



Voluntary Carbon Standard 2007.1 Final Validation Report

Report No: 53612608-09/87

Validation Report:

Name of Validation company:	Date of the issue:
TÜV NORD CERT GmbH	2009-11-17
Report Title:	Approved by:
“Bundled wind power project by KMSPL, Bangalore”	Eric Krupp
Client:	Project Title:
M/s. Kanaka Management Services Pvt. Ltd.	“Bundled wind power project by KMSPL, Bangalore”
Summary:	

M/s. Kanaka Management Services Pvt. Ltd has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Validation of the project - “Bundled wind power project by KMSPL, Bangalore” 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 6 Corrective Action Requests (CARs), 7 Clarification Requests (CRs) and 1 FAR 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 833,500 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, ACM0002 Version 10, 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 ACM0002, Version 10: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”) which are included in the VCS 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
- 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

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

- Final validation reporting

The information included in the VCS PD^{/PD4/} 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 in the districts of Tirunelveli, Coimbatore and Erode in the State of Tamil Nadu and in the districts of Hassan and Davangere in the State of Karnataka, India. The project activity involves the installation of Wind turbines of 8 X 0.75 MW capacity, 7 X 1.25 MW capacity, 4 X 1.5 MW capacity, 2 X 2.5 MW, 1 x 0.4 MW, 3 X 0.225 MW, 1 X 0.7 MW, 4 X 0.35 MW, 1 X 0.25 MW & 3 X 0.6 MW capacities, thereby totalling to an aggregate installed capacity of 38.275 MW.

Table 1: Details of the location of WTGs

S. N.	Client name	WTG size	Grid/captive	HTSC No	WTG details	Geographical coordinates
1	Madras Hydraulic Hose (P) Ltd.	0.75	Captive		NEG Micon, NM48/750	N8 58 0.01, E77 23 59.99
2	Shanthi Gears Ltd.	1.25	Grid	1624/TIN	Suzlon, S66-1250	N8 59 28.0, E77 32 41.8
		1.5	Captive	2417	Suzlon, S82-1500	E 77 31 56.1 N 8 59 35.6
		2.5	Grid	56; 2020	Suzlon, S66-1250	E 77 33 30.5 N 9 01 11.3; E 77 45 41.0 N 8 14 14.0
3	Raj Ranga Textile Pvt. Ltd.	1.25	Captive	986	Suzlon, S66-74, 1250	N10 48 09.5 E77 08 42.9
4	Sueeraa Alloys Global Pvt. Ltd.	1.25		989	Suzlon, S66-74, 1250	N10 48 23.2 E77 08 50.8
5	Cotton Blossom India Pvt. Ltd.	0.75	Grid			
				1416	NEG Micon,	N8 57.436 E77 30.01

S. N.	Client name	WTG size	Grid/captive	HTSC No	WTG details	Geographic coordinates
		0.75	Grid	2048	NM48/750 NEG Micon, NM48/750	N8 55.923 E77 38.140
6	Ambica Agarbathies and Aroma Industries Ltd.	0.75	Captive	1198	NEG Micon, NM48/750	N8 58 21.7 E77 26 53.2
7	Tirupur Export Knitwear Industrial Complex	4	Grid	1269; 1270; 1271	Vestas RRB, V39-500	N8 18 09.1 E77 41 28.5, N8 18 00.9 E77 41 28.6, N8 18 12.6 E 77 41 38.6, N8 18 04.9 E77 41 39.1, N8 18 15.7 E77 41 49.2, N8 18 7.2 E77 41 49.5, N8 18 17.2 E77 42 1.7, N8 18 9.7 E77 41 59.9
8	Ansan Textile	0.225	Grid	609	NEPC M700-225/40	N10 55.473, E77 17.439
9	Sree Santhosh Garments	0.225	Captive	473	NEPC M700-225/40	N10 55.214 E77 17.391
10	Mod Forge Pvt. Ltd.	0.75	Captive	1952	NEG Micon, NM48/750	8.7° N , 77.8° E.
11	Sri Kumaran Wind Energy (P) Ltd	3.75	Captive	1739, 1725, 1726	Suzlon, S66-1250	8° 58'54.25", 77°27'31.63 "
12	Eskay Design	1.25	Grid	1982	Suzlon, S66-1250	N8 59 50.9 E77 32 54.4
13	Nutech Associates	1.25	Grid	1198	Suzlon, S66-1250	N10 39 42.9 E77 24 47.3
		0.75	Grid		NEG	N 8 15 51.6

NEG

VCS 2007.1 Validation Report of the GHG emission reduction project entitled “Bundled wind power project by KMSPL, Bangalore”

S. N.	Client name	WTG size	Grid/captive	HTSC No	WTG details	Geographic coordinates
					Micon, NM48/750	E77 37 59.4
		1.5	Grid	H-20	Suzlon, S82-1500	13° 10.6' 32" N 76° 11.6' 93" E
14	Oriental Extractions Pvt. Ltd.	0.7	Captive	1201, 1206	Suzlon, S-33, 350	N10 35 43.9 E77 18 07.0, N10 36 12.3 E77 19 20.4
15	Nagammal Mills Pvt. Ltd.	1.5	Grid	1626, 2126	NEG Micon, NM48/750	8°58'54.25", 77°27'31.63' '9°00'54.37" ,77°24'29.3 7"
16	Best Engineers Pumps Pvt. Ltd .	1.25	Grid	1939	Suzlon, S66-1250	N8 59 19.4, E77 33 40.2
17	Premier Carbonic Pvt. Ltd.	0.35	Grid	1145		N103622.7, E771828.0
18	Pure Carbo Gases	0.25	Grid	580	Pioneer Wincon, W-250	N10.94104 E077.31165
19	Popular Carbonic Pvt. Ltd.	0.35	Grid	1144		N103551.7, E771802
20	Royal Classic Mills Pvt. Ltd	0.75	Captive	1937	NEG Micon, NM48/750	N85805.8, E77 29 54.7
21	Saranya Garments Pvt. Ltd.	0.75	Grid	2124	NEG Micon, NM48/750	N8 56 400, E77 38 403
22	Cethar Vessels Ltd	1.25		1648	Suzlon, S66-1250	N8 55 36.7, E77 36 20.6
23	VT Switch gears & Transformers	0.6	Grid		Vestas RRB, PS-600	N14 13 59.8, E75 47 3.1
24	Shri Santhosh Meenakshi Textiles	2.5 (0.5 MW x 5 No.)		337; 667; 628; 420; 421	NEPC - 500	N10 54.342, E77 10.271, N10 55.178, E77 08.773, N10 55.466, E77 09.031, N10 55.441, E77 08.748,

S. N.	Client name	WTG size	Grid/captive	HTSC No	WTG details	Geographic coordinates
						N10 54.290 E77 10.419
25	Lakshmi Exports	0.35	Grid		Suzlon, S33- 350	N10 56 28.9, E77 20 42.2
		0.225	Grid	474		N10 56 27.72, E77 20 42.27
26	Adtech Systems Ltd	0.6	Grid	D 126	Suzlon, S52-600	N10 32 09.9, E77 24 42.5
27	Nutech Prasiddhi Consortium	1.5	Grid	H20	Suzlon, S82-1500	76° 11.7' 75" E, 13° 10.5' 30" N
28	Sri Ramiah Spinners Ltd.	0.35	Captive	2390	Suzlon, S33- 350	N8 18 07.1, E77 37 54.9
29	Jayashree Cables & Conductors Ltd.	0.6	Grid		Suzlon, S52-600	N10 32 38.8, E77 24 52.4

The electricity generated by the project activity is exported to Tamil Nadu Electricity Board (TNEB) in the State of Tamil Nadu & Karnataka Power Transmission Corporation Limited (KPTCL) in the State of Karnataka, which are 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 States of Karnataka and Tamil Nadu.

The estimated electricity supplied to the grid from the project activity is about 89,923.7 MWh per year. The GHG emission reductions that are projected to be achieved are 833,500 tCO₂e during the chosen ten year crediting period.

1.4 Level of assurance

The validation report is based on VCS PD^{/PD1 to PD4/}, financial spreadsheet^{/XLSI 1-29 to XLSIII 1-29/}, 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 from August 2009 to November 2009.

Preparations: 2009-08-09 to 2009-10-13

On-site validation: 2009-09-20 & 2009-09-21

(Draft) Reporting: 2009-08-20

(Final) Reporting: 2009-11-17

The validation consisted of the following three phases:

- a desk review of the project design, 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. Kanaka Management Services Pvt. Ltd. in August 2009 and supporting background documents related to the project design and baseline were reviewed September, October and November. 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

From 2009-09-20 and 2009-09-21, the TÜV NORD JI/CDM CP performed validation site visit at the project locations in Tirunelveli, Coimbatore and Erode districts in Tamil Nadu and Hassan and Davangere in Karnataka.

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 interviewee 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
2. Consultants /IM02/	- Project design, Commissioning and implementation - Technical equipment and operation of the project - Performance of the project - Involved personnel and responsibilities

Interviewed Persons / Entities	Interview topics
	- 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

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^{/PD4/}; resolving the CARs & CRs raised and outstanding concerns, TÜV NORD JI/CDM CP issues this final validation report and opinion.

6 CARs, 7 CRs and 1 FAR 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 CAR, CR and FAR issued

Validation topic	No. of CAR	No. of FAR	No. of CR
D- Project Design	2	-	2
B- Baseline and additionality	3	-	2
M- Monitoring plan	-	-	1
C- Calculation of GHG emissions	-	1	2

Validation topic	No. of CAR	No. of FAR	No. of CR
E- Environmental Impact	-	-	-
L- Local Stakeholder Comments	1	-	-
SUM	6	1	7

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

3.1 Project Design

The proposed project utilizes wind power for electricity generation. Total installed capacity of the project is 38.275 MW. The estimated electricity supplied to the grid is about 89,923.7 MWh per year. This project is equipped with WTGs developed by Suzlon make S-66, S-33, S-52, S-82, Pioneer Wincon W-250, NEG Micon, Vestas RRB, NEPC -500.

Supporting documents like purchase orders^{/PO/} of the WTGs by the investors 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 turbine

Technical details for S-66

Rotor	
diameter	66 m
blades	3 No.
Orientation	Upward/ horizontal axis
Rotational speed	13.8 / 20.7 rpm
Rotational direction	clockwise
Swept area	3421 m ²
Hub height	74 m
regulation	Pitch regulated
Operational data	
Cut in wind speed	3 m/s
Rated wind speed	14 m/s
Cut off wind speed	22 m/s
Gearbox	
Type	Integrated 3 stage
Cooling	Oil cooled, forced lubrication
Generator	
Type	Asynchronous, 4/6 pole
Rated voltage	690 V
Frequency	50 Hz
Cooling	Air cooled

Technical details for S-82

Rotor	
diameter	82 m
blades	3 No.
Orientation	Upward/ horizontal axis
Rotational direction	clockwise
Swept area	5281 m ²
Hub height	80 m
regulation	Pitch regulated
Operational data	
Cut in wind speed	4 m/s
Rated wind speed	12.5 m/s
Cut off wind speed	20 m/s
Gearbox	
Type	Integrated 3 stage
Generator	
Type	Asynchronous, 4 pole
Rated voltage	690 V
Frequency	50 Hz
Cooling	Air cooled

Technical details for S-52

Rotor	
diameter	52 m

Rotor	
blades	3 No.
Orientation	Upward/ horizontal axix
Rotational direction	clockwise
Swept area	2124 m ²
Hub height	75 m
regulation	Pitch regulated
Operational data	
Cut in wind speed	3.5 m/s
Rated wind speed	12 m/s
Cut off wind speed	25 m/s
Gearbox	
Type	Integrated 3 stage
Cooling	Oil cooled, forced lubrication
Generator	
Type	Asynchronous, 4 pole
Rated voltage	690 V
Frequency	50 Hz
Cooling	Air cooled

Technical details for S-Vestas NM48

Rotor	
diameter	48.2 m
blades	3 No.
Orientation	Upward/ horizontal axix
Rotational direction	clockwise
Hub height	55 m
Operational data	
Cut in wind speed	< 3.5 m/s
Cut off wind speed	25 m/s
Gearbox	
Cooling	Splash lubrication
Generator	
Nominal power	750/ 200 kW
Rotational speed (synchronous)	1500/ 1000 rpm
Insulation class	F

The project duration is: 20 years.

Start date of the project activity: 2005-03-22

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

There are twenty nine individual investors this bundled project activity. These investors have authorized M/s. Kanaka Management Services Pvt. Ltd. for all carbon

related activities and communication. Authorization letters^{/PoA/} in this regard have been verified.

Proof of title was submitted to the DOE. Power Purchase Agreements^{/PPA1- PPA29/} & Commissioning Certificates^{/CR1- CR29/} are 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, CARs and CRs were raised and successfully closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CARD1 The PLF has been taken as per the Tamil Nadu Electricity Regulatory Commission amendment to order dated 2006-05-18, and the Karnataka Electricity Regulatory Commission Order dated 2005-01-18. However, the same has not been considered in the calculation of emission reductions. The reference link for PLF as per TNERC is not mentioned. Clarify as to why TNERC PLF	/PD1/ 1.9 4.0	Revised ER calculation considers the used PLF for Karnataka (26.5%) and for Tamil Nadu (27.46%). Average state PLF has been considered in the PD. Further as per the TNERC order, the PLF of 25.9 has been taken. The revised PD given web link to TNERC tariff order.	/PD3/ 4.0	The average PLF has been considered in estimating the annual generation for the project. The PLF for Tamil Nadu machines has been revised as per the TNERC 2006 order and its amendment. The correct PLF of 25.9 has been chosen depending on the year of commissioning (25.29%-2005 and 27.46%-2006 onwards). The suitable web links have been provided. Therefore the emission reductions have been revised to 83,350 tCO ₂ e. The revised value is found to be OK and as per the state electricity

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
relevant to WTGs commissioned after the 2006 order has been considered when the first WTG of the project was commissioned in 2005.				regulations. Hence, CAR D1 is closed.
CAR D2 Unique identification no. and geographical coordinates for each individual machine is not provided in the PD. Annex 2 of the PD is missing.	/PD 1/ /PD2/	The unique identification numbers and geographical coordinates for each machine have been given in Attachment 1 (spreadsheet) and Annex 2 of the PD.	/PD3/	All the details in response to the clarification raised, which provides unique identification and delineation of this project activity has now been included under Annex 2 of the revised PD. The details were verified during site visit and are found to be OK. Hence CAR D2 is closed.
CR D1 1) PD version and date is not mentioned 2) Methodology version no mentioned in section 4.3 is incorrect. Also please clarify which	/PD1//PD2/ 1.0	1) These details are provided now. 2) This has been rectified.	/PD3/ 1.0	The final revised PD (Version 3; 2009-11-05) contains version and date, Annex 2 with project location and geographical coordinates. The version of methodology

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
version of additionality tool has been referred to. 3) The format in which the years (2006-2007, etc) is mentioned is incorrect 4) Please submit the proof for start date of the project activity and also mention the life time of the project. 5) There is no annexure in PD as mentioned. 6) Attachment 1 is not included in the PD. Include title of the project in Attachment 1 and financial worksheet 7) The make of the WTGs are not mentioned in project technology description.		3) The format of years is changed in revised PD. 4) Proof of start date is being submitted (earliest WTG commissioned from the bundle). 5) The revised PD contains Annex 2 6) These referred to the Attachments (separate excel sheets submitted to DOE). 7) Make of WTGs is mentioned now.		ACM0002 (version 10) has been mentioned in the revised PD. Commissioning certificates of the first WTG have been submitted as proof of start date. Project lifetime of 20 years has been included in the PD. Attachment 1 specified unique identification number. Section 1.9 mentions the make of the WTGs. Section 1.13 mentions the status of the WTGs of the project which are currently undergoing validation under the CDM process. The responses w.r.t points 1) to 6) are found to be OK. Hence CR D1 is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
8) Under section 1.13, specify the WTGs which applied for other carbon credits like CDM etc under this section along with all details like WTG no and status of the project activity.		8) Section 1.13 is modified to include status of other carbon credit mechanism applications. All the WTGs are under the CDM validation process.		
9) The Contact details in section 1.15 are incomplete.		9) The contact details of the PP have been included in section 1.15		
CR D2 Technical specification has not been given for WTGs. Also provide the documentary evidence for technical specifications.	/PD1/	Technical specifications are included and documentary evidences (Purchase Order annex) are being submitted.	/PD3/	Section 1.9 contains the technical specifications of the WTGs. This was verified against the specifications in the purchase orders and was found to be in agreement. Hence CR D2 is closed.

3.2 Baseline

The proposed project adopts CDM approved methodology ACM0002, 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 baseline methodology is assessed as correct. There is no methodology deviation or revision.

The project participant used ACM0002, version 10 approach to determine the emission coefficient of the indicative simplified baseline and monitoring methodologies for selected large scale CDM project activity which states that the baseline scenario in case of installation of a new grid-connected renewable power plant/unit is *“Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”*. 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 (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 0.9982 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 state 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 approach have been established to demonstrate the additionality.

Step as per VCS 2007.1	Argument	Assessment
Step 1: Regulator	There is no law or regulation prevalent in the states of Tamil Nadu	Validation team has checked all the National Regulations

Step as per VCS 2007.1	Argument	Assessment
y Surplus	and Karnataka that makes mandatory the establishment of the wind power plant for power generation	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 shall face one (or more) distinct barrier(s) compared with barriers faced by alternative projects. An investment of the project was conducted with project IRR as suggested by additionality tool. The internal rate of return (IRR) on investment as financial indicator is one of the known financial indicator used by banks, financial institutions and project developer for making investment decision. The financial indicator chosen is the internal rate of return of the project (IRR). This is compared with the cost of financing which has been taken from the Weighted Average Cost of Capital from market based returns using Capital asset pricing model. For the investment analysis a useful life of 20 years has been considered for projections of cash flow. The sub projects have been considered for investment analysis of the project. All the relevant cost i.e. capital cost, O&M cost and revenue (excluding VER revenue and including subsidies/fiscal incentive wherever applicable) for investment analysis.	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 and found OK. 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 as appropriate for the project activity. Using the investment analysis, the project proponents have demonstrated the Project IRR of all the 29 investors as mentioned in the below table.

Step as per VCS 2007.1	Argument	Assessment		
	Since the project activity generates financial benefits other than CDM related income, the investment analysis is carried out by ‘benchmark analysis’ as referred in additionality tool version 5.2 sub-step 2b – option III. The project activity bundle has WTGs installed between 2005 and 2007. So the Benchmark i.e. WACC has been calculated for each financial year. To arrive at this benchmark risk free rate The Risk free rate (rf) has been taken from the long term government bond rates at the time of the investment decision of the project activity (sub Bundle) in 2004 to 2007 (http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf). The average interest rate on Central Government date Securities² i.e. bond rate during year for the considered financial years (i.e. 2004-05 to 2006-07) was chosen. The Market Risk Premium, as measured and applied in practice, is the premium above the risk-free rate of return that investors expect to earn on a well-diversified portfolio of equities. The expected rate of return on a market portfolio (E (rm)) has been calculated as the compounded annual growth rate of the market portfolio. Hence BSE Sensex has been considered for calculating the Expected market return at the time of taking decision of project activity. The	Project proponent	Project IRR (%)	Benchmark (%)
		1. Madras Hydraulic Hose P.Ltd.	11.85	14.55
		2. Shanthi Gears Ltd.	12.57 13.92 13.20	14.55 15.91 13.36
		3. RAj Ranga Textile	11.79	14.55
		4. Sueeraa Alloys	11.64	14.55
		5. Cotton Blossom india	11.45	14.55
		6. Ambica Agarbat his	12.17	14.55
		7. Tirupur Exports	8.91	14.55
		8. Ansan Textile	12.28	13.36
		9. Sree Santhos h garments	12.57	14.55
		10. Mod Forge	12.60	13.36
		11. Sri Kumara n Wind Energy	13.93	14.55
		12. Esky Design	12.19	13.36

Step as per VCS 2007.1	Argument	Assessment										
	Expected market return has been estimated for year 2004-05 to 2006-07 on the basis of average of each months return.	13.Nutech Associates	12.64 11.64 10.85	14.55 14.55 15.91								
		14. Oriental Extractions	11.26	14.55								
		15.Nagammal Mills	10.93	13.36								
		16. Best Engineers Pumps	12.76	13.36								
	Beta calculation for four power generating industries has been carried out to arrive at the average beta applicable to this project activity.	17. Premier Carbonic	11.03	14.55								
		18.Pure Carbo Gas	12.15	13.36								
		19.Popular Carbonic	12.09	14.55								
		20.Royal Classic Mills	13.35	13.36								
	Along with this, The Cost of Debt has been considered as Prime Lending Rate (PLR) (http://www.rbi.org.in/scripts/PublicationsView.aspx?id=9581) at the time of investment decision of the project activity.	21.Saranya Garments	12.08	13.36								
		22.Cethar Vessels	12.10	14.55								
		23.VT switch Gears	12.14	14.55								
		24.Shri Santhosh Meenakshi Mills	12.08	13.36								
	<table><tr><th>Year</th><th>Cost of Debt</th></tr><tr><td>2004-05</td><td>10.25%</td></tr><tr><td>2005-06</td><td>10.25%</td></tr><tr><td>2006-07</td><td>12.25%</td></tr></table>	Year	Cost of Debt	2004-05	10.25%	2005-06	10.25%	2006-07	12.25%	25.Lakshmi Exports	12.95 10.63	13.36 14.55
		Year	Cost of Debt									
		2004-05	10.25%									
	2005-06	10.25%										
	2006-07	12.25%										
The WACC this calculated for the years 2004-05, 2005-06, 2006-07 are 14.55%, 13.36% and 15.91% respectively.												
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.												

Step as per VCS 2007.1	Argument	Assessment		
		26.Adtech Systems	11.58	13.36
		27.Nutech Prasiddi	13.66	15.91
		28.Sri Ramiah Spinners	13.42	15.91
		29.Jayashree Cables & Conductors	13.58	15.91
		Above mentioned Project IRRs for all the investors including the one getting highest returns i.e., 13.93% (for the year 2005-06) from the project activity is lower than benchmark WACC of 14.55%. Thus, the established investment barrier has been assessed to be correct. The arguments with supporting spreadsheets^{/XLS I, II, III-1-29/} provide proof for the non-viability of the project. The input data and assumptions for calculation of IRR like (profit after tax, net cash flow, book depreciation, term loan & equity) were verified with references^{/PO/, /LOAN/, /PPA1-PPA29/, /O&M/} provided by PP. The considered benchmark is appropriate. The estimated annual electricity for the WTGs located in Tamil Nadu is		

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><th>Project proponent</th><th>IRR at +10 PLF (%)</th><th>IRR at base PLF (%)</th><th>IRR at - 10 PLF (%)</th></tr><tr><td>1. Madras Hydraulic Hose P.Ltd.</td><td>13.44</td><td>11.85</td><td>10.20</td></tr><tr><td>2. Shanthi Gears</td><td>14.08 15.76</td><td>12.57 13.92</td><td>11.00 12.04</td></tr></table>	Project proponent	IRR at +10 PLF (%)	IRR at base PLF (%)	IRR at - 10 PLF (%)	1. Madras Hydraulic Hose P.Ltd.	13.44	11.85	10.20	2. Shanthi Gears	14.08 15.76	12.57 13.92	11.00 12.04	based on the PLF of 27.46% for the WTGs commissioned in 2006 and onwards, and 25.29% for earlier as commissioned WTGs as per TNERC Amending Order no. 5 dated 2006-05-18, which was an amendment to the earlier TNERC proceedings. As per the TNERC Order no. 3 dated 2006-05-15, the project activity consists of WTGs of Group I and Group II. Hence the PLF considered for the WTGs in Tamil Nadu is found to be valid and is acceptable. The PLF of 26.5% for WTGs in Karnataka is based on the KERC Order dated 2005-01-18. KERC after considering various PLFs proposed by different companies and State Government entities and having examined the actual PLF achieved by the wind power plants in operation in Karnataka, recommends a PLF of 26.50%. Hence the PLF considered for this project activity is found to be valid and is acceptable. The project revenue is sensitive to the electricity generation. Hence the sensitivity analysis has been carried out by the PP for the above variable. The calculation has been reviewed and it is concluded
Project proponent	IRR at +10 PLF (%)	IRR at base PLF (%)	IRR at - 10 PLF (%)											
1. Madras Hydraulic Hose P.Ltd.	13.44	11.85	10.20											
2. Shanthi Gears	14.08 15.76	12.57 13.92	11.00 12.04											

Step as per VCS 2007.1	Argument				Assessment
	Ltd.	14.97	13.20	11.37	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 individual developers with increase in the generation to a tune of + 10% and it has been verified that the Project IRR does not cross the benchmark. ☒ Step passed ☐ Step not passed ☐ Not applicable
	3. Raj Ranga Textile	13.46	11.79	10.06	
	4. Sueera a Alloys	13.30	11.64	9.92	
	5. Cotton Blossom India	13.09	11.45	9.75	
	6. Ambica Agarba this	13.64	12.17	10.63	
	7. Tirupur Exports	10.26	8.91	7.48	
	8. Ansan Textile	14.18	12.28	10.35	
	9. Sree Santhosh garments	14.29	12.57	10.79	
	10. Mod Forge	14.32	12.60	10.82	
	11. Sri Kumar an Wind Energy	15.55	13.93	12.24	

Step as per VCS 2007.1	Argument	Assessment
	12.Eskay Design	13.90 12.19 10.35
	13.Nutech Associates	14.24 13.32 12.28 12.64 11.64 10.85 10.96 9.90 9.34
	14. Oriental Extractions	12.72 11.26 9.70
	15.Nagammal Mills	12.40 10.93 9.38
	16. Best Engineers Pumps	14.53 12.76 10.92
	17. Premier Carbonic	12.47 11.03 9.51
	18.Pure Carbo Gas	13.85 12.15 10.41
	19.Popular Carbonic	13.78 12.09 10.34
	20.Royal Classic Mills	15.21 13.35 11.45
	21.Sarany Garme	13.63 12.08 10.44

Step as per VCS 2007.1	Argument				Assessment
	nts				
	22.Cet har Vessel s	13.62	12.10	10.52	
	23.VT switch Gears	13.66	12.14	10.54	
	24.Shri Santho sh Meena kshi Mills	13.57	12.08	10.51	
	25.Laks hmi Exports	14.48 12.05	12.95 10.63	11.33 9.09	
	26.Adt ech System s	13.20	11.58	9.89	
	27.Nut ech Prasidd i	15.52	13.66	11.75	
	28.Sri Ramia h Spinne rs	15.18	13.42	11.59	
	29.Jaya shree Cables & Condu ctors	15.35	13.58	11.75	
Step 3: Common Practice	Common practice analysis has been carried out for Tamil Nadu and Karnataka with the publicly available data. The scenario in Tamil Nadu is explained as per the statistics published				By the TNERC Proceedings, Order no. 3 dated May 15, 2006 for Tamil Nadu, The CEA Executive Summary report for March 2006 & The

Step as per VCS 2007.1	Argument	Assessment
	in the TNERC proceedings³, Order no. 3 dated May 15, 2006 where the total installed capacity in India being 124,287 MW the renewable resources contributes to around 6.97% i.e., 8,661 MW. The scenario in Karnataka is explained based on the statistics published in the CEA Executive Summary report for March 2006⁴ which gives the Indian power scenario, as on March 31, 2006. As per this report, the installed power generation capacity in the Southern grid is 36447.52 MW and the installed renewable energy sources generating projects including wind contributes to 4233.49 MW, which is about 11.6% of the total generating capacity. Region-wise installed capacity was also provided in the report where the Thermal power stations in the Southern grid contributes to 16% (20366.32 MW) and renewable energy sources just 10.7%. The Annual Report 2005-06, by Ministry of New and Renewable Energy⁵, Government of India has been cited to show that out of 4434.5 MW of total wind power installed capacity for electricity generation in India, Karnataka evidenced only 487.00 MW as on December 31, 2005. Hence, wind energy in Karnataka contributes to only 10.9% during the period. Hence it has been sufficiently demonstrated that the development of wind power project without VCS revenues is not a viable option.	Annual Report 2005-06, by Ministry of New and Renewable Energy for Karnataka, it has been established that the contribution towards installation of renewable energy projects, especially wind power projects in India, in the Southern region 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 acceptable. ☒ Step passed ☐ Step not passed ☐ Not applicable

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

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

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR B1 1) W.r.t the benchmark used, Gordon model is not in conformity with the additionality tool and VVM please clarify. 2) While the benchmark is stated to be WACC using CAPM vide p.19, the benchmark stated vide p.21 is totally different. 3) WACC and benchmark calculations shall be presented in a separate worksheet 4) BSE 100 is the norm followed; BSE 30 is not suitable	/PD1/ /BMR/	The benchmark approach is changed to WACC. The mistake is rectified in PD and financial analysis (benchmark approach) to keep benchmark uniform as WACC using CAPM A separate worksheet ‘Benchmark WACC 2004-2007’ has been submitted. BSE Sensex data for the particular period has been presented.	/PD2/ /WACC/	The earlier benchmark (Gordon Model) has been replaced with WACC benchmark by CAPM. The PD has been revised. All editorial discrepancies have been rectified in the revised PD and the WACC benchmark calculation submitted in a separate excel spreadsheet. BSE Sensex has been used to determine expected market return. CAR B1 is closed.
CAR B2 1) Barring minor exceptions, in almost all cases, the first year of operation is considered wrongly, for instance-operating hours in the first year exceeded 8760 or was negative 2) Power tariff considered for Tamil Nadu projects supplying to grid are based on old rates. Vide March 2009 Order, TNERC has increased the tariff	/XLS I-1-29/	The same has been rectified in revised financial analysis spreadsheet. The present verification term proposed is till December 2008 and in that term the tariff rate Rs. 2.7/ kWh is as	/XLS III-1-29/	The financial spreadsheet has been revised w.r.t to the year of operation (no of days), wheeling charges, crediting period, Power Tariff of INR 2.70/kWh is accepted based on PP’s justification. Detailed break-up of project costs for each

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
retrospectively.		used. DOE is requested to reconsider the comment.		investor have been submitted by the PP.
3) Where the power is wheeled to factory for captive consumption, wheeling charges have not been considered		For the captive WTGs, the wheeling charges are subtracted in the Generation calculation (financial worksheet – P&L – Row 12). For emission reduction calculation, net supply to grid is provided (after wheeling charge deduction for captive WTGs).		The loan component details have been modified as per the actuals. The loan agreement has been verified and found to tally with the project costs in the /XLS III-1-29/.The loan schedules and installments have been corrected and found to be in agreement with the loan agreements ^{/LOAN1-29/} Tax rates at the time of decision making and tax benefits as per 80 IA have been included in the revised spreadsheet ^{/XLS III-1-29/}
4) Project cost break up furnished does not provide details of each component constituting the project cost as specified in cell B27 of ‘assumptions’ sheet.		Detailed project cost break up for the individual clients was submitted to the DOE.		The financial spreadsheet ^{/XLS III-1-29/} has been revised w.r.t points 1) to 10) and found to be OK.
5) It is not known whether the loan is based on actual loan sanctioned or assumption as 65% (and in some cases 70%) of the project cost has been taken as loan		The loan component details are modified as actual.		CAR B2 is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
component. Since the project is already operational, actual loan amount and terms of loan should be used. 6) Uniformly, the loan schedule and the projections are not in conformity. 2006-07 interest is accounted for in 2005-06 and so on. Same mistake is noticed in cash flow statement also. 7) In several cases, the loan schedule is incorrect as a one instalment or at times more amount remain unpaid throughout the life of the project 8) The crediting period given is at variance with what is stated in the VCS PD (p.4)., while VCS PD states 1.4.2006 as the starting date, whereas the worksheet considers period prior to 1.4.2006 also in several cases. 9) In several cases the tax rate assumed is incorrect as it was not the tax rate prevailing at the time of taking decision. Also, tax computation does not include surcharge and educational cess. In several cases, the tax rate used was not the tax rate prevailing at the time of decision making.		Loan schedule is corrected and properly linked with the cash flow statement. The mistake is rectified in the revised sheets. The mistake is rectified in the revised sheets to start VCS crediting period from 1.4.2006. The tax rates are revised as per the investment decision years. The tax rate used in P&L is linked to net tax rate including surcharge and cess (calculated in assumptions sheet). The rates are also corrected as prevalent in the decision making year.		

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
10) Tax computation is not correct in almost all cases. Sec. 80IA benefits were not taken into consideration.		The tax benefit is included now (Cash flow sheet, Row 17).		
CAR B3 Common Practice Analysis has not been included in the PD. Clarify the following w.r.t Common Practice Analysis: - The first WTGs were commissioned in 2006. This is not in agreement with the commissioning certificate of Ambica industries for 1x 750kW WTG and the DOC details in the ER sheet. - Evidence should be provided in support of the statement “it can be concluded that wind power project development is substantially dependent on carbon revenues....”	/PD 1/ 2.5	Common practice analysis is presented in the revised PD, Section 2. Reference to first DOC is updated in PD. The statement is substantiated from the total capacity addition after 2003 and number of projects in CDM validation/ registration process.	/PD 2/ 2.5	Common practice analysis has been included in the revised PD. The reference to the year of commissioning (March 2005) of the first WTG has been correctly mentioned in the revised PD. Hence CAR B3 is closed.
CR B1 1) The nomenclature for O&M cost (Cell 17 of ‘assumptions’ sheet) may be modified as indicated 2) Since 5.28% book depreciation and 15% IT depreciation rates have not	/XLS I-1-24/	The same is modified. These are removed now.	/XLS II-1-24/	The nomenclature of cell 17 (assumptions), and formula to compute generation has been revised. Book and IT depreciation rates of

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
been used, they may as well be removed. 3) The formula used to compute generation from 4th year onwards does not appear to be correct. It has affected the generation during leap year. 4) In many cases, IT depreciation provision is incorrect. IT depreciation has been provided at 80% even in cases of projects, which were operational for <180 days, while in some cases, though they were operational for >180 days, depreciation has been provided at 50% of the entitlement. 5) It may be clarified how the VCS benefits were considered essential to overcome the investment barrier to this project activity, in particular that the benchmark represents a rate below which the investment would not have been made. 6) Following documents/documentary evidence should be submitted: - Details of the project cost - Quotations/Purchase Orders for each component of the		The formula is changed – it will appropriately show higher generation for 24 hours for the leap years (over and above non-leap years). It is rectified now. To calculate IT depreciation as per the 180 days limit (50% for less, 80% for more days). The individual sub-project owners were looking for bundlers to keep CDM registration costs to justifiable. As the CDM process is ongoing, it is decided to claim VERs for the pre-CDM registration Documents have been submitted to the DOE.		5.28% and 15 % have been removed in the revised spread sheet. For depreciation for 180 operating days, 50% rate has been used if the no of days are less than 180, and 80% increase has been use for when the days are more the 180 day limit. The VCS declaration^{/DEC/} has been submitted by the PP. The PP confirms that VCS benefits will be claimed only for the CDM pre-registration period. Documents including project cost break up^{/COST/}, purchase orders^{/PO/}, loan sanction letters^{/LOAN1-29/}, Power purchase agreements^{/PPA1-29/}, O&M agreements^{/O&M/} and commissioning certificates^{/CR1-29/} have been submitted. The responses w.r.t points 1) to 6) have been verified and found to be OK. Hence CR B1 is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
i. project cost i. Loan sanction letters v. PPA/ electricity bill to evidence the tariff assumed v. O&M agreement i. Commencement of generation certificate				
CR B2 Provide the sensitivity analysis in a tabular format having the base PLF and $\pm 10\%$ increase/decrease. Sensitivity analysis has to be conducted in respect of as many variables as reasonably possible. The results need to be mentioned in the PD. Also, provide the sensitivity analysis on the PLF of both Tamil Nadu and Karnataka as they are different in two states.	/PD1/	The PLF used is separate for the two states and sensitivity analysis is done as per the EB Guidance.	/PD3/& /XLS3/	The project revenue is demonstrated sensitive to the electricity generation in the respective project location by carrying out sensitivity analysis to a tune of $\pm 10\%$ for individual investor. Sensitivity analysis has been presented in a tabular form under Section 2.5 of the revised PD and is in line with the Guidance provided on the Assessment of Investment Analysis, version 02, Annex 45 of EB 41. This is found to be OK. CR B2 is closed.

3.3 Monitoring Plan

The proposed project uses CDM approved methodology ACM 0002 /Version 10: Grid Connected Renewable electricity Generation, which is approved under VCS 2007.1.

The project satisfies all criteria for ACM 0002. The application of monitoring methodology is assessed as correct.

The monitoring plan^{/PD4/} 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 utilities (TNEB & KPTCL).

In Tamil Nadu, the main meter is located at each of the WTGs. the grid. The Project has individual main meter at each WTG installed and owned by the State electricity board. These meters are tri-vector meters of 0.5s accuracy class. The meters are sealed by the electricity board and meet the Indian and regional electricity authority's standards. The readings of these individual main meters are used for arriving at the monthly generation of the respective WTG.

This energy meter is a two-way meter 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 meter is of 0.5% accuracy class as per standard industry norms. The quantities of electricity exported and imported are measured by this meter on a continuous basis. The difference between the two parameters (export and import) is the net power exported.

The main meter owned by the state electricity board will be calibrated by TNEB officials, according to the frequency and the maintenance schedule as per the TNEB procedures and the PPA signed with the PP or as per the UNFCCC guidelines.

The reading from the main meter (JMR) is recorded on monthly basis by the official from the state electricity board in the presence of a representative of the PP.

The receipt of the sales to grid is cross-checked with the data recorded by the central monitoring system for each individual meter to avoid any differences. The Joint Meter Readings (JMR) taken will be sent to individual PP every month. Each PP will then raise an invoice to the Tamil Nadu Electricity Board with respect to the electricity exported to the grid by the WTG(s). The same data will be used for the emission reduction calculation.

For the WTGs in Karnataka, there is one common meter installed at metering site. The JMR taken at one metering point will give the readings of each WEG connected to that metering point. With a main meter & a check meter installed at each metering point, the JMR taken at any one metering point will give readings of both main meter and check meter.

In Karnataka, the Net electricity generated from the windfarm in this project activity is calculated based on the difference of electricity exported to the grid, electricity imported from the grid, transmission loss incurred during export of electricity and import of electricity. The procedure for calculating transmission loss for the electricity exported and electricity imported is mentioned under section 3.3 of the PD. This was checked by the joint meter reading^{/JMR/} reports and invoices raised by the PP to the KPTCL. The actual quantum of power exported is calculated after considering all the above and is duly signed by the officer of KPTCL.

Apportioning of transmission loss for the WTGs in Karnataka is done as the percentage of electricity generated by the WTG out of total generated electricity from the windfarm.

For all practical purposes, it is the reading in the main meter that is reckoned for calculation, as long as the readings in the main and check meters are within acceptable limits.

Based on the daily generation report and monthly meter reading report duly signed by the TNEB/KPTCL officer, the project proponents raise an invoice on the TNEB/CESC Mysore/HESCOM at the rates stipulated in the PPA^{/PPA1-PPA29/} 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 visits were carried out from 2009-09-20 and 2009-09-21 in Tamil Nadu and Karnataka. Two members 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 (as mentioned above) 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/KPTCL submitted by the PP. This was found to be in line with the monitoring plan^{/PD4/} & the PPA^{/PPA1-PPA29/} signed for the project and deemed to be OK.

The meters are calibrated as per the PPAs signed between TNEB/KPTCL with the respective PPs and as per the TNEB/KPTCL norms.

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 The monitoring plan shall be more precise and clear. 1) Section 3.2 shall include all points as per VCS 2007.1	/PD1/ /PD2/	1) The section has been revised	/PD2//PD3/	The revised PD under Section 3.3 contains the actual monitoring details and description of the metering structure as on the project sites in

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
guidelines .e.g. purpose of monitoring, types of data and information to be reported, etc. 2) Similarly section 3.3 is incomplete. 3) Section 3.2 states that “weekly meter readings will be taken by the WTG operator” and the same time it states that responsible authority is KSEN/TNEB. Clarify. 4) Also clarify the statement “check meter readings will be either at LCS meter or at the CMS of O&M”. 5) It is mentioned that the parameter is calculated. What about “measured”? 6) “For WTGs in Karnataka, some at one site”. What		2) Same as above 3) The statement has been rectified. 4) This statement has been deleted from the VCS PD. 5) It has been changed to “measured and calculated”. 6) The substation has been included in the monitoring plan.		Tamil Nadu and Karnataka. These were also checked during the on-site visit and sample joint meter reading^{/JMR/} The estimated value for net electricity is as per the emission reduction sheet. The revised PD has been checked w.r.t points 1) to 9) and found to be OK. Hence Hence, CR M1 is closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
about the other WTGs? The PD does not make a mention of the substation 7) In the monitoring parameters for Karnataka, the values of electricity have been left blank. 8) In 3.3 “Description of measurement methods...to be applied” does not mention procedure for calculation of transmission loss 9) The QA/QC procedure for emergency preparedness, data accuracy and data uncertainties is not included in the PD.		7) The estimated value for net electricity generated has been filled in. 8) Procedures for transmission loss have been included. 9) The revised monitoring plan contains QA/QC procedures adopted by the PP.		

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. There are no GHG emissions arising from the project being a wind power project. Hence, the project emissions are zero. As the project activity does not involve power plant construction, fuel handling (extraction, processing, and transport), and land inundation, the leakage due to the project activity is not applicable as per ACM 0002.

Following the ACM0002 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 ($EF_{grid,y}$). Also refer section 3.2.

The baseline emission factor is equal to the CM, which is applying the default weights which 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, 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^{/PD4/} this project is expected to reduce emissions of 833,500tCO₂e over a 10 year crediting period.

Following CRs were raised and was subsequently closed out in view of the satisfactory response received from the project promoters:

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR C1 Provide Emission reductions in excel sheet The ER spreadsheet does not summarize the monthly emission reductions	/PD1//PD2/ /ER/	ER calculation is provided in excel sheet and monthly ER summary can not be given due to uncertainty of monthly generation. Only annual PLF is available. Monthly data will be given based on actual generation for the verification.	/PD3/ /ER/	The emission reductions has been specified in an excel sheet. Annual estimated data has been provided. This is found to be OK. Hence CAR C1
CR C2 The weighted average values of OM are not used in the determination of	/PD1//PD2/ /ER/	The PD now includes weighted average values of OM in determining CM. Subsequently revision in the		Calculation of OM and BM in the revised PD is as per ‘Tool to calculate the emission factor for

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CM.		emission reductions is made in revised PD and ER sheet.		an electricity system (Version 01.1)’. The three year average value from 2005-06 to 2007-08 i.e., 0.9982 tCO ₂ /MWh of OM and the BM value of 2007-08 i.e., 0.7133 tCO ₂ /MWh is arrived after considering four decimal places available under the CEA database, Version 4. This has been checked and found OK. CR C2 is closed.

FAR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
FAR C1 Since the project is also undergoing validation for CDM, it has to be ensured that double counting of the emission reductions does not take place throughout the VCS crediting period.	/PD 1/ 1.13	A signed declaration has been submitted to the DOE confirming that the project under VCS is to quantify VERs upto the date of registration in CDM, or for the balance of the crediting period in case of rejection. Evidence shall be submitted during verification.	/PD2/	Evidence of the same shall be checked during verification of the project activity.

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>

Wind power 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 WEGs 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

The PP conducted a stakeholder survey during the period during 2009-07-06 to 2009-09-30 , by distributing survey questions w.r.t the project activity and its impacts. No negative comments were received. The filled survey questions^{/SUR/} were submitted for verification. All comments were positive and it has been verified that all comments sufficiently have been addressed.

However, following CAR was raised and was subsequently closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR L1 Section 6 is incomplete. When was the stakeholder meeting held? A copy of notification of the meeting and minutes of the meeting should be submitted	/PD1/ 6.0	The section 6 is updated with the details of stakeholders' consultation. As the remote and dispersed sites are involved, survey feedbacks were obtained.	/PD2/ /SUR/	The dates of the stakeholder meeting have been included in the revised PD The surveys ^{/SUR/} were conducted in the areas surrounding WTGs in both Karnataka and Tamil Nadu during 2009-07-06 to 2009-09-30. These were verified and no negative comments were received. CR L1 is closed

4 Validation conclusion

M/s. Kanaka Management Services Pvt. Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project – “Bundled wind power project by KMSPL, Bangalore”, 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 II/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 6 Corrective Action Request (CAR), 7 Clarification Requests (CR) and 1 FAR were raised and successfully closed out.

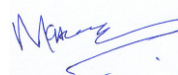
The validation is based on the VCS PD, proof of title, additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and supporting documents made available to the validators by project proponent.

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 833,500 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

Team Leader

Bangalore, 2009-11-11



Eric Krupp

Final approval

Essen, 2009-11-17

5 References

Table 5-1: Documents provided by the project proponent

Reference	Document
/PD1/	VCS PD for M/s. Kanaka Management Services Pvt. Ltd. dated 20/08/2009, Version 1
/PD2/	VCS PD for M/s. Kanaka Management Services Pvt. Ltd dated 28/10/2009, Version 2
/PD3/	VCS PD for M/s. Kanaka Management Services Pvt. Ltd dated 11/11/2009, Version 3
/PD4/	VCS PD for M/s. Kanaka Management Services Pvt. Ltd dated 17/11/2009, Version 4
/TD/	Technical specification of the WTGs.
/XLSI 1-29/	Financial calculation sheet corresponding to VCS /PD1/
/XLSI II-29/	Financial calculation sheet corresponding to VCS/PD2/
/XLSIII 1-29/	Financial calculation sheet corresponding to VCS/PD3/ and /PD4/
/WACC/	WACC calculation spreadsheet
/ER/Attachm	Emission reduction calculation sheet corresponding to VCS/PD4/ including details of

Reference	Document
ent 1/	all WTGs
/CR1/-/CR29/	Commissioning certificates of all the WTGs from the TNEB/ KPTCL
/PPA1/-/PPA29	Power Purchase Agreements between TNEB/CESC Mysore/HESCOM and the respective PP for all the WTGs
/PO/	Purchase orders for all the WTGs
/DEC/	Letter from all the investors regarding creation of no other form of environmental credit by this project activity
/PoA/	Authorization letter by the PP as a focal point for communication on behalf of other PPs
/JMR/	Samples of statements showing the energy generated
/LOAN/	Loan sanction letters from the respective banks for all the 5 investors
/SUR/	Survey questionnaires of the stakeholders’ consultation meeting
/O&M/	Operation & Maintenance agreement for all WTGs between all the 29 investors and the WTG suppliers

Table 5-2: Background investigation and assessment documents

Reference	Document
/ACM 0002/	Indicative simplified baseline and monitoring methodologies for selected large-scale CDM project activity categories (Version 10)
/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

Reference	Link	Organisation
/unfccc/	www.unfccc.int	UNFCCC website
/cea/	www.cea.nic.in	Central Electricity Authority
/rbi/	http://rbidocs.rbi.org.in/rdocs/Publications/PDFs/80303.pdf	Reserve Bank of India
/MoEF/	http://envfor.nic.in/legis/eia/so1533.pdf	Ministry of Environment and Forests, GoI, India
/PLF/	http://tnerc.tn.nic.in/orders/ncs%20order%20approved%20order%20host%20copy.pdf	Tamil Nadu Electricity Regulatory Commission
/PLF/	http://www.kerc.org/order2005/Order%20on%20NCE%20Tariff%20(FINAL).doc	Karnataka state Electricity Regulatory Commission
/MNES/	http://mnes.nic.in/annualreport/2005_2006_English/CH8/2.html	Ministry of New and Renewable Energy, GoI, India
/satsig/	http://www.satsig.net/maps/lat-long-finder.htm	Satellite Signal

Table 5-4: Interviewed Persons

Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	Mr. Nandagopal	M/s. Kanaka Management Services Pvt. Ltd.
/IM02/	☐ Ms. ☒ Mr.	Mr. Pravin Jadhav	Consultant, CantorCO2e India Pvt Ltd.