that the project has not created another form of environmental credit by the project in section 1.13 of VCS PD is missing.</p>	/PD/1.13	The proof has been provided to DOE.	/PD/1.13	<p>This project activity has not created another form of environmental credit. The proof^{/DEC/} for the same has been verified and found OK.</p> <p>CR 3.1.1 is closed.</p>
<p>CR 3.1.2 Provide contact information of the project proponent in section 1.15 of the PD.</p>	/PD/1.13	The contact information provided in the revised PD.	/PD/1.13	<p>The contact information of the project proponent has been given in the revised PD.</p> <p>CR 3.1.2 is closed.</p>
<p>CR 3.1.3 Proof of title need to be submit for verification.</p>	/PD/8	Proof of title was provided to DOE for verification.	PD/8	<p>The proof of ownership of the plant and equipment has been verified with the documents^{/COM//DEC/} provided by the project participants and found to be OK.</p> <p>CR 3.1.3 is closed</p>
<p>CR 3.1.4 The aggregating capacity (16.65MW) in the PD contradicts with capacity mentioned in the work order (16.8MW) signed between the project proponent and validator. clarification requested.</p>	/PD/1.4	Due to typographical error it is mentioned as 16.8MW in the work order. We request you change the project capacity as 16.65 MW and there will be no change in capacity of the bundle.	/PD/1.4	<p>The same has been accepted. The project has been implemented as described in the PD and Same has been confirmed from the commissioning certificates^{/COM/} of the individual WEG& during onsite visit.</p> <p>CR 3.1.4 is closed.</p>

3.2 Baseline

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 predominant by fossil fuels. The selected baseline methodology is approved baseline methodology for "consolidated baseline methodology for grid-connected electricity generation from renewable sources" (ACM0002 Ver.10).

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 16.65 MW WEGs to the southern grid.

ACM0002 (Version 10) 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 (05-06, 06-07 and 07-08) of Simple Operating Margin and 20 % Build Margin of current year (07-08) 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.

The project proponent has calculated the Simple Operating Margin (OM) based on the latest three year statistics data (year of 2005-06, 2006-07, 2007-08) as per Central Electricity Authority guidelines version 4.0 October 2008 and the Operating Margin Emission Factor is 0.998157296 tCO₂/MWh, which is weighted average of the three years data. The value for Build Margin (BM) for 2007-2008 is directly used, i.e., 0.71331778 tCO₂/ MWh. 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 0.92694742 tCO₂e/MWh.

VCS 2007.1 Validation Report

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.

Altogether the project activity reduces emissions of 3,96,420 tCO₂e over the ten year fixed crediting period.

The project satisfies all criteria for ACM0002. The application of baseline methodology is assessed as correct. There is no methodology deviation or revision. The selection of baseline scenario is assessed appropriately.

The additionality is assessed using project test-1.

Step as per VCS 2007.1	Argument	Assessment
Step 1: Regulatory Surplus	<ul style="list-style-type: none"> • Local or National Legislation does not require the production of the underlying 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 Proponents have been issued with all 	<p>Validation team has checked all the National 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.</p> <p> <input checked="" type="checkbox"/> Step passed <input type="checkbox"/> Step not passed <input type="checkbox"/> Not applicable </p>

VCS 2007.1 Validation Report

Step as per VCS 2007.1	Argument	Assessment
	<p>required regulatory clearances before commissioning.</p>	
<p>Step 2: Implementation Barriers: Investment Barrier</p>	<p>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 projects in the bundle.</p> <p>Weighted average costs of capital (WACC) has been considered as the benchmark for the project activity.</p> <p>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 all the projects 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 six power generating industries has been carried out to arrive at the average beta applicable to this project activity.</p> <p>Along with this, RBI PLR on the debt cost of equity and applicable rate of tax has been considered together for arriving the benchmark. Since the investment decision taken by the project participants is in different period, the</p>	<p>Investment Barrier: 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 of WACC, validation team has referred all necessary supportive data which is publically available and found OK.</p> <p>Project proponents have demonstrated through the investment analysis that the financial returns of the project activity are below the requisite benchmark. TUV-Nord considers the benchmark chosen is appropriate for the project. Using the investment analysis, the project proponents have demonstrated that the Project IRR for all the investors are lower than benchmark.</p> <p>Thus, the established investment barrier has been assessed to be appropriate and sufficient. The arguments with supporting spreadsheets^{/IRR/} provide proof for the non-viability of the project. The input data and assumptions for calculation of IRR like</p>

VCS 2007.1 Validation Report

Step as per VCS 2007.1	Argument	Assessment																		
	<p>specific benchmark has been chosen for each project participant.</p> <p>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.</p> <p>An investment analysis of the project activity was conducted with the project Internal Rate of Return (IRR) as the financial indicator comparing with the benchmark considered for the project activity. The IRR for the project activity without VCUs revenue was computed for a period of 20 years, corresponding to the lifetime of the all the WEGs. Project proponents have demonstrated through the investment analysis that the financial returns of the project activity are below the requisite benchmark.</p> <p>The IRR calculations of project activity exhibit that the IRR of the project without VCUs revenue for all the project participants is below the required rate of return (RRR).</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 45%;">Project participants</th> <th style="width: 20%;">WACC</th> <th style="width: 35%;">IRR % without VER</th> </tr> </thead> <tbody> <tr> <td>Dollar Apparels - 2 * 1650</td> <td style="text-align: center;">13.26</td> <td style="text-align: center;">10.81</td> </tr> <tr> <td>Dollar Apparels – 5 * 750</td> <td style="text-align: center;">12.96</td> <td style="text-align: center;">9.04</td> </tr> <tr> <td>Devi Sea Foods 1</td> <td style="text-align: center;">13.25</td> <td style="text-align: center;">10.63</td> </tr> <tr> <td>Devi Sea Foods 2</td> <td style="text-align: center;">15.00</td> <td style="text-align: center;">10.46</td> </tr> <tr> <td>MCTM Global</td> <td style="text-align: center;">15.08</td> <td style="text-align: center;">7.24</td> </tr> </tbody> </table>	Project participants	WACC	IRR % without VER	Dollar Apparels - 2 * 1650	13.26	10.81	Dollar Apparels – 5 * 750	12.96	9.04	Devi Sea Foods 1	13.25	10.63	Devi Sea Foods 2	15.00	10.46	MCTM Global	15.08	7.24	<p>project cost, net cash flow, additional depreciation, interest on term loan) are verified with references^{/PO, LSL, PPA, O&M/} provided by PP. Based on the assesment the chosen bench marks for all the project participants are appropriate and deemed acceptable. The project developer has demonstrated that the expected return from the project activity is lower than the chosen WACC benchmark.</p> <p>The project revenue is sensitive to the electricity generation and project cost. 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 benefits.</p> <p>The sensitivity analysis have also been provided for individual developers with increase in the generation, O&M Cost and project cost to a tune of +/- 10% and it has been verified that the Project IRR does not cross the chosen bench mark.</p> <p style="margin-top: 20px;"> <input checked="" type="checkbox"/> Step passed <input type="checkbox"/> Step not passed <input type="checkbox"/> Not applicable </p>
Project participants	WACC	IRR % without VER																		
Dollar Apparels - 2 * 1650	13.26	10.81																		
Dollar Apparels – 5 * 750	12.96	9.04																		
Devi Sea Foods 1	13.25	10.63																		
Devi Sea Foods 2	15.00	10.46																		
MCTM Global	15.08	7.24																		

VCS 2007.1 Validation Report

Step as per VCS 2007.1	Argument	Assessment																			
	<table border="1" data-bbox="496 259 1018 582"> <thead> <tr> <th data-bbox="496 259 794 293">Investments</th> <th data-bbox="794 259 906 293"></th> <th data-bbox="906 259 1018 293"></th> </tr> </thead> <tbody> <tr> <td data-bbox="496 293 794 349">Srinivasan Raghavan</td> <td data-bbox="794 293 906 349">13.96</td> <td data-bbox="906 293 1018 349">9.39</td> </tr> <tr> <td data-bbox="496 349 794 405">R.Thirunavakuarsu</td> <td data-bbox="794 349 906 405">13.96</td> <td data-bbox="906 349 1018 405">9.39</td> </tr> <tr> <td data-bbox="496 405 794 461">Standard Fireworks</td> <td data-bbox="794 405 906 461">13.43</td> <td data-bbox="906 405 1018 461">10.39</td> </tr> <tr> <td data-bbox="496 461 794 517">Thiagarajar Mills</td> <td data-bbox="794 461 906 517">13.26</td> <td data-bbox="906 461 1018 517">10.98</td> </tr> <tr> <td data-bbox="496 517 794 582">Aditya Marine</td> <td data-bbox="794 517 906 582">13.26</td> <td data-bbox="906 517 1018 582">8.85</td> </tr> </tbody> </table> <p data-bbox="496 616 1034 1473">The sensitivity analysis is also carried out. The purpose of the sensitivity analysis is to demonstrate the sensitivity of the return on project due to uncertainty in Generation O&M cost and project cost. From the 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. It is evident that the project activity having lower returns while comparing benchmark without VCS revenue. s are higher than other states. Such power policies of the state government impediments implementation of clean power projects.</p>	Investments			Srinivasan Raghavan	13.96	9.39	R.Thirunavakuarsu	13.96	9.39	Standard Fireworks	13.43	10.39	Thiagarajar Mills	13.26	10.98	Aditya Marine	13.26	8.85		
Investments																					
Srinivasan Raghavan	13.96	9.39																			
R.Thirunavakuarsu	13.96	9.39																			
Standard Fireworks	13.43	10.39																			
Thiagarajar Mills	13.26	10.98																			
Aditya Marine	13.26	8.85																			
Step 3: Common Practice	<p data-bbox="480 1473 1034 1975">From the Annual report 2005-2006 of Central electricity authority (CEA)¹, which shows that the Wind energy has only 6.48% of the installed capacity as compared to 33.63% of hydro and 55.31% of thermal in Southern Regional electricity Grid. The above shows that power generation using wind energy in southern region face the common practice barrier due to preference for thermal generation because of higher</p>	<p data-bbox="1034 1473 1522 1975">From the Common Practice analysis provided by the PP it is found that the scope of existing and upcoming wind energy projects of similar or higher scale is 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.</p>																			

¹ http://cea.nic.in/power_sec_reports/Executive_Summary/2005_03/22-28.pdf

VCS 2007.1 Validation Report

Step as per VCS 2007.1	Argument	Assessment
	capacity utilization and availability of fossil fuel sources in the state.	OK. <input checked="" type="checkbox"/> Step passed <input type="checkbox"/> Step not passed <input type="checkbox"/> Not applicable

However, CAR 3.2.1 to CAR 3.2.3 was raised.

VCS 2007.1 Validation Report

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
<p>CR 3.2.1</p> <p>Description about the appropriateness and estimation of benchmark and according to EB 39; annex 35 "The Risk premiums applied in the determination of required returns on equity shall reflect the risk profile of the project activity being assessed." Explain why this country risk premium reflects the risk profile of the project activity. Also clarification requested for selecting single benchmark for the project activity since the investment decision of the project participants is in different period</p>	<p>/PD/ 2.5</p>	<p>According to paragraph 11 of Annex 45 of EB 41 of CDM, "Local commercial lending rates or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR". WACC has been now chosen as the appropriate benchmark for the project IRR. and it has been calculated for individual project activity based on the every individual investment decision date. The justification is now provided in section 2.5 of the PD.</p>	<p>/PD/ 2.5</p>	<p>PP has taken the WACC as the benchmark for the project activity which is also inline with as per the Guidance on Investment Analysis EB 41, Annex 45, and version 2. Project proponents have demonstrated through the investment analysis that the financial returns of the project activity are below the requisite benchmarks is not worthwhile by taking all the risks associated with the project activity. Since the project activity has been implemented in various years and various project participants the cost associated with its implementation are different in nature also returns expected from the project activity also vary according to the market scenarios. Project promoters</p>

VCS 2007.1 Validation Report

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				<p>considering different benchmarks according to their investment decision taken period is appropriate and deemed to be acceptable. CAR 3.2.1 is closed</p>

VCS 2007.1 Validation Report

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
<p>CAR 3.2.2</p> <p>Proof for the estimated generation for the project activity and emission reduction working sheet need to be submitted to validator.</p>	<p>/PD/ 2.5 1.2 1.4</p>	<p>The same has been submitted to the validator.</p>	<p>/PD/ 2.5 1.2 1.4</p>	<p>The estimated generation has taken based on the guaranteed generation given by the equipment suppliers after applying all the correction factors (95% machine availability 95% grid availability, 5% losses due to uncertainty in wind pattern and modelling). The same has been verified with the documents^{/PO/} provided by the project participants and found appropriate for the project activity. CAR 3.2.2 is closed.</p>
<p>CAR 3.2.3</p> <p>The identified baseline and emission factor calculation is not inline selected methodology. Correction requested. Also give a reference (weblink) for the CEA database.</p>	<p>/PD/ 2.1 4.2</p>	<p>The baseline and emission factor calculation has been changed accordingly to the methodology. Also reference is provided for the CEA data base.</p>	<p>/PD/ 2.1 4.2</p>	<p>The identified baseline for the project activity is that the absence of the project activity the power would have been generated from the fossil fuels dominant southern grid. The same has been verified with the link provided in the revised PD and baseline is inline with the selected</p>

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				<p>methodology of ACM 0002. Also the baseline emission factor has been calculated as per "Tool to calculate the emission factor for an electricity system" which is inline with the methodology</p> <p>CAR 3.2.3 is closed.</p>

3.3 Monitoring Plan

The proposed project used CDM approved methodology ACM 0002/Version 10: "Consolidated Baseline Methodology for grid connected electricity generation from renewable sources", which is approved under VCS 2007.1.

The project satisfies all criteria for ACM0002. The application of monitoring methodology is assessed as correct.

The revised monitoring plan^{/PD/} 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

This methodology stipulates that monitoring shall consist of metering the net electricity exported (to the grid) by the renewable technology. Tamil Nadu State Electricity Board is certifying agency for meter reading. The net electricity supplied to the Southern grid is monitored with the help of electricity imported and exported to the grid which is directly obtained from meter readings which is unique for the WEG connected through the Tamilnadu State Electricity Board (TNEB) grid which is in part of the Southern grid. The connected meter is the two-way meter which can measure both import and export located

at grid interconnection point owned by the state electricity board. Joint meter reading is certificate for electricity generated by WEGs for the month being taken by State electricity board in presence of project proponent representative. The net quantity of electricity supplied to the grid would be calculated ex-post from the recorded readings from the meter that is the difference between export and import.

During the on-site visit the monitoring personnel were interviewed^{/IM01//IM03/} to cross check their roles & responsibilities, competency and training of the staff members^{/TRG/} w.r.t project management, monitoring and reporting, operation and maintenance scheduled^{/O&M/}, monitoring plan^{/PD/}, net electricity generation records^{/GR/}, calibration procedures/frequency for the meters^{/CAL/} and were found to be satisfactory. Data are monitored continuously. Measurements are recorded every month. Electricity sale invoices will be kept for cross-checked. The meters are calibrated by the TNEB officials within 3 years as per the requirements of UNFCCC (EB 41, Annex 20). Calibration, periodical testing, Responsibilities related to monitoring and maintenance procedures of monitoring equipment are clearly defined in the section 3 of the PDD. This was checked and found to be ok.

However, CAR 3.3.1 and CR 3.3.2 have been raised.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
<p>CAR 3.3.1 In section 3.3 Description of measurement methods and procedures has to be changed as below.</p> <ul style="list-style-type: none"> • Monitoring ... • Data type... • Frequency... • Recording... • Archiving policy... • Calibration frequency... • Accuracy 	/PD/ 3.3	The details are provided in section 3.3 in the revised PD.	/PD/ 3.3	All the relevant information about the monitoring methods and procedures is incorporated in the revised PD in section 3.2. CAR 3.3.1 is closed.

3.4 Calculation of GHG Emissions

The calculation of emission reductions is based on subtracting project emissions and leakage from the baseline emissions. As the plant runs exclusively with wind energy without any usage of fossil fuel, the project emissions is considered as zero. Leakage is considered to be zero as per applied methodology since there is no equipment is transferred from another activity or if the existing equipment is transferred to another activity.

Following the ACM 0002 methodology, the combined margin (CM) methodology calculated ex-ante was chosen to calculate the baseline emission factor.

Baseline emission is equal to Electricity supplied to the grid by the project activity (EG_y) multiplied by the grid emission factor (EF_y). The net electricity export to the grid is cross checked with the sale records to the grid and other records maintained by the monitoring personnel.

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}) and the build margin emission factor (EF_{BM}).

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: November, 2008) issued by CEA.

The calculation of emission reduction is assessed as adequate, transparent and conservative.

However CAR 3.4.1 is raised.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR 3.4.1 Provide the transparent calculations of the emissions reductions in section 4 of the PD.	/PD/ 4.1. 4.2 4.3	The calculation of emission reduction provided in the revised PD.	/PD/ 4.1. 4.2 4.3	The transparent calculations of emission reduction and emission factor have given in the revised PD. The same has been verified ^{/PO//ER//CEA/} and found to be

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				OK. CAR 3.2.3 is closed.

3.5 Environmental Impact

As per the Schedule 1 of Ministry of Environment and Forests (Government of India) notification dated 27th. 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/sol1533.pdf>

The proposed project doesn't fall under the list of activities requiring EIA as it will not involve any negative environmental impacts, as the WEGs installed for generation of power use wind (cleanest possible source of renewable energy).

No CAR/ CR was raised.

3.6 Comments by stakeholders

The promoters organized formal & informal stakeholder consultation with the objective to inform the local interested stakeholders which include villagers, technology suppliers, representative from state electricity board and social workers in the local region on the environmental and social impacts of the project activity and discuss their concerns related to the development and operation of the activity. A stakeholder consultation meeting of the project were conducted and the schedule of same is provided under section 6 of VCD PD. All the Comments were positive and it has been verified that all comments sufficiently have been addressed. The same has been confirmed with the documents^{/LSC/} provided by the project proponent.

4 Validation conclusion

M/s Vestas Wind technology India Private Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project - "16.65 MW Bundled Wind Power Project in Tamilnadu", 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 3 Corrective Action Requests (CAR) and 6 Clarification Requests (CR) were raised and successfully closed out.

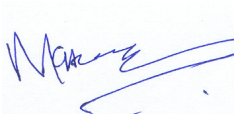
The validation is based on the VCS PD, proof of title, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validators by project proponent.

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 ACM 0002 Version 10.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 3, 96,420 t CO₂e (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, 2009-11-15

Rainer Winter
Final approval
Essen, 2009-11-16

TÜV NORD JI/CDM Certification Program

5 References

Table 5-1: Documents provided by the project proponent

Reference	Document
/CC/	Commissioning Certificates of all the WEGs
/DEC/	Declaration letter that the “the project has not created another form of environmental credit”
/ER/	<ul style="list-style-type: none"> • Emission reduction worksheet for monitoring (draft) • Emission reduction worksheet for monitoring (final)
/IRR/	IRR calculation sheets consisting of Investment Analysis, Returns from Project activity and profitability projections of the Project
/LSC/	Local stakeholder interviews
/ORG/	Organization chart.
/PD/	<ul style="list-style-type: none"> • PD draft version • PD final version
/CR/	Calibration Report of all energy meters in the bundle.
/PO/	Purchase orders of WEG’s
/PPA/	Power purchase agreements
/SC/	Permission for setting up of wind farm at respective project site (in form of technical clearances)
/SD/	Proof of starting date of project activity. (based on Commissioning Certificates)

Table 5-2: Background investigation and assessment documents

Reference	Document
/ACM0002/	Consolidated baseline methodology for grid-connected electricity generation from renewable sources (Version 10)
/CEA/	CO ₂ Baseline Database for Indian Power Sector -User Guide, Ver 4 dated September 2008 published by CEA.
/CPM/	TÜV Nord JI / CDM CP Manual (incl. CP procedures and forms)
/GCP/	1. Voluntary Carbon Standard Project Description Template 2. UNFCCC: Guidelines for Completing the Project Design Document (CDM- -PDD)
/GHG/	The Greenhouse Gas Protocol, The GHG Protocol for Project Accounting
/IPPC-RM/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book
/KP/	Kyoto Protocol (1997)
/MA/	Decision 17/CP.7 (Marrakesh – Accords)
/TOOL/	“Tool to calculate the emission factor for an electricity system” version 1.1
/VVM/	Validation and Verification Manual

Table 5-3: Websites used

Reference	Link	Organisation
/cea/	www.cea.nic.in	Central Electricity Authority
/moef/	http://envfor.nic.in/	Ministry of Environment and Forests.
/unfccc/	www.unfccc.int	Unfccc website
/unfccc/	http://cdm.unfccc.int	UNFCCC
/vcs/	www.v-c-s.org	VCS website

Table 5-4: Interviewed Persons

Reference		Name	Organisation / Function
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Venkata Naidu	Area Service Manager - Coimbatore
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Chockalingam Swamy	Area Service Manager - Thirunelveli
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Kathirvel	Site Operator Vestas Wind Technology India Private Limited.
/IM01/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Sathishkumar	Site operator Vestas Wind Technology India Private Limited.
/IM02/	<input checked="" type="checkbox"/> Mr. <input type="checkbox"/> Ms.	Arun Kumar Bojan	Senior Engineer, Vestas Wind Technology India Private Limited.

==XX==