



Voluntary Carbon Standard 2007.1 Final Validation Report

Report No: 53605908-08/634

Validation Report:

Name of Validation company:	Date of the issue:
TÜV NORD CERT GmbH	2009-11-12
Report Title:	Approved by:
“8.35 MW wind power project at Guddarangavana Halli, District Chitradurga, State Karnataka in India”.	Mr. Krupp Eric
Client:	Project Title:
MSPL Limited	“8.35 MW wind power project at Guddarangavana Halli, District Chitradurga, State Karnataka in India”.
Summary:	

MSPL Limited has commissioned the TÜV NORD II/CDM Certification Program to carry out the validation of the project - “8.35 MW wind power project at Guddarangavana Halli, District Chitradurga, State Karnataka in India”, 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 8 Corrective Action Requests (CAR) and 8 Clarification Requests (CR) were raised and successfully closed out.

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

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

The project fulfils criteria of VCS 2007.1 provided.

- The project additionality is sufficiently justified in the PD.
- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of AMS I D Version 13.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 170680 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.

Work carried out by:	Number of pages:
Mr. Ma Paa Puratchikkanal Mr. K V Sudarshan Mr. R. Murali Ms. Indumathi	37

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1 Introduction

1.1 Objective

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

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

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project's baseline study and monitoring plan (based AMS ID. /Version 13: “Grid connected renewable electricity generation”) which are included in the PD and other relevant supporting documents.

The items covered in the validation are described below:

- VCS 2007.1 & Project Country Criteria
 - To meet the requirements of VCS 2007.1 guidelines requirements, in particular,
 - Project country requirements / criteria
- VCS Project Description
 - Project design
 - Project boundaries and Predicted VCS project GHG emissions
- Project Baseline
- Baseline methodology
- Baseline GHG emissions
- 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 PD 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 proposed project falls under small-scale methodology AMS I.D version-13, and involves the installation of wind energy generators having wind power generation capacity of 8.35 MW installed capacity (<15 MW). The Project activity comprises of installation and operation of eight 950 kW Wind Electricity Generators (WEGs) and one 750 kW WEG having aggregated installed capacity of power generation of 8.35 MW in Guddarangavana (GR) Halli of Chitradurga District in Karnataka, India.

The proposed VCS project activity is located at the following latitudes and longitudes² in District Chitradurga in Karnataka.

Location	Machine No.	North	East
MSPL-01	GR-11	14°18'04"	76° 23'39"
MSPL-02	GR-1	14°18'58"	76° 23'30"
MSPL-03	GR-2	14°18'53"	76° 23'33"
MSPL-04	GR-3	14°18'44"	76° 23'34"
MSPL-05	GR-4	14°18'42"	76° 23'34"
MSPL-06	GR-5	14°18'36"	76° 23'34"
Ramgad-01	GR-6	14°18'31"	76° 23'38"
Ramgad-02	GR-17	14°19'38"	76° 22'23"
Ramgad-03	GON-4	14°16'45"	76° 25'07"

The proposed project would generate energy from wind resources thereby displacing, electricity supplied from southern grid which is dominated by fossil fuel power plants.

The estimated electricity supplied to the grid from the project activity is about 18414.51 MWh per year. The estimated GHG emission reduction is 170680 tCO₂e for the chosen ten year crediting period.

1.4 Level of assurance

The validation report is based on VCS PD^{/PD1- PD4/}, financial spreadsheet^{/XLS1 to XLS3/}, 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 <http://www.satsig.net/maps/lat-long-finder.htm>

2 Methodology

The validation of the project was carried out from March to November 2009.

Preparations: 20/03/2009-07/04/2009

On-site validation: 17/04/2009

(Draft) Reporting: 29/04/2009

(Final) Reporting: 12/11/2009

The validation consisted of the following three phases:

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

2.1 Review of Document

The draft PD^{PD1}/ submitted by the MSPL Limited in March 2009 and supporting background documents related to the project design and baseline were reviewed on 29/04/2009. Furthermore, the validation team used additional documentation by third parties like host party legislation, technical reports referring to the project design or to the basic conditions and technical data.

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

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

2.2 Follow-up Interviews

On 17/04/09, the TÜV NORD JI/CDM CP performed validation site visit with the project proponent in Guddarangavana (GR) Halli of Chitradurga District 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 2-1 Interviewed persons and interview topics

Interviewed Persons / Entities	Interview topics
1. Projects & Operations Personnel /IM01/	- Desk review findings - General aspects of the project - Project design, Commissioning and implementation - Technical equipment and operation of the project
2. Consultants /IM02/	- Performance of the project - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan

Interviewed Persons / Entities	Interview topics
	- Monitoring and measurement equipment - QA/QC Testing and calibration procedures - Monitored data management - Data quality, archiving and reporting procedures - Data uncertainty and residual risks - GHG calculation - Procedural aspects of the verification - Apportioning of energy to the bundled proponents

A detailed list including the functions and designations of the the key interviewees is given in chapter 5 in table 5-4 of this validation report.

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 II/CDM CP.

After reviewing the revised and resubmitted project documentation^{/PD3/}, resolving the CARs & CRs raised and outstanding concerns, TÜV NORD II/CDM CP issues this final validation report and opinion.

8 CARs and 8 CRs were found during Validation. Please refer to Section 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	01	-	03
B- Baseline and additionality	06	-	04
M- Monitoring plan	01	-	-
C- Calculation of GHG emissions	-	-	-
E- Environmental Impact	-	-	-
L- Local Stakeholder Comments	-	-	1
SUM	08		08

3.1 Project Design

The proposed project utilizes wind energy for electricity generation. Total installed capacity is 8.35 MW (8x0.95MW & 1x0.75 MW) with estimated electricity supplied to the grid of about 18414.51 MWh per year. The eight 950 KW and one 750 KW Wind Electric Generator machines are supplied by Vestas Wind Technology (formerly NEG Micon). The NM 48/750 kW WEG with a rated output of 750 kW is one of the machines well known for its best performance. It is a stall regulated machine with a cut-in speed of 4 m/s and a cut-out speed of 25 m/s. The nominal wind speed requirement for this machine is 16 m/s. This machine is type tested and certified by DNV, Denmark A/S. The NM 54/950 kW Power Trim WEG with a rated output of 950 kW is a stall regulated machine with a cut-in speed of 3.5 m/s and a cut-out speed of 25 m/s. This machine is type tested and certified by DNV, Denmark A/S. Supporting documents like purchase orders^{/PO1 to PO4/} of the WTGs by each investor were made available to the TÜV NORD JI/CDM CP. It was found that the purchase order^{/PO1 to PO4/} issued by the suppliers of the WTGs specifies the technical details for the respective WTG. Information was also collected through performing interviews with the PP and during the on-site assessment.

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

Table 3-1: Technical details of the wind turbines

S.N O.	Parameter	WEG 750	WEG 950
	Operational parameters		
1	Nominal Output (KW)	750	950
2	Power Regulation	Stall	Stall
3	Cut – in (m/s)	4	3.5
4	Cut – out (m/s)	25	25
	Rotor		
5	Rotor diameter (m)	48.2	54.5
6	Rotor swept area (m2)	1824	2333
7	Number of blades	3	3
8	Rotor revolutions (rpm)	22/15	22/15
9	Rotor placing	Upwind Rotor	Upwind Rotor
	Brake System		
10	Blade Tip air brake	Hydraulic, fail safe	Hydraulic, fail safe
	Disk Brake	Hydraulic, fail safe	1 pcs. Hydraulic, fail safe
	Drive Train		
11	Gear Type	Planetary – parallel axle	Planetary – parallel axle
12	Ratio	1:67.5	1:67.5 (1:81.0 – 60 Hz)
13	Main shaft	Forged shaft and flange	Forged shaft and flange

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S.N O.	Parameter	WEG 750	WEG 950
14	Main bearing	Spherical roller bearing	Spherical roller bearing
15	Cooling	Heat exchanger with pump	Heat exchanger with pump
	Generator		
16	Type	Asynchronous, 4/6 pole	Asynchronous, 4/6 pole
17	Nominal Voltage (V)	690	690
18	Nominal Frequency (Hz)	50	50
19	Name plate rating (kW)	750/200	950/200
20	Cooling	Liquid cooled with pump	Liquid cooled with pump
	Yaw system		
21	Type	Ball bearing	Sliding bearing
22	Yaw brake	3 Friction brake/ motor brake	
23	Drive mechanism	4 electrical planetary gears	3 electrical planetary gears
	Tower		
24	Type	Conical, steel, painted	Conical, steel, painted
25	Hub Height	According to type approvals	According to type approvals
	Controller		
26	Type	Computer controlling	Computer controlling
27	Computer controlling	Soft by thyristors	Soft by thyristors
28	Capacitor bank	No – load compensated	Generator no load compensation
29	Remote Control	By modem	By modem
	Sensors		
30	RPM sensors	Rotor, generator, yaw system	Rotor, generator, yaw system
31	Temperature sensors	Gear, generator, controller	Gear, generator, controller, ambient
32	Thermal sensors/ warning	Main switch, engine protection	
33	Vibration sensor	Nacelle, rotor	Nacelle, rotor
34	Meteorology	Anemometer, wind vanes, thermometer	Anemometer, wind vanes
35	Hydraulic systems	Pressure sensitive switches, pressure transducer	Pressure transducer
	Lightning protection		
36	According to standard	IEC 1024	IEC 1024 Class 1
37	Blades	Receptor in the blade tips	Receptor in the blade tips
38	Nacelle	Arial	Air rod

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The project duration is: 20 years.

Start date of the project is 21/03/2003

Crediting period for the project activity: 28/03/2006 to 27/03/2016

There are two individual investors in this bundled project activity. MSPL Limited was authorized to take up the responsibility of this VCS project activity on the behalf of the investors. Authorization letter in this regard have been submitted.

Proof of title was also submitted. PPA^{/PPA1-PPA4/} and purchase order copies^{/PO1-PO4/} of each investor is treated as proof of title. Refer to Table 5-1. The emission reduction has not been double counted.

However, CAR D1 and CR D1-CR D3 were raised and successfully closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CAR D1 Under Section 1.6 of the PD, the start date of the Project activity and the crediting period have to be clearly mentioned.	/PD 1/	Please see Section 1.6 of the PD for the updated information. Start date of project activity and its crediting period have been mentioned.	/PD 2/ /PD 3/	Necessary changes have been made in PD. The start date of the Project activity mentioned in the PD was verified to be correct from the commissioning certificate of the first installed windmill of 950 KW capacity on 21/03/2003 ^{/CR1/} and the crediting period start date has been mentioned correctly as per VCS requirement ^{/vcs/} . CAR D1 is closed.
CR D1 References have to be given for the tables mentioned under section 1.7	/PD 1/	References for the table mentioned in section 1.7 have been provided in the PD.	/PD 2/ /PD 3/	The given references were verified from CEA website ^{/cea/} and found to have applied correctly. CR D1 is closed.
CR D2				

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
In Section 7 of PD, under schedule, date on which expected crediting period starts & the date on which PPA signed also need to be mentioned.	/PD 1/	The necessary updates have been made in the PD.	/PD 2/	Required dates have been included which was verified from /PPA/ & /vcs/ and found to have mentioned correctly. CR D2 is closed.
CR D3 All statutory clearances and documents have to be provided for validation. 1. Purchase Orders of each wind Mills 2. Copy of Commissioning certificates of each wind mills 3. Power Purchase Agreement 4. A copy of Electrical Inspectorate from state government 5. Operation & Maintenance contract 6. Insurance premium receipt	/PD 1/	All statutory documents have been provided.	/PD 2/ /PD 3/	The required documents Purchase orders of 9 wind mills/ ^{PO 1-PO4/} , Commissioning certificates of each wind mills/ ^{CR 1-CR4/} , Power purchase agreements/ ^{PPA1-PPA4/} , Electrical inspectorates from State Government/ ^{EIP1-EIP4/} , Operation and Maintenance Contracts/ ^{OM1OM4/} and Insurance premium receipts /INS 1- INS4/ were verified and found to be in order. CR D3 is closed.

3.2 Baseline

The proposed project adopts CDM approved small scale methodology AMS ID / Version 13: Grid Connected Renewable electricity Generation, which is approved under VCS 2007.1.

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

Accordingly, the energy baseline being considered is as directed in paragraph 9 of the AMS.I.D/Version 13, that provides that the applicable baseline is the energy (in kWh) produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh). The baseline scenario for the new grid-connected renewable power plant power generation from the fossil fuel based electricity generation plants, interconnected with the grid. The selection of baseline scenario is assessed to be appropriate.

The combined margin emission coefficient (in kg CO₂e/kWh) of the current generation mix in the Southern grid has been considered for determining the emission in the baseline, as applicable to wind power projects according to the methodology AMS ID Version 13.

The project proponent has calculated the Simple Operating Margin (OM) based on the weighted average of latest three year statistics data (year of 2005-06, 2006-2007, 2007-08) as per Central Electricity Authority guidelines version 4.0 October 2008 and the weighted average Operating Margin Emission Factor is 0.9981 tCO₂/MWh. 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 tCO₂equivalent / MWh.

The calculation of EF_y is being done from current and publicly available data 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 and common practice approach have been established to demonstrate the additionality.

Step as per VCS 2007.1	Argument	Assessment
Step 1: Regulatory Surplus	- Local or National Legislation does not require the production of the underlying 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	Validation team has checked all the National Regulations and Local legal requirements. It was found that there is no legal requisite in India which enforces the implementation of wind project for generation power. Hence the argument is appropriate for this project activity. Other regulatory clearances ^{/PPA/}, ^{/CR/} and ^{/EIP/} submitted by the PP have been verified and found to be OK. ☒ Step passed ☐ Step not passed

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Step as per VCS 2007.1	Argument	Assessment									
	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 required regulatory clearances before commissioning.	☐ Not applicable									
Step 2: Investment Barrier	The project faces capital or investment return constraints that can be overcome by the additional revenues associated with the generation of VCU. So the PP has chosen Benchmark Analysis to demonstrate the additionality of the projects in the bundle. The local commercial lending rate of 10.75% given by state Bank of India during 2003 (the time of placing of purchase order for the project activity) for the company is the applicable Prime Lending Rate (PLR) and it is set as the benchmark. An investment analysis of the investment proposition in the proposed VCS project activity was carried out by the project proponent with the Internal Rate of Return (IRR) of the project as the indicator. The project IRR of 1x0.95 MW MSPL machine amount to 7.53% and 5x 0.95 MW (4.75 MW) of MSPL machines amount to 8.53% and 2.65 MW RMMPL machines amount to 7.40%. Since the Project IRR is chosen as the financial indicator to demonstrate the additionality, local commercial bank lending rate is one of the appropriate benchmarks as per the Guidance on Investment Analysis EB 41, Annex 45, and version 2. A sensitivity analysis also has been	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 of local commercial prime lending rate, validation team has referred the supporting letter from State Bank of India ^{/PLR/} stating the PLR during 2002-2003 as 10.75% and found to be 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 is conservative and appropriate for the project. Using the investment analysis, the project proponents have demonstrated that the Project IRR for MSPL and RMMPL machines as follows: <table border="1"> <thead> <tr> <th>Name of Customers</th><th>Capacity</th><th>Project IRR</th></tr> </thead> <tbody> <tr> <td>MSPL Limited</td><td>0.95 MW</td><td>7.53%</td></tr> <tr> <td>MSPL Limited</td><td>4.75 MW</td><td>8.53%</td></tr> </tbody> </table>	Name of Customers	Capacity	Project IRR	MSPL Limited	0.95 MW	7.53%	MSPL Limited	4.75 MW	8.53%
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Step as per VCS 2007.1	Argument	Assessment																																																																							
	carried out for Project capital cost, tariff and escalation in O& M cost and plant load factor to the tune of +/-10% and +/-5%. The variations of each variables to +/-10% are provided as below For Set 1 = 0.95 MW MSPL Ltd. machines <table border="1"> <tr> <th>Project Capital Cost</th><th>Project IRR</th><th>Benchmark IRR</th></tr> <tr> <td>+ 10 %</td><td>6.39%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.53%</td></tr> <tr> <td>-10%</td><td>8.92%</td></tr> </table> <table border="1"> <tr> <th>Power Tariff</th><th>Project IRR</th><th>Benchmark IRR</th></tr> <tr> <td>+ 10 %</td><td>7.62%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.53%</td></tr> <tr> <td>-10%</td><td>7.44%</td></tr> </table> <table border="1"> <tr> <th>Rate of annual escalation of O&M cost</th><th>Project IRR</th><th>Benchmark IRR</th></tr> <tr> <td>+ 10 %</td><td>7.52%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.53%</td></tr> <tr> <td>-10%</td><td>7.54%</td></tr> </table> <table border="1"> <tr> <th>PLF</th><th>Project IRR</th><th>Benchmark IRR</th></tr> <tr> <td>+ 10 %</td><td>8.76%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.53%</td></tr> <tr> <td>-10%</td><td>6.28%</td></tr> </table> For Set 2 = 4.75 MW MSPL Ltd machines <table border="1"> <tr> <th>Project Capital Cost</th><th>Project IRR</th><th>Benchmark IRR</th></tr> <tr> <td>+ 10 %</td><td>7.27%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>8.53%</td></tr> <tr> <td>-10%</td><td>10.13%</td></tr> </table> <table border="1"> <tr> <th>Power Tariff</th><th>Project IRR</th><th>Benchmark IRR</th></tr> <tr> <td>+ 10 %</td><td>8.63%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>8.53%</td></tr> <tr> <td>-10%</td><td>8.43%</td></tr> </table> <table border="1"> <tr> <th>Rate of annual escalation of O&M cost</th><th>Project IRR</th><th>Benchmark IRR</th></tr> <tr> <td>+ 10 %</td><td>8.52%</td><td rowspan="2">10.75%</td></tr> <tr> <td>Actual</td><td>8.53%</td></tr> </table>	Project Capital Cost	Project IRR	Benchmark IRR	+ 10 %	6.39%	10.75%	Actual	7.53%	-10%	8.92%	Power Tariff	Project IRR	Benchmark IRR	+ 10 %	7.62%	10.75%	Actual	7.53%	-10%	7.44%	Rate of annual escalation of O&M cost	Project IRR	Benchmark IRR	+ 10 %	7.52%	10.75%	Actual	7.53%	-10%	7.54%	PLF	Project IRR	Benchmark IRR	+ 10 %	8.76%	10.75%	Actual	7.53%	-10%	6.28%	Project Capital Cost	Project IRR	Benchmark IRR	+ 10 %	7.27%	10.75%	Actual	8.53%	-10%	10.13%	Power Tariff	Project IRR	Benchmark IRR	+ 10 %	8.63%	10.75%	Actual	8.53%	-10%	8.43%	Rate of annual escalation of O&M cost	Project IRR	Benchmark IRR	+ 10 %	8.52%	10.75%	Actual	8.53%	<table border="1"> <tr> <td>PMPL</td><td>2.65 MW</td><td>7.40%</td></tr> </table> All the above three IRRs of the project activity are lower than benchmark PLR of 10.75%. Thus, the established investment barrier has been assessed to be appropriate and sufficient. The arguments with supporting spreadsheets^{/XLS3/} provide proof for the non-viability of the project. The input data and assumptions for calculation of IRR like (profit after tax, project cost, net cash flow , additional depreciation,) are verified with references/^{PO1-4/, /OM1-OM3/, /ADE/, /INS1-INS2/} provided by PP. The considered benchmark is appropriate. The estimated annual electricity is based on the PLF of 26.5% which is considered as per KERC Tariff Order for Karnataka dated 18th January 2005^{/kerc/}. Though the order was released subsequent to the start date of the project activity, the PLF mentioned in the order is based on the last 3 years (2003-2005) wind power generation details in Karnataka including the Project site Chitradurga. More over for arriving at the PLF of 26.5%, Karnataka Electricity Regulatory commission has considered the proposed PLFs given by KPTCL, KREDL, InWEA, IWPA and also the proposed PLFs given by Reliance Energy and Synergy Global. The Commission, after considering the above proposals and after examining the actual PLF achieved by the plants in operation, decides that a PLF of 26.5%^{/kerc/}. Hence the PLF of 26.5% considered for this project	PMPL	2.65 MW	7.40%
Project Capital Cost	Project IRR	Benchmark IRR																																																																							
+ 10 %	6.39%	10.75%																																																																							
Actual	7.53%																																																																								
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Power Tariff	Project IRR	Benchmark IRR																																																																							
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PMPL	2.65 MW	7.40%																																																																							

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Step as per VCS 2007.1	Argument	Assessment																																																					
	<table border="1"> <tr> <td>-10%</td><td>8.54%</td><td></td></tr> </table> <table border="1"> <tr> <td>PLF</td><td>Project IRR</td><td>Benchmark IRR</td></tr> <tr> <td>+ 10 %</td><td>9.95%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>8.53%</td></tr> <tr> <td>-10%</td><td>7.12%</td></tr> </table> For set 3= 2.65 MW RMMPL machines <table border="1"> <tr> <td>Project Capital Cost</td><td>Project IRR</td><td>Benchmark IRR</td></tr> <tr> <td>+ 10 %</td><td>6.33%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.40%</td></tr> <tr> <td>-10%</td><td>8.76%</td></tr> </table> <table border="1"> <tr> <td>Power Tariff</td><td>Project IRR</td><td>Benchmark IRR</td></tr> <tr> <td>+ 10 %</td><td>7.51%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.40%</td></tr> <tr> <td>-10%</td><td>7.28%</td></tr> </table> <table border="1"> <tr> <td>Rate of annual escalation of O&M cost</td><td>Project IRR</td><td>Benchmark IRR</td></tr> <tr> <td>+ 10 %</td><td>7.38%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.40%</td></tr> <tr> <td>-10%</td><td>7.41%</td></tr> </table> <table border="1"> <tr> <td>PLF</td><td>Project IRR</td><td>Benchmark IRR</td></tr> <tr> <td>+ 10 %</td><td>8.45%</td><td rowspan="3">10.75%</td></tr> <tr> <td>Actual</td><td>7.40%</td></tr> <tr> <td>-10%</td><td>6.39%</td></tr> </table>	-10%	8.54%		PLF	Project IRR	Benchmark IRR	+ 10 %	9.95%	10.75%	Actual	8.53%	-10%	7.12%	Project Capital Cost	Project IRR	Benchmark IRR	+ 10 %	6.33%	10.75%	Actual	7.40%	-10%	8.76%	Power Tariff	Project IRR	Benchmark IRR	+ 10 %	7.51%	10.75%	Actual	7.40%	-10%	7.28%	Rate of annual escalation of O&M cost	Project IRR	Benchmark IRR	+ 10 %	7.38%	10.75%	Actual	7.40%	-10%	7.41%	PLF	Project IRR	Benchmark IRR	+ 10 %	8.45%	10.75%	Actual	7.40%	-10%	6.39%	activity is acceptable. The project capital cost, tariff and escalation in O& M cost and plant load factor are sensitive to the electricity generation. Hence the sensitivity analysis has been carried out by the PP for the above variables. The calculations have been reviewed and concluded that the project activity has an IRR less than the benchmark value, clearly indicating that the project is financially not feasible without carbon benefits. The sensitivity analysis has also been provided for individual developers by varying the project cost, tariff and escalation of O&M cost and Plant Load Factor to a tune of +/- 10% as well as +/-5% and it has been verified that the Project IRR does not cross the bench mark. Thus the arguments under investment barrier are found to be real. ☒ Step passed ☐ Step not passed ☐ Not applicable
-10%	8.54%																																																						
PLF	Project IRR	Benchmark IRR																																																					
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Step 3: Common Practice	Common practice analysis has been carried out with the publicly available data. As per the statistics of region wise installed capacity as on 31.3.2006 it can be observed that fossil fuels (mainly coal and gas) have a majority share in power generation, and accordingly influence the electricity generation	The reference documents CO2 baseline database 2006 ⁴ and CO2 baseline database 2008 ⁵ were verified in respect to region wise and sector wise installed capacity of wind mills before and after commissioning of this Project activity. From the statistics																																																					

⁴ Baseline Database for the Indian Power Sector, Version 1.1, December 2006, Government of India, Ministry of Power, Central Electricity Authority

⁵ Baseline Database for the Indian Power Sector, Version 4, October 2008, Government of India, Ministry of Power, Central Electricity Authority

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	system via various grids in India. More over after analyzing the statistics of Sector-wise installed capacity (MW) as on 31.03.2008, the same scenario emerges. Hence it is observed that after analyzing the conditions prior to project initiation, as well as the current data, fossil fuels still contribute more than 50% of the total power generation capacity in the country, thus having major implications on the GHG emissions resulting out of the sector. More over from State wise Installed Wind Capacity in India from March 2005 to March 2008, it can be seen that installed capacity of wind power during March 2005 was 410.7 MW which is around 11% of the total installed capacity of wind power in India. It is clearly seen that during the start date of the Project Activity, installation of wind mills were very less in Karnataka state compared to the total wind power installation in India. More over, the new wind electric generators installed in the proposed VCS project substitute the baseline consumption of electricity produced from fossil fuel operated power plants; with cleaner zero GHG emitting fuel (wind) to operate the wind power plant. Thus, more carbon intensive fossil fuels are substituted with zero carbon intensive fuels for the operation of the proposed VCS power plant. Clearly, even as on date, wind power development in India is not a common practice. From the above analysis it has been concluded that wind power project was not a common practice at the time of	analysis, it has been found that the Project activity was not a common practice during the time of its installation. More over State wise Installed Wind Capacity in India from March 2005 to March 2008⁶ was verified and concluded that that during the start date of the Project Activity, installation of wind mills were very less in Karnataka (11%) state compared to the total wind power installation in India. It is deemed to be acceptable that more carbon intensive fossil fuels are substituted with zero carbon intensive fuels for the operation of the proposed VCS wind power plants. Hence it verified to be OK that installation of wind mills were not common practice during project start date As a result of existence of the analysis of the barriers, the project activity has been concluded as not a common practice scenario. OK. ☒ Step passed ☐ Step not passed ☐ Not applicable
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⁶ <http://www.inwea.org/installedcapacity.htm>

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	commissioning of this project. Hence it has been sufficiently demonstrated that the development of wind power project without VCS revenues is not a viable option.	
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Thus the validation team arrived at the opinion that the project activity is assessed to be additional.

However, following CAR B1-CAR B6 and CR B1-BR B4 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 In section 2.5, Explain and provide proof for the following parameters: 1. PLF 2. Project Capital cost 3. Operation & Maintenance expenses 4. Power tariff 5. Administrative overhead expenses 6. Life of the Project	/PD 1/ /PD 2/ /XLS 1/	For determination of the project IRR, the wind machines in the project activity have been clubbed into three sets based on the ownership with MSPL and RMMPL and then by year of commissioning that translates into difference in tariff. Please see the Synopsis worksheet in the IRR sheet for details. 1.PLF: It may be noted that the project proponent had engaged a third party for estimation of the PLF as per the attached Centre for wind energy Report for estimation of annual generation of energy for Wind Projects by MSPL Limited in Chitradurga Districts. As may be seen from this report, the PLF for the machines was estimated at 25.2% for the 950 KW machine and	/PD4/ /XLS 3/	The arguments given by PP are satisfactory. The centre for energy Report on estimation of annual generation of energy for Wind Projects by MSPL Limited in Chitradurga Districts/ ^{CWET/} was checked and found that the estimated PLF as 25.2% for the 950 KW machine and 20.7% for the 750 KW are found to be correct. These PLFs are very less and unlikely to reach the minimum guaranteed generation of

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		20.7% for the 750 KW machine. But the minimum guaranteed generation from Wind turbine supplier for the 950 kW machine is 250,000 units (PLF – 30%) and for the 750 kW machine is 18,50,000 units (28.15%) as per the purchase orders. As per the third party report, it is unlikely for the PLF to reach the figures as specified in the purchase orders. Considering the above figures, the PLF as per KERC order 2006 has been taken as the most likely estimate for the purpose of IRR calculation for the project activity. 2. The project capital cost It is taken from the purchase orders for supply of each machine, erection and commissioning. For e.g., for the 950 kW machine of MSPL Ltd., the capital cost is as follows: a) Price for supply of one number of 950 kW machine from contract order MKA/WM/NEG/MSPL/5110 dated 4th March 2003 = Rs.337.50 Lakhs (inclusive of all taxes		30% for 950 KW machines and 28.15% for 750 KW machines given by Suppliers in purchase orders^{/PO1-PO4/}. As per above facts, not choosing PLF based on estimated and guaranteed generation is acceptable. Hence, the KERC order dated 18th January 2005^{/kerc/} was verified in respect to the PLF used in the project activity and found to have applied correctly. Though the KERC order was released subsequent to the start date of the Project activity, the PLF mentioned in the order is based on the last 3 years (2003 – 2005) wind power generation details in the regions of Karnataka including

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		and statutory duties) b) Price for erection and commissioning of the same wind mill from contract order No.MKA/WM/E&C/NEG/5112 dated 4 March 2003 = Rs.20.0 Lakhs (inclusive of all taxes and duties) c) Therefore, total capital cost for the 950 kW wind machine is $337.5 + 20 = 357.5$ Lakhs which is the figure used to calculate project IRR. d) The same method has been used for determining the capital cost for all the nine machines. 3. Operation & Maintenance Expenses: The O & M Expenses have been taken from the O & M Contract Order for each machine for annual operation, maintenance and security. For example, for the 950 KW machine of MSPL Ltd., the O & M contract order No. MKA/AMC/NEG/5111 dated 4th March 2003 mentions the O & M charges as follows: a) From 1st April		Chitradurga. Hence the chosen PLF is deemed to be acceptable. 2. The Purchase orders /PO1 –PO4/ have been checked. Thus the Project capital cost used in financial calculation is in line with the orders and verified to have applied correctly.

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		2003 to 31st March 2005: Nil b) From 1st April 2005 to 31st March 2023: Rs.3, 80,000/- for one 950 KW WEG with increase of 5% every year over the previous year. c) Thus, this figure translates to 1.06% of the capital cost for this machine in the third year with an annual escalation of 5% year on year henceforth. The same figure has been used to calculate the O & M expenses over the project period of 20 years in the IRR sheet attached. d) The same method has been used to calculate the O & M expenses for all the nine machines. 4.Power tariff: The power tariff has been taken from the Power Purchase Agreement signed between KPTCL and MSPL and KPTCL and RMMPL.The tariff is taken at 3.25 Rs./Kwh for the MSPL machine that got commissioned on 21/03/2003. For all other machines in the project activity, the tariff is taken as 3.10 Rs./KWh for the first 10 years.		3. The Operation and maintenance contracts of each machines /OM1-OM4/ have been checked. Thus the O& M expenses used in financial calculations are in line with the contracts and have been applied correctly.

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		Subsequently, as mentioned in the PPAs, from the 11th year onwards, the KPTCL will pay to the Company for the energy delivered at the Metering Point at a rate based on operating costs and incentives to be agreed upon by mutual negotiations. Thus, considering the incentives to be taken in consultation with the Corporation, the incentives as mentioned in the KERC Tariff Order dated 2005 of 16% ROE has been taken. Thus, from the 11th year onwards, the project tariff has been kept at Operation Cost + 16% ROE. 5. Administrative overhead expenses: The administrative expenses have been estimated at 5% of the revenues based on the standard values as assumed by the project proponent. The breakup of actual administrative expenses in Chitradurga as incurred by project proponent for the year 2008-09 works out to 4.25% as per details attached.		4. The Power Purchase Agreements /PPA1-PPA4/ have been checked in respect to the tariff used in financial calculations and found that the tariff rates have been applied correctly corresponding to each machines. KERC order dated 18th January 2005/^{kerc/} was checked and found that the decrease in

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		6. Life of the Project: The life of the project is taken as 20 years for wind power projects as per the O & M Agreement for the project and the Directory – Indian Wind Power 2007		tariff rate from 11th year is in line with the order. Thus decrease in tariff rate is found to be deemed acceptable. 5. The break up costs of the administrative expenses for the year 2008-09^{/ADE/} given by PP have been verified and found to be around 4.25% of capital cost. Thus the estimated administrative expenses as 5% of the capital cost during project start date are found to be deemed acceptable. 6. The O& M Agreements ^{/OM1-OM4/} and the Directory – Indian Wind Power 2007 were verified and thus the life of the Project

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
				taken as 20 years is found to be OK. All the above 6 points are successfully addressed. CAR B1 is closed.
CAR B2 In financial work sheet, First year generation, revenue and costs should be pro rata to the period for which the WEGs were operational during that financial year. [MSPL's 1 X 950 commenced generation on 21.3.2003, MSPL's 5 X 950 on 30.9.2003, RMMPL's 2 X 950 on 30.9.2003 and RMMPL's 1 X 750 on 19.5.2004]	/PD 2/ /XLS 1/	The first year generation and revenue has been worked out on a pro-rata basis. The capital costs for all the machines have been incurred within the financial year 2003 as per purchase orders and therefore have been included for the first year.	/PD 3/ /XLS 3/	Necessary changes have been made by working out the generation and revenue on a pro-rata basis. More over the argument given by PP in respect to inclusion of all capital costs during first year is satisfactory. In regard to this argument, Purchase orders /PO 1-PO4/ were verified and found that all the machines were purchased during 2003 and thus including the capital costs for all machines during first year (2003-04) is found to be OK. CAR B2 is closed.
CAR B3 O&M cost has been provided from the	/XLS 1/	Please see the updated excel sheet wherein the generation and revenues	/XLS 2/	Necessary changes have been made. The

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
third year onwards irrespective of the data on which the WEG commenced generation. In the process, two years free warranty has not been fully accounted for in the calculation. The escalation should also be provided based on the commencement date of generation of WEG.		have been distributed pro-rata. Thus, all subsequent calculations using these figures also account for this distribution. Thus, the O & M Costs and the escalation values are applicable as per the commissioning of machines.		O&M costs are verified to be correct as per O&M contract agreements /OM1-OM4/. CAR B3 is closed.
CAR B4 Though it does not affect additionality, providing full year book depreciation, when the WEGs were in operation for less than a year, is not in conformity with accepted accounting principles.	/XLS 1/	Accelerated depreciation (80%) is available for WTGs commissioned on or before 30 th September of the financial year under Income Tax Act vide Section 32(Rule 5) Appendix 1 of Income Tax Act 1961. In the event the WTGs are commissioned between 1 st October and 31 st March of the financial year, 50% of accelerated depreciation (i.e. 40%) can be claimed immediately and thereafter annual depreciation of 80% can be availed. Unabsorbed depreciation can be carried forward for any number of years. The depreciation in the IRR sheet has been calculated accordingly.	/XLS 2/	Required changes in regard to applicability of depreciation rate have been made. Income tax act, section 32 was checked in respect to the depreciation calculations and found to have used the rates correctly as per the act. CAR B4 is closed.
CAR B5 1. The Purchase orders for WEGs were released in	/XLS 1/	The tax rates assumed for the calculations have been updated to the rates prevailing in 2002-03,	/XLS 2/	Necessary changes have been made. KPMG's

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
March 2003, July 2003 and December 2003 and the investment decision must have been taken before. The tax rate assumed in the calculations (33.99%) does not appear to be rate prevailing in 2003-04. 2. Tax computation is not in conformity with IT Act and the ruling given on sec. 80IA.	/XLS 1/	i.e. time of decision making for the project activity, i.e. 35.007% (35% + surcharge at 2%) during 2002-03. The tax computation has been carried out in conformance with the IT Act, 1961. The provisions contained in section 80-IA of the Act, provides for 100% deduction (tax holiday) in respect of profits derived by an assessee from its undertaking(s) engaged in, inter-alia, generation of power. The ruling Sec.80 IA, Chapter VIA, IT Act, 1961 specifies that the deduction may be claimed by the assessee for any ten consecutive assessment years out of fifteen years beginning from the year in which the undertaking or the enterprise develops and begins to operate any infrastructure facility. The same 10 years tax	/XLS 2/	Corporate tax rate survey – annual report was verified in respect to the tax rates used in these financial calculations and thus the applied values are found to be correct. Required changes have been made. More over the clarifications given for tax computations are verified to be in accordance with IT act section 80-IA. Thus tax computation calculation is deemed to be acceptable. The above 2 clarifications are successfully addressed. CAR B5 is closed.

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
		holiday has been applied in the IRR computations.		
CAR B6 IRR computation has following discrepancies: a) Cash inflow does not include tax shield enjoyed by the company on account of accelerated depreciation; and b) Since the investment has taken place in the cases of MSPL (1 X 950 , 5 X 950) and RMMPL (2 X 950) in the same year as the generation had commenced, the cash outflow should be netted out with cash inflow of first year.	 /XLS 1/ /XLS 1/	 The tax shield for the proposed project activity has been accounted for the tax computation in the IRR calculations. The cash outflow has been netted out with cash inflow of first year in the updated calculations.	 /XLS 2/ /XLS 2/	 a)Required changes have been made correctly by including the tax shield in the calculations. b)Required changes in cash flow have been correctly made. Thus IRR computation has been verified to be correct. The above 2 clarifications are successfully addressed. CAR B6 is closed.
CR B1 In section 2.5, step 3, Provide specific web links or references for the references being made corresponding to the tables 3, 4 & 5 under common practice analysis.	/PD1/	References for the tables 3, 4 and 5 have been provided under Section 2.5.	/PD 2/	The background sources given under common practices were verified from the web link ^{/cea/} and thus found be correct. CR B1 is closed.

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR B2 1. The reference for the PLR chosen needs to be provided.	/PD 1/	The PLR is based on the certified statement by India's largest nationalized bank, and has been submitted.	/PD 2/ /PD 3/	The certificate statement given by State Bank of India for the PLR ^{/PLR/} during 1-11-2002 to 4-05-2003 has been verified. Thus the given PLR reference for benchmark is deemed to be acceptable. CR B2 is closed.
CR B3 Tariff has been subjected to variation. Clarify whether the tariff is subject to variation. Moreover, it may also be clarified as to why the PLF has not been subjected to variation.	/XLS 1/ /PD 1/	The tariff has been subjected to variation as per the directions in the PPA. The PLF is also now subjected to variation.	/XLS 2/ /XLS 3/ /PD 2/ /PD 3/ /PD 4/	The power purchase agreements ^{/PPA1-PPA4/} were checked in respect to tariff variation and found to be OK. The variations of PLF to the tune of +/-10% and +/-5% have been verified. Even with increase in PLF to +10%, the IRR does not cross benchmark of 10.75%. Hence the overall sensitivity analysis calculations are found to be OK. CR B3 is closed.

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CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR B4 Though it does not affect additionality, book depreciation rate of 4.75% does not seem to have been recommended by Companies Act. In case it is, the relevant section/schedule and a soft copy thereof may be furnished	/XLS 1/	Book depreciation rate is 4.75% as per Companies Act for the project. This has been referred from Companies Act, 1956, Schedule XVI, Rates of Depreciation for Plants & Machinery under Straight Line Method.	/XLS 2/	The tax guru web site ⁷ was checked and thus the book depreciation rate of 4.75% stated as per companies act were found to have applied correctly.
2. Clarification is requested on applicability of MAT to the project activity as per the Income Tax Act	/XLS 1/	The applicability of the MAT to the project activity is described as under Section 115JB of the IT Act, 1961.	/XLS 2/	Section 115JB of the IT Act, 1961 has been checked and the applied MAT rate is found to be correct. CR B4 is closed.

3.3 Monitoring Plan

The proposed project uses CDM approved methodology AMS I D Version 13: Grid Connected Renewable electricity Generation, which is approved under VCS 2007.1.

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

The monitoring plan 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 delivered.

⁷ <http://www.taxguru.in/company-law/rates-of-depreciation-under-the-companies-act-as-mentioned-in-schedule-xiv.html>

As per the requirements of the methodology, monitoring shall consist of metering the electricity generated by the renewable technology.

The Delivered energy is metered by the MSPL and BESCOM at the high voltage side of the step up transformer installed at the receiving station.

Metering equipment is electronic trivector meter of accuracy class 0.2% required for the project (both main and check meters). The Main Meters and check meters at the project site are owned by MSPL, maintained by Vestas Wind Technology and it will be under the custody of BESCOM.

Net electricity supplied to grid will be calculated based on the measured values of “export” and “import” on the meter at the delivery point, where joint reading is taken by project proponent representative and BESCOM officials. Apportioning of net electricity uploaded is done with reference to the electricity generated from individual wind turbines by the state utility department. The BESCOM will issue a monthly certificate for actual power exported by each project owner in the wind farm to the grid, based on the individual meter readings of each wind turbine. The reading recorded in this certificate, issued by BESCOM, will be used to calculate actual GHG emission reductions by the project activity.

The data relevant to establishing the net electricity generated from the project including the electricity share certificate from BESCOM, the invoice to BESCOM and the monthly metering sheets available with the project proponent shall be archived for the entire crediting period plus two years. The monitoring data shall also be archived by Vestas Wind Technology as a backup arrangement for the entire crediting period plus two years.

Thus the frequency, responsibility and authority for registration, monitoring, measurement and reporting activities are clearly mentioned under monitoring plan.

The on-site visit was carried out on 17/04/2009. 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 and to resolve issues identified in the document review.

During the onsite-visit the above informations was verified from the joint meter reading^{/JMR/} reports which have been duly signed by the representatives of BESCOM submitted by the PP. This was found to be in line with the monitoring plan^{/PD3/} & the Power purchase agreements^{/PPA1-PPA4/} signed for the project and found to be ok.

The meters are calibrated at least once in a year by the BESCOM officials. This was checked and found to be ok. Responsibilities related to monitoring are clearly defined in the monitoring plan and were assessed and found to be OK.

However, following CAR was raised and successfully closed out.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion

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CAR M1 Under section 3.4 Complete details of monitoring equipments have to be given 2. Proof of back up arrangements for data archiving & storage have to be provided.	/PD 1/	1. The complete monitoring plan is explained in detail in the Section 3 of the PD. The calibration certificates for the meters monitoring energy generation from the project have been provided as Annexure-IV. 2. As mentioned in the Section 3.3. of the PD, the data relevant to establishing the net electricity generated from the project including the electricity share certificate from erstwhile KPTCL and now BESCO, the invoice to BESCO and the monthly metering sheets are available with the project proponent and shall be archived for the entire crediting period plus two years. The monitoring data shall also be archived by Vestas Wind Technology as a backup arrangement for the entire crediting period plus two years. This data is already recorded with Vestas as it is the operation and maintenance in charge for the project activity.	/PD 2/ & /PD 3/	Necessary information under monitoring plan and data storage have been correctly included in the PD. The added informations were found to meet the requirements under monitoring. CAR M1 is closed.
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3.4 Calculation of GHG Emissions

The Validation team checked and found out that GHG emission reduction achieved by the project activity is calculated as the difference between the baseline emission and the project emission.

The project category applicable to the proposed project is AMS ID. Accordingly, the energy baseline being considered is as directed in paragraph 9 of the AMS.I.D/Version 13, which provides that the applicable baseline is the kWh produced by the renewable generating unit multiplied by an emission coefficient (measured in kg CO₂e/kWh) calculated in a transparent and conservative manner as:

A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the ‘Tool to calculate the emission factor for an electricity system’.

The methodology also states that the calculations must be based on data from an official source (where available) and made publicly available.

Thus, as per the publicly available CEA publication of the CO₂ Baseline Database, Version 4.0 dated October 2008, the simple operating margin emission factor for the southern regional grid is calculated based on weighted average of latest three year statistics data (year of 2005-06, 2006-2007, 2007-08) as 0.990 kg CO₂e/kWh and the Build Margin emission factor for the Southern Grid is 0.713 kg CO₂e/kWh. As specified in the methodology, the combined margin emission factor (in kg CO₂e/kWh) of the current generation mix using the tool to calculate the emission factor for an electricity system has been considered to estimate the baseline emissions.

The tool to calculate the emission factor requires that for intermittent sources for power generation like wind as in the case of proposed CDM project the weights to be used for calculating the emission factor for Combined Margin. Thus the weights 0.75 % for OM and 0.25% for BM have been added.

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^{/PD3/} this project is expected to reduce emissions of 170680 tCO₂e over a 10 years crediting period.

Thus the emission reduction calculations^{/ER/} are found to be OK.

3.5 Environmental Impact

Wind power is one of the cleanest sources of renewable energy, with no associated emissions and waste products. In India, as per the provisions under the EIA Notification of 1994, wind power projects do not require an Environmental Impact Assessment. This has been verified from the website <http://envfor.nic.in/legis/eia/so1533.pdf> and concluded that EIA is not necessary.

3.6 Comments by stakeholders

A stakeholder consultation meeting of the project was conducted on 17/05/2007 at Chitradurga, Karnataka. Stakeholders meeting notification was published in the local daily and information was also given to the local Gram Panchayats and farmers in the villages. A summary of the stakeholder comments have been included in the VCS PD. All comments were positive and it has been verified that all comments sufficiently

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have been addressed. Invitation notice for stakeholders meeting ^{/SHI/} and minutes of meeting and attendance sheet for stakeholders meeting conducted on 17/05/2007^{/SHM/} were verified and found to be in order.

However CR L1 was raised and successfully closed.

CAR/CR	Reference	Summary of project owner response	Revised sections (as applicable)	Conclusion
CR L1 In section 6, under stakeholders comments provide necessary supporting documents like invitation notice and attendance sheet.	/PD 1/	The stakeholders comments and invitation notices are submitted.	/PD 2/ & /PD 3/	The required documents ^{/SHI- SHM/} have been verified in respect to the stakeholders meeting conducted and found to be OK.

4 Validation conclusion

MSPL Limited has commissioned the TÜV NORD JI/CDM Certification Program to carry out the validation of the project, “8.35 MW wind power project at Guddarangavana Halli, District Chitradurga, State Karnataka in India”, 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 8 Corrective Action Requests (CAR) and 8 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.

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- The monitoring plan is transparent, adequate and inline with applied baseline and monitoring methodology of AMS I D Version 13.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 170680 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, 2009-11-05

Eric Krupp
Final approval
Essen, 2009-11-12

5 References

Table 5-1: Documents provided by the project proponent

Reference	Document
/PD1/	VCS PD for MSPL Limited dated at 14/02/2009, Version 1
/PD2/	VCS PD for MSPL Limited dated at 09/07/2009, Version 2
/PD3/	VCS PD for MSPL Limited dated at 02/09/2009, version 3
/PD4/	VCS PD for MSPL Limited dated at 10/11/2009, version 4
/TD 1/	Technical specification of the WTGs for 950 KW.
/TD 2/	Technical specification of the WTGs for 750 KW.
/XLS1/	Financial calculation sheet corresponding to VCS /PD2/
/XLS2/	Financial calculation sheet corresponding to VCS/PD3/
/XLS3/	Financial calculation sheet corresponding to VCS/PD4/
/CR1/	Commissioning certificates dated 21.03.2003 for 1 number of 950 KW WTG from KPTCL

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Reference	Document
/CR2/	Commissioning certificate dated 30.09.2003 of 5x950 KW (4.75 MW) WTGs from KPTCL
/CR3/	Commissioning certificate dated 30.09.2003 of 2x950 KW (1.9 MW) WTGs from KPTCL
/CR4/	Commissioning certificate dated 19.05.2004 of 1x750 KW (0.75 MW) WTG from KPTCL
/PPA1/	Power Purchase Agreements between KPTCL and MSPL Limited for 4.75 MW WTGs dated 11.02.2004
/PPA2/	Power Purchase Agreement between KPTCL and MSPL Limited for 0.95 MW WTG dated 7.08.2003
/PPA3/	Power Purchase Agreement between KPTCL and Ramgad Minerals and Mining Private Limited for 1.9 MW WTGs dated 11.02.2004
/PPA4/	Power Purchase Agreement between KPTCL and Ramgad Minerals and Mining Private Limited for 0.75 MW WTG dated 05.03.2005
/PO1/	Purchase order for 1 x 950 KW WEG by MSPL Limited dated 04.03.2003
/PO2/	Purchase order for 5 x 950 KW WEGs by MSPL Limited dated 29.07.2003
/PO3/	Purchase order for 1 x 750 KW WEG by Ramgad Minerals and Mining Private Limited dated 30.12.2003
/PO4/	Purchase order for 2 x 950 KW WEG by Ramgad Minerals and Mining Private Limited dated 29.07.2003
/OM1/	Operation and Maintenance contract between NEG Micon Private Limited and MSPL Limited for 1 x 950 KW WTG dated 04.03.2003.
/OM2/	Operation and Maintenance contract between NEG Micon Private Limited and MSPL Limited for 5 x 950 KW WTGs dated 29.07.2003.
/OM3/	Operation and Maintenance contract between NEG Micon Private Limited and Ramgad Minerals and Mining Private Limited for 1 x 750 KW WTGs dated 30.12.2003.

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Reference	Document
/OM4/	Operation and Maintenance contract between NEG Micon Private Limited and Ramgad Minerals and Mining Private Limited for 2 x 750 KW WTGs dated 29.07.2003.
/EIP 1/	Electrical Inspectorate letter from Government of Karnataka for the approval of 1 x 950 KW WTG for MSPL Limited dated 14.05.2003.
/EIP 2/	Electrical Inspectorate letter from Government of Karnataka for the approval of 5 x 950 KW WTGs for MSPL Limited dated 24.09.2003.
/EIP 3/	Electrical Inspectorate letter from Government of Karnataka for the approval of 2x 950 KW WTGs for Ramgad Minerals and Mining Private Limited dated 24.09.2003.
/EIP 4/	Electrical Inspectorate letter from Government of Karnataka for the approval of 1x 750 KW WTGs for Ramgad Minerals and Mining Private Limited dated 30.03.2004.
/PLR/	Letter from State Bank of India stating the PLR as 10.75%.
/SHI/	Invitation sent for stakeholders informing stakeholders consultation meeting on 17 th May 2007
/SHM/	Minutes of meeting of local stakeholders consultation conducted for 8.35 MW Wind Power Project dated 17 th May 2007
/INS 1/	Insurance premium receipt for fire and burglary insurance from the Oriental Insurance Company Limited.
/INS 2/	Insurance premium receipt for Machinery breakdown insurance from the Oriental Insurance Company Limited.
/ADE/	Administrative expenses for the Year 2008-09
/CWET/	Estimation of annual generation of energy for Wind Projects installed MSPL Limited in Chitradurga Districts by Centre for Wind Energy Technology

Table 5-2: Background investigation and assessment documents

Reference	Document
/AMS ID/	Grid connected Renewable Electricity Generation (version 13)

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Reference	Document
/IPPC-RM/	1. 1996 IPCC Guidelines for National Greenhouse Gas Inventories: work book 2. 2006 IPCC Guidelines for National Greenhouse Gas Inventories: work book

Table 5-3: Websites used

Reference	Link	Organisation
/vcs/	www.v-c-s.org	VCS website
/unfccc/	www.unfccc.int	UNFCCC website
/cea/	http://www.cea.nic.in/planning/c%20and%20e/Government%20of%20India%20website.htm	Central Electricity Authority
/rbi/	www.rbi.org.in	Reserve Bank of India
/enfor/	http://envfor.nic.in/divisions/cd/cdm_iac.html	Ministry of Environment and Forests, GoI, India
/kerc/	http://www.kerc.org/order2005/Order%20on%20NCE%20Tariff%20(FINAL).doc	Karnataka Electricity Regulatory Commission
/inwea/	http://www.inwea.org/installedcapacity.htm	Indian Wind Energy Association
/mnes/	http://mnes.nic.in/	Ministry and New and Renewable Energy

Table 5-4: Interviewed Persons

Reference		Name	Organisation / Function
/IM01/	☒ Mr. ☐ Ms.	Ajeet Kumar	General Manager, MSPL Limited

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Reference		Name	Organisation / Function
/IM02/	☒ Mr. ☐ Ms.	Vivek Adhia	Consultant
/IM02/	☒ Mr. ☐ Ms.	Brij Mohan	Consultant
