



Voluntary Carbon Standard 2007.1

VALIDATION REPORT

15 MW BUNDLED GRID CONNECTED WIND ENERGY PROJECT IN MAHARASHTRA, INDIA

Project No.: V-3-I-01-B-0087

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VCS Validation Report for “15 MW bundled grid connected wind energy project in Maharashtra, India”	S. V Jamble
Client:	Project Title:
M/s C Mahendra Exports Limited M/s Ratnakala Exports M/s Ambika Diamonds M/s Rindiam Export	15 MW bundled grid connected wind energy project in Maharashtra, India”
Summary:	
<p>M/s C Mahendra Exports Limited, the focal point for the project along with the other developers have contracted Perry Johnson Registrars Clean Development Mechanism Inc. (PJRCDM) to perform validation of the project – “15 MW bundled grid connected wind energy project in Maharashtra, India” under Voluntary Carbon Standard (VCS) 2007.1 The validation is an independent assessment to determine the conformance of the project activity to the requirements of VCS 2007.1, including applicable baseline methodology, demonstration of additionality, monitoring plan and the greenhouse gas (GHG) emission reduction potential.</p> <p>The project involves installation and operation of twelve (12) numbers WTG’s in Maharashtra. The generated electricity is exported to the NEWNE regional electricity grid. The project activity has applied the tools of Clean Development Mechanism (CDM), the flexible mechanism under the United Nations Framework Convention on Climate Change (UNFCCC) and one of the VCS 2007.1 approved GHG Programs. The applied methodology is version 14 of AMS-I.D., Type I, Renewable Energy Projects, category I.D., <i>Grid Connected Renewable Electricity Generation</i>.</p> <p>PJR CDM conducted a physical verification of the WTGs, interviewed project proponents and concerned persons and carried out a review of submitted documents. A list of Clarification Requests (CLs), Corrective Action Requests (CARs) and Forward Action Requests (FARs) was issued and were closed by the project proponents.</p> <p>The proposed project activity is also under-validation stage under CDM and has applied for VCS 2007.1 for the crediting period starting from implementation till registration with CDM. Total emission reductions achievable by the project activity have been estimated to be 22,203tonnes of CO₂e per annum.</p> <p>Based on the documentation verified, it is PJR CDM’s opinion that the emission reductions from the project activity under consideration would be real, measurable, additional and permanent.</p>	
Project No. / Version No.	Number of pages
V-3-I-01-B-0087 /01	40
Work carried out by:	Work reviewed by
T Krishna, Mathsy Kutty	S V Jamble

Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority, Ministry of Power, Government of India
CL	Clarification Request
FAR	Forward Action Request
GHG	Greenhouse gases
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate of Return
kWh	kilo watt-hour
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MEDA	Maharashtra Renewable Energy Development Agency
NEWNE	Northern Eastern Western North Eastern (NEWNE) Grid of India
MW	Mega Watt
NEWNE	Northern Eastern Western North Eastern (NEWNE) Grid of India
PD	Project Description (VCS)
PJRCDM	Perry Johnson Registrars Clean Development Mechanism Inc.
PLF	Plant Load Factor
PP	Project Proponent
RBI	Reserve Bank of India
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Unit
WTG	Wind Turbine Generator



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1 INTRODUCTION

C Mahendra Exports Limited, the focal point for the project activity, along with each of the project developers mentioned in the PD, (hereinafter referred to as the “client” or “project proponent”) have contracted Perry Johnson Registrars Clean Development Mechanism Inc. (PJRCDM) to perform validation of the project “15 MW bundled grid connected wind energy project in Maharashtra, India” (hereinafter referred to as the project/project activity) under the Voluntary Carbon Standard (VCS) 2007.1 standard. This report describes the validation work undertaken.

1.1 Objective

The purpose of validation is to perform an independent, third party assessment of whether the project activity conforms to the qualification criteria set out in the VCS 2007.1 standard to attain real, measurable, additional and permanent emission reductions.

The validation statement/opinion is a written assurance that the project complies with all the applicable VCS requirements and has the ability to generate the emission reductions stated over the project’s crediting period.

1.2 Scope and Criteria

The validation scope includes an independent and objective review of the project’s VCS project description (PD). In particular, the specific objectives of the validation work involve:

To verify that the project activity meets the requirements of VCS 2007.1 standard including additionality, proof of title and compliance with local laws

To assess whether the baseline and monitoring plan are in conformance with the methodology applied from the VCS approved GHG program.

To certify that the information presented are complete, consistent, transparent and free of omission or material error.

The information in the PD is reviewed against the criteria of VCS 2007.1 standard, the VCS program guidelines, and the applied simplified baseline and monitoring CDM methodology AMS ID version 14. PJRCDM has performed the validation based on a risk based approach focusing mainly on the significant risks to meet the qualification criteria and the ability to generate Voluntary Carbon Units (VCUs).

The work carried out by PJRCDM is free from any conflict of interest.

1.3 VCS project Description

The project activity is implementation of twelve (12) number wind turbine generators (WTGs) of installed capacity 0.6 MW and 1.5MW capacity for energy generation in four villages Tisangi, Ghtnandre, Jarandi and Titane in Sangli and Dhule districts of Maharashtra state. The generated electricity shall be evacuated to the regional grid through the locally available evacuation facility provided by the state utility (MSEDCL – Maharashtra Electricity Distribution Energy Transmission Company Ltd.).

The WTGs installed under the project activity have been supplied by M/s Suzlon Energy Ltd of 1.25 MW (12 nos). The project activity is a bundled wind power project with a total installed capacity of 15 MW (commissioning certificate of MEDA) and is expected to generate 26, 280 MWh per annum. The project developer as assumed the plant load factor of 20% (Tariff order of MERC).The same has been verified the tariff order provided by the PP. The electricity generated is sold to the grid.

They are uniquely identified as below:

S.No.	WEG Number	Land Survey Number	Name of Invetisor	Date of Commissioning
1	G – 320	474	C. Mahendra Exports Ltd.	31-Mar-2006
2	G – 52	388		25-Mar-2006
3	G – 53	435		25-Mar-2006
4	G – 54	453		25-Mar-2006
5	G – 55	479		20-Feb-2006
6	G – 56	478		20-Feb-2006
7	G – 57	456		25-Mar-2006
8	G – 38	851		14-Feb-2006
9	G – 311	843	Ratnakala Exports	20-Feb-2006
10	G – 319	491		31-Mar-2006
11	K – 139	198	Ambika Diamonds	11-Jul-2005
12	K – 123	142	Rindiam Export	01-Sep-2005

1.4 Level of assurance

In line with VCS 2007.1 requirements and as per ISO 14064-3:2006 paragraph A.2.3.2, a reasonable level of assurance is defined for the validation of the project.

This implies that, based on the process and procedures conducted, PJRCDM should state whether the information in the PD

- is materially correct and is a fair representation of the actual project details, and
- is prepared in accordance with VCS requirements and the applied CDM methodology for information pertaining to additionality, GHG quantification, monitoring and reporting.

The validation work is carried out as per this requirement and details are presented in the Validation statement in section 4 below.

2 METHODOLOGY

The project activity applies approved small scale CDM methodology AMS I D (version 14) categorised under sectoral scope 1 ‘Energy Industries (renewable/non renewable sources)’ for which PJRCDM has been accredited to carry out both validation and verification activities. For validation, PJRCDM’s approach involves broadly three steps:

Completeness check and desktop review of the project description (PD)

Onsite inspection, interview with project representatives and issuance of findings

Resolution of the findings followed by preparation of the validation report

The following team members from PJRCDM were involved in these steps:

Name	Role	Areas covered
Mathsy Kutty	CDM validator	Supervision of the Desk review, draft report and final report.
T Krishna	GHG auditor	Desk review, Draft report and final report preparation. Site visit
S V Jamble	Technical reviewer	Technical review

2.1 Review of Document

On receipt of the project description from the client, the completeness of information made available as per VCS2007.1 standard requirements is reviewed. A desktop review is further carried out to assess the following:

- the project details as per VCS PD template
- appropriateness of methodology applied
- compliance with relevant laws and regulations
- correctness of application of baseline and monitoring methodology
- demonstration of additionality
- monitoring plan
- stakeholder comments
- proof of title
- other external documents like grid emission factor, IPCC emission factor, etc. where applicable

A complete list of all documents reviewed is attached in section 5 of this report.

2.2 Follow-up Interviews

The representatives of PJRCDM visited the project site on 9th October, 2009 to resolve the issues identified during the desktop review.

The following personnel were interviewed on the denoted topics:

Name / Designation / Company	Topics of Interview
Lovleen Gupta Pricewater House Coopers	Monitoring of the meters, internal audits and emission reduction calculations
Mr.Sudanand Patil Site Incharge Suzlon Energy Limited	Metering system and calculations of the net export to the grid
Mr.Mandar Executive C Mahendra Exports Ltd	Financial details of the project activity and

During the site visit, PJRCDM verified the actual operation of the project as described in the PD. The system of controller energy meters and joint energy meters used for monitoring the sale of electricity sale to grid were examined. The monthly records for joint meter readings were reviewed.

2.3 Resolution of any material discrepancy

Based on the site inspection and review of documents and records including the monitoring plan, issues that need to be further elaborated upon, researched or added in order that the project activity meets the VCS 2007.1 requirements and can achieve credible emission reductions is identified, discussed and to be resolved by the project proponent. A Corrective Action Request (CAR) is raised if one of the following occurs:

- a. The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- b. The VCS 2007.1 standard requirements, including the specific requirements of the methodology applied, have not been met;
- c. There is a risk that emission reductions cannot be monitored or calculated

If information made available is insufficient or not clear/ transparent enough to determine whether the applicable VCS requirements have been met, a Clarification request (CL) is raised and communicated to the project proponent.

Observations may also be raised which are for the benefit of future verification period- called as Forward Action Requests (FARs). These, however, have no impact upon the completion of the current validation activity.

On receipt of response and revised PD from the project proponent, the adequacy of compliance with VCS and the methodology requirements is checked. Closure of comments raised occurs only if the response provided and corrections made fully comply with the stated requirements of the VCS2007.1 standard and the methodology applied.

The list of CARs/ CLs/ FARs raised and the response provided, the means of validation, reasons for their closure, and references to correction in the PD are provided *Appendix-II* to this report.

3 VALIDATION FINDINGS

3.1 Project Design

a) Project design/Technology used:

The project activity is grouped and comprises of twelve (12) numbers Wind Electric Generators (WEGs), with rated generation capacities of 1.25 MW

The WTGs installed under the project activity have been supplied by Suzlon make of 1.250 MW (S 70 model) capacity. The project activity is a bundled wind power project with a total installed capacity of 15 MW and is expected to generate 26, 280 MWh per annum. The project developer as assumed the plant load factor of 20.0% the same has been verified from the tariff order of Maharashtra State Electricity Regulatory Commission recommended PLF from MERC tariff order dated 24th November 2003 (Page 33 of the order - http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf)[18].

b) Project duration, crediting time and project start date:

The project proponent has considered the commissioning date as the project start date which is the earliest amongst the commissioning dates of all the sixteen (12) numbers WTGs considered under the bundled project activity. The selected project start date is in line with the VCS policy guidance (VCS 2007.1) which says “the project start date is identified as the date when the project activity began reducing or removing GHG emission”. PJR CDM verified the commissioning dates of all the 12 WTGs (WTG nos G- 52 to 57, 320, 38, 311, 319, 139 and 123) under the project activity from the commissioning certificated issued by the Maharashtra State Electricity Distribution Company Limited. The earliest date of commissioning of the WTG included in the project activity is on 11th July, 2005. Hence project start date for the project activity chosen to be 11th July 2005, is in line with the VCS guidance for defining start date of the project activity.

The project proponent has opted for a fixed crediting period of 10 years starting from 28th March 2006. The selected crediting period is reasonable keeping in view VCS 2007.1 guidance for such projects.

Operational lifetime of the proposed project has been defined as 20 years.

c) Ownership:

Proof of title:

The proposed project includes sixteen (12) numbers WTGs installed and operated by the different entities have been considered as project participants and hence, own the emission reductions resulting from the bundled project under consideration. All the project participants have submitted purchase order copies for the entire wind turbine as the proof of ownership of 12 WTGs under the bundle. The same has been accepted by PJR CDM and the documentary evidences had been provided in *Appendix I* of this document

d) Double counting and whether the project participated in another emission trading programme:

The renewable energy credits (RECs) are still in the implementation phase and have not been availed by the project activity in question. In the event that such RECs are made available to the project activity, it has been confirmed by the PP that they would only claim either for the VCU's or the RECs. This would further be checked again during the verification period.

The proposed bundled project had applied under CDM program and is under validation, however, is still awaiting for registration. (<http://cdm.unfccc.int/UserManagement/FileStorage/UQ8WZYCH5IVSPBNF2760MGE10TDX9A>) The project proponent (PP) has provided an undertaking to confirm that the PP shall claim for the emission reductions only under one scheme for the crediting period selected, in line with guidance by the VCS programme

e) Project applicability to the VCS for projects rejected under other GHG programme (if applicable):

The project has not been rejected under any other GHG programme

f) Whether the project is eligible under the VCS:

- The proposed project is a renewable electricity project. The project activity will generate greenhouse gas (GHG) emission reductions by avoiding CO₂ emissions from electricity generation by fossil fuel power plants connected to the grid. The project is also demonstrated to be additional compared with the business as usual scenario, hence, the project is anticipated to fulfil VCS conditions and qualify for carbon finance.
- In addition to above, the project meets the specific criteria set in 5.2.1 of VCS Standard and has contracted a validating entity on 15th November 2008 [15].

3.2 Baseline and demonstration of additionality

The project proponents have applied approved baseline methodology AMS-I.D., version 14 which has been approved under the CDM programme. The total installed capacity of the bundle is 15 MW which is equal to the qualifying limit of 15 MW for

type I small scale project activities. The application of baseline methodology is justified:

- The proposed project generates electricity using the renewable source i.e. wind energy.
- The total installed capacity of the project is equal to 15 MW. The installed capacity has been verified from (the commissioning certificates of all the WTG's and also Name plate details provided by the equipment supplier)
- The grid boundary selected for the project activity is the NEWNE Regional grid of India to which the project exports generated power. The selection is appropriate for a large country like India and is in line with CDM guidelines. The project proponents have committed not to increase the capacity or to replace the technology during the crediting period.

Baseline scenario for the proposed project has been identified in line with the baseline methodology. In the absence of project activity, same amount of electricity would have been generated by the NEWNE regional grid as per the current grid mix and expected future capacity expansions.

Additionality: Since the project activity applies the SSC methodology, AMS I.D, the project proponent used the “Attachment A to Appendix B of the simplified modalities and procedures for small-scale CDM project activities” for the assessment and demonstration of additionality. The project proponent has carried out financial analysis in order to demonstrate that the additionality for the project activity.

Approach selected:

Since the project activity generates revenue without sale of carbon credits and the alternative to the project does not involve investments, a benchmark analysis was selected to demonstrate the financial unattractiveness of the project compared to the benchmark.

Financial indicator: the PP has calculated Post tax project IRR has been selected as the financial indicator.

Benchmark:

The PP has used the Weighted Average Capital Cost (WACC) as the benchmark for the project activity, as the project is financed by the way of equity and debt. WACC represents the minimum rate of return which the project should earn to merit consideration, as failure to earn the minimum rate of return is indicative of the erosion in the value of shareholders' investment. The benchmark selected is conservative for these type of project activity and is in the line EB 41 guidelines. The WACC has been evaluated as under:

$WACC = \%age \text{ of Debt} \times \text{Cost of Debt} + \%age \text{ of Equity} \times \text{Cost of Equity}$

%age of Debt: 70%

Cost of debt is defined as the rate at which lenders agree to lend money to a project. Accordingly, the PP considered bank prime lending prevailing at the time of project start date has been considered as the cost of debt. The prime lending rate at the time of investment was in the range of 10.25 – 10.75 % [Source: Reserve Bank of India, <http://www.rbi.org.in/scripts/WSSViewDetail.aspx?TYPE=Section&PARAM1=4>]

average PLR of 10.5 % has been considered and the same had been verified and found conservative.

Cost of Equity:

Percentage of Equity: 30%

The PP has used the cost of equity calculated using the Capital Asset Pricing model (CAPM) to arrive at the benchmark for the project activity. The benchmark selected is justified as the same is compared with the equity IRR and hence in the line EB 41 guidelines. The benchmark has been arrived at based on the following assumptions:

Percentage of Equity: 30% in line with the standard norms in India.

The formula applied for Cost of Equity is given by:

$$R_e = R_f + \beta * (\text{Market Return} - R_f)$$

Where,

R_e = Rate of return on equity capital

R_f = Risk- free rate of return

R_m = Market risk premium (estimated as Market return – risk free return)

β = Beta

Risk Free Return (R_f) and the Market risk premium (R_m):

The risk free rate has been taken from Indian government bond rates available at the project start date. This has been considered at 7.34% as prevalent at the start date of the project activity. The data on government bond rates is published by Reserve Bank of India. (Web-link: <http://rbidocs.rbi.org.in/rdocs/Publications/PDFs>) and confirmed by PJR CDM for the project activity.

The market risk premium (R_m) at the start date of the project activity has been estimated based on the BSE index and data between 1978-79 to up to respective start of the project activity.

Beta

Beta (β) value has been applied to calculate the cost of equity for the proposed project. The beta is determined by referring beta values of publicly listed companies that are engaged in similar types of business. As there was only one wind energy project (BF utility) listed on BSE- Bombay Stock Exchange in India in year 2005. The next best option for assessing the risk of these projects is to consider the data available on companies which are involved in similar businesses.

Therefore, the PP have considered beta values of all electricity generating companies in India. The group of companies considered includes renewable as well as conventional power generating companies. The use of this Beta value is therefore considered conservative, as it does not add for the higher risk of non conventional energy.

The applicable Beta value has been determined on the basis of the Beta values of all power generating companies in India which were listed on the stock exchange at the time of this investment. Beta values of individual companies have been sourced from Bloomberg (3 years

average). The companies considered were BF Utilities, NTPC Ltd, Neyveli Lignite, Reliance Energy, JaiPrakash Hydro etc.

The WACC for each developer, based on the above assumptions was estimated to be as given in the table below:

<i>Dates</i>	<i>B</i>	<i>R_f</i>	<i>R_m</i>	<i>R_m - R_f</i>	<i>R_e</i>	<i>PLR</i>	<i>Tax rate</i>	<i>WACC</i>
March 2005 (Earliest Investment decision date)	1.40	6.11 %	17.63%	11.52%	22.3%	10.50%	7.87%	13.46%
May 2005 (PO date for Rindiam Exports and Ambika Diamonds)	1.41	6.11 %	17.11%	11.00%	21.6%	10.50%	7.87%	13.25%
July 2005 (PO date for Ratnakala Exports)	1.34	6.11 %	17.69%	11.58%	21.6%	10.50%	7.87%	13.24%
August 2005 (PO date for C. Mahendra Exporst)	1.30	6.11 %	17.90%	11.79%	21.4%	10.50%	7.87%	13.20%

From the analysis and assumptions stated above, it can be noted that the benchmark WACC works out to be 13.46%, 13.25%, 13.24 and 13.20% depending on the time of investment. The PP has defined the lowest of the WACC thus estimated as the benchmark for the project activity. PJR CDM deems this selection to be conservative.

The benchmark WACC for the project is thus defined to be 13.20%

Input values used for the financial analysis:

Assessment period: The assessment period for the financial calculation of IRR has been considered at 20 years (lifetime of project activity) and is reasonable. PJRCMD was able to confirm the same against the technical specifications in the purchase agreement [11].

The tariff for the project activity has been confirmed against the Power Purchase Agreement with the respective PP's and is considered as INR 3.50 per kWh as base year with INR 0.15 escalation per year and the same had been verified.

The operation and maintenance cost (O&M) and yearly escalation is with offers received from the O & M contractors and the same has been verified from the documents provided. The Plant load factor is considered as per MERC tariff order dated 24th November 2003, page no.33 of the tariff order. (http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf).



The capital cost as per the budgetary offers received from the equipment supplier and the same had been verified and found to be conservative of all the project participants

Other parameters like depreciation, income tax, Minimum alternate Tax (MAT) have been considered taking into account the laws prevalent at the time of investment decision like the Income tax rules in India.

The calculations were provided in the spreadsheet and verified to be correct. The project IRR of the activity without revenues from carbon credits for the individual project participants is furnished below:

Post tax project IRR for all the investors

Name of Investor	Project IRR at base PLF
C. Mahendra Exports Limited	9.10%
Rindiam Exports	7.84%
Ratnakala Exports	7.95%
Ambika Diamonds	8.04%

This is less than the benchmark WACC of 13.20% without VCU revenues for all the project participants of the project activity.

Sensitivity analysis: To further demonstrate the robustness of the financial analysis, the project developer has also carried out the sensitivity analysis only for plant load factor and capital cost, as the tariff is as per the Power Purchase Agreement made with MSEDCL, there is no variation in the tariff and is fixed. Hence, the Project developer has carried out sensitivity analysis for plant load factor and Capital cost only and is found to be justified as per the explanation and documentary evidences provided.

It is seen that even with 10% variations in PLF and Capital Cost considered individually for the PP's, the IRR for the project activity doesn't cross the benchmark of 13.04%. Furthermore, since the investment cost used for the IRR analysis has been sourced from the budgetary offers received from the equipment supplier, hence the sensitivity analysis is carried out 10% variation and is conservative.

Tariff: The tariff as per PPA for the project activity for the base year is considered at INR 3.50 and yearly escalation of INR 0.15 for the initial 13 year for all the PP's. The same had been verified and is in line with PPA.

Operation and Maintenance cost: The same does not contribute to more than 20% of the revenue or the cost and hence has not been considered for the sensitivity analysis.

The above analysis clearly demonstrates that the project activity does not represent a financially attractive venture to the promoters. In conclusion, the assessment of the arguments presented above is deemed to sufficiently demonstrate that the project is not a likely alternative, and that emission reductions resulting from the project are additional.

3.3 Monitoring Plan

The project proponents have applied simplified approved methodology AMS-I.D., version 14 – *Grid connected renewable electricity generation*, which has been approved under the CDM programme. The applicability of the same has been justified as already discussed under section 3.2 of the validation report.

The monitoring plan consists of monitoring the energy generated by the project activity as measured by the installed energy meters. These energy meters used for monitoring are electronic trivector meters which measure both the amount of electricity imported from and exported to the grid continuously. There are two set of meters main meter and check meter at WTG location and at the substation. This data is measured monthly in the presence of third party, State Electricity Board officials as a Joint Meter Reading (JMR) exercise. The data is consolidated annually and emission reductions calculated based on these net generating figures.

In case of Maharashtra, since the WTGs under the project are connected to the same feeder as other non-VCS projects, the energy generation of each WTG is arrived at based on the agreed procedures followed by MSEDCL. The procedure takes into account apportioning of the total energy generated by each WTG connected to the feeder and the equivalent line losses of each WTG. Based on this calculation, the final invoices are raised by the MSEDCL. Hence for the emission reduction calculation purposes the net energy generation is sourced from the invoices. However, the total energy generated and imports of each WTG, as well are monitored as a part of the monitoring plan. The data is consolidated annually and emission reductions calculated based on these net generating figures.

The responsibility of measuring parameters rests with the Operations & Maintenance contractor who is also the technology provider. The data is archived electronically and the retention time for keeping of records is defined in the PD as two years in addition to the crediting period.

The calibration procedure for the energy meters is carried out once in a year and the calibration of energy meters was not under PP control and is solely carried out by the Electricity Board. The meters are of 0.2 accuracy class in Maharashtra.

Furthermore, the controller meters installed on the individual WTGs are micro-processor based controllers and are reliable. It uses a Woodward Multi function Relay that have three current inputs from CT and three direct voltage inputs (690 Volts). The analog values of current / voltage are converted into digital signal internally using A/D Converters at very high sampling rate. Furthermore, PJRCMD was also able to verify against the letter provider by the equipment supplier that the data provided is accurate and reliable. Given that the final emission reductions are based on the 3rd party data, sourced from the break up sheets and given that it is based on this data that the grid company makes payment to the individual proponents, PJRCMD is of the opinion, it is reasonable to assume that the same will be conservative.

Further the Operations & Maintenance contractor responsible for measurement of parameters carries out internal audits which were verified.

The grid emission factor has been determined ex-ante and is not monitored

3.4 Calculation of GHG Emissions

The GHG source for baseline of the project has been chosen as CO₂ and no other sinks and reservoirs for either the baseline or project activity have been identified. This is justified as per the applicable methodology.

The baseline of the project activity is kWh produced by the renewable generating unit multiplied by an emission coefficient (kg CO₂/kWh) calculated as a combination of operating margin and build margin according to the procedures prescribed in the 'Tool to calculate the emission factor for an electricity system'.

Emission reductions for the proposed project have been calculated as :

Emission reductions (ER) = Baseline emissions (BE) – Project emissions (PE) – Leakage (L).

Since the proposed project is a renewable energy based project, hence, no project emissions and leakage have been considered in accordance with the baseline methodology AMS ID, version 14.

Hence, the final emission reductions resulting from the proposed bundled project is equivalent to the baseline emissions.

Baseline emissions (BE) = Net amount of electricity generated by the project in a year (EG) * emission factor of the NEWNE regional grid (EF).

While the net annual generation of the project is a metered value, the grid emission factor has been calculated using the data available on the official website of Central Electricity Authority (CEA) under the Ministry of Power, Govt of India. An *ex-ante* fixed combined margin emission factor for the NWENE regional electricity grid of India has been calculated to be 0.9061 t CO₂e/MWh, which has been sourced from Central Electricity Authority CO₂ Baseline Database. Central electricity Authority (CEA) (which is an official source of Ministry of Power, Government of India) have worked out baseline emission factor for various grids in India and made them publicly available ("Baseline CO₂ Emission Database Version 4. This database i.e. the CO₂ baseline database provides information about the OM and BM factors of the regional electricity grids in India. PJR CDM confirms that the database is an official publication of the Government of India for the purpose of CDM baselines and the OM in the CEA database is calculated ex ante using the simple OM approach based on the generation weighted average emissions per electricity unit of all fossil-fuelled generating sources serving the system over a three year period of 2006-08. BM is calculated ex ante based on the 20% most recent capacity additions in the grid based on net generation for the year 2007-08 described in tool to calculate the emission factor for an electricity system.

The estimated emission reductions from the project activity have been estimated at an average of 22,203tCO₂e per annum

3.5 Environmental Impact

The project activity is a renewable energy project with a cumulative capacity of 15 MW of WTGs being implemented in Sangli and Dhule districts of Maharashtra. This does not warrant any environmental impact assessment to be carried out as per the



current law of India. However, PJR CDM was able to verify the projects compliance with the local laws and regulations.

3.6 Comments by stakeholders

The Major stake holders of the project activity are local villagers, Village Gram Panchayat, MEDA, MSEDCL etc. The PP has received the necessary clearances and approvals from above stakeholders

All the stakeholders have provided positive opinion about the project.

4 VALIDATION CONCLUSION

PJR CDM Inc. has carried out the validation of the “15 MW bundled grid connected wind energy project in Maharashtra, India” project by C Mahendra Exports Ltd and others in different villages of Sangli and Dhule districts in Maharashtra state of India. The validation was carried out to independently assess whether the project conforms to the qualification criteria and requirements of Voluntary Carbon Standard (VCS) 2007.1, including the baseline and monitoring methodology applied. The VCS Program provides the standards and framework for independent validation based on ISO 14064-2:2006 and ISO14064-3:2006 standards.

PJRCDM’s approach is risk-based, drawing on an understanding of the risks associated with the meeting of VCS 2007.1 standard requirements. The assessment was based on the review of project description (PD), supporting evidences, site interview, including other explanations where necessary to enable PJRCDM to provide reasonable assurance that the information reported in the PD is complete and materially correct. Our scope and conclusion is thus limited to the above evaluation.

The project involves sale of electricity from wind turbine generators with total capacity of 15 MW to the grid, thereby displacing grid power. The VCS approved CDM baseline and monitoring methodology AMS I D, version 14 has been correctly applied to determine the baseline and the emission reductions.

In our opinion, it is sufficiently demonstrated that the project is not the baseline scenario and emission reductions resulting from the project activity are real, permanent and are additional to what would have occurred in the absence of VCS project activity. Further, the monitoring plan makes adequate provision for ensuring transparency and accuracy during project monitoring.

The total GHG emission reduction achievable from the project is estimated at 22,203 tCO₂e per annum. This estimate is fair given that the underlying assumptions do not change.

Based on the information provided by the project developer, it is PJR CDM’s opinion that the “15 MW bundled grid connected wind energy project in Maharashtra, India in India as described in the VCS PD of version 2 and PD dated 3rd November 2009 meets all relevant VCS 2007.1 requirements and correctly applies approved CDM simplified baseline and monitoring methodology AMS-I.D, version 14.



GHG Auditor
PJR CDM



Site program Manager
PJR CDM

APPENDIX I: DOCUMENTS REVIEWED

Sl. No.	Document reference
[01]	VCS PD: “15 MW bundled grid connected renewable energy project in Maharashtra, India”, version 01 to 02, dated 3 rd November 2009
[02]	Financial and benchmark evaluation worksheets
[03]	AMS-I.D., Version 14, “Grid connected renewable energy generation”, EB 48.
[04]	Voluntary Carbon Standard, Voluntary Carbon Standard 2007.1, 18 th November 2008
[05]	Voluntary Carbon Standard, Voluntary Carbon Standard Program Guidelines, 18 th November 2008
[06]	ISO 14064 part I, II and III : 2006
[07]	Indicative Simplified Baseline and Monitoring Methodologies for selected Small-Scale CDM Project Activity Categories, Annex 20 to EB 41
[08]	Version 01.1 of “Tool to calculate the emission factor for an electricity system”
[09]	Attachment A to Appendix B, tool for demonstration of additionality for small scale projects, Version 06, 30 th September 2005
[10]	<p>Operation & Maintenance Agreement between</p> <ul style="list-style-type: none"> • C. Mahendra Exports Ltd. and Suzlon Infrastructures Services Ltd. on 21st April 2007 • Ratnakala Exports and Suzlon Windfarm Services Ltd. • Ambika Diamonds and Suzlon Windfarm Services Ltd. on 22nd March 2007 • Rindiam Exports and Suzlon Windfarm Services Ltd. on 23rd March 2007
[11]	<p>Purchase Order placed by</p> <ol style="list-style-type: none"> a. C. Mahendra Exports with Suzlon Energy Ltd. on 27th August 2005 for the 8 WTGs. b. Ratnakala Exports with Suzlon Energy Ltd. on 13th July 2005 for the 2 WTGs. c. Ambika Diamonds with Suzlon Energy Ltd. on 3rd May 2005 for 1 WTG d. Rindiam Export with Suzlon Energy Ltd. on 3rd May 2005 for the 1 WTG.
[12]	<p>Work Order for Civil & electrical work, and the Erection, Installation & Commissioning between</p> <ul style="list-style-type: none"> • C. Mahendra Exports and Suzlon Infrastructure Ltd. on 27th August 2005 • Ratnakala Exports and Suzlon Developers Ltd. on 13th July 2005 • Ambika Diamonds and Suzlon Developers Pvt. Ltd. on 3rd May 2005 • Rindiam Export and Suzlon Developers Pvt. Ltd. on 3rd May 2005
[13]	<p>Power Purchase Agreement between</p> <ul style="list-style-type: none"> • C. Mahendra Exports and MSEDCL on 11th January 2006 for 10MW • Ratnakala Exports and MSEDCL on 10th February 2006 for 2.5MW • Ambika Diamonds and MSEDCL on for 1.25MW • Rindiam Exports and MSEDCL on 15th September 2005 for 1.25MW

[14]	Commissioning Certificates of the WTGs for <ul style="list-style-type: none"> ▪ C. Mahendra Exports, Location number: G-38,G-320, G-55 & 56 and G-52, 53, 54 & 57 from the MSEDCL, vide letter dated 22nd February 2006, 7th April 2006, 27th February 2006 and 28th March 2006 respectively ▪ Ratnakala Exports, Location number: G-311 & G-319 from the MSEDCL, vide letter dated 27th February 2006 and April 2006 respectively. ▪ Ambika Diamonds, Location number: K-139 from the MSEDCL, vide letter dated 20th July 2005 ▪ Rindiam Export, Location number: K-123 from the MSEDCL, vide letter dated 6th September 2005
[15]	Contract with Validator, PJR signed by <ul style="list-style-type: none"> • C. Mahendra Exports Ltd., dated 15th November 2008
[16]	Land sale deed between <ul style="list-style-type: none"> • M/s. Sarjan Realities Ltd. and M/s. C. Mahendra Exports on 22nd December 2005, 30th December 2005 and 18th March 2006. • M/s. Sarjan Realities Ltd. and M/s. Ratnakala Exports on 6th January 2006 and 13th January 2006 • M/s. Sarjan Realities Ltd. and M/s. Ambika Diamonds on 27th May 2005 • M/s. Sarjan Realities Ltd. and M/s. Rindiam Export on 16th June 2005
[17]	<ul style="list-style-type: none"> • Authorisation of C. Mahendra Exports Ltd. from each project proponents, dated on 20th October 2009
[18]	MERC Order dated 24 th November 2003
[19]	Version 04 of the CO ₂ database by the official website of Central Electricity Authority (CEA), Ministry of Power, Government of India. (www.cea.com)
[20]	Reserve Bank of India Annual Report http://rbidocs.rbi.org.in/rdocs/AnnualReport/PDFs/72286.pdf
[21]	Letter from the equipment provider – Suzlon Energy Ltd, on the operational lifetime of the project activity dated 01 st October 2009.
[22]	MEDA website for actual generation data for region wise data for individual developers in the state of Maharashtra. http://www.mahaurja.com/Download/WindGenerationInfo.xls
[23]	Letter from the equipment provider, Suzlon Energy Ltd, on the controller readings and data reliability.
[24]	Land agreements between <ul style="list-style-type: none"> • C. Mahendra Exports and Sarjan Realities Ltd. on 27th August 2005. • Ratnakala Exports and Sarjan Realities Ltd. on 13th July 2005

APPENDIX II

Resolution of Corrective Action and Clarification Requests: - “15 MW bundled grid connected wind energy project in Maharashtra, India ”

Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<p>CL 1 Pls state in section 1.2, whether the project activity size is macro or micro project</p>	1.2	<p>The project falls in the group “Projects” as per VCS guidelines as the annual emission reductions falls between 5,000 and 100,000 tCO₂e. This statement has been included in section 1.2 of the revised PD.</p>	<p>OK. The PD has now been revised. This CL is closed</p>
<p>CAR 1 The decimals had been provided throughout the document for emission reduction calculations and avoid the same. Provide explanation, whether the project activity is micro or mega as per the vcs guidelines.</p>	1.3	<p>The decimals have been removed from the emission reduction calculations in the revised PD. The project falls in the group “Projects” as per VCS guidelines as the annual emission reductions falls between 5,000 and 100,000 tCO₂e.</p>	<p>The decimals are revised in the PD OK. The PD has now been revised This CAR1 is closed</p>
<p>CAR 2 Provide the details of nearest town, distance from each location, district in the</p>	1.5	<p>To get this information from client. Will send it by tomorrow.</p>	<p>OK. The details had been included in the revised PD This CAR is closed</p>

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
table			
<p>CL 2 As per the details provided in section 1.6, the commissioning date of the first WTG is 11.07.2005. It had been claimed that, the start date of crediting period is 01.07. 2005, the PP need to explain, how the start date of the crediting period will be earlier than the commissioning of the WTG's. Further, the commissioning dates for all the WTG's need to be submitted for verification</p>	1.6	<p>The start date of the crediting period has been changed to 28 March 2006. This correction has been carried out in the revised PD and the VER calculation sheet submitted to the DOE.</p> <p>The commissioning certificates of all the WEGs have been submitted to the DOE.</p>	<p>The start date of the crediting period has been revised. OK</p> <p>The commissioning certificates had been submitted for all the WTG's and verified</p> <p>This CL2 is closed</p>
<p>CL 3 The source and document evidence for PLF considered for emission reduction calculations need to be provided. The source and the documented evidence for the same is to be provided.</p>	1.4	<p>The project participant has considered the Maharashtra Electricity Regulatory Commission (MERC) recommended PLF from MERC tariff order dated 24th November 2003 (please refer to page 33 of the order - http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf). Justification of adopting this PLF is as follows:</p> <p>1. The PLF recommended by MERC is</p>	<p>The weblink has been verified and PLF considered as per MERC tariff order is conservative</p>

VCS VALIDATION REPORT



Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion																														
		<p>also validated by the actual generation obtained in the past by the project developers in the area. As per data sourced from MEDA (Maharashtra Energy Development Agency), the PLF of wind power projects in Maharashtra has hovered around 20% [Reference: http://www.mahaurja.com/Download/Sitewise_WindInstallationInfo.xls] as demonstrated in the table below:</p> <table border="1" data-bbox="1084 847 1839 1190"> <thead> <tr> <th>Year</th> <th>Installed capacity in year (MW)</th> <th>Commulative Capacity (MW)</th> <th>Generation (Million units)</th> <th>Plan Load Factor accepted (%)</th> </tr> </thead> <tbody> <tr> <td>2003-04</td> <td>7.93</td> <td>407.285</td> <td>705.53</td> <td>19.71%</td> </tr> <tr> <td>2004-05</td> <td>48.75</td> <td>456.035</td> <td>742.96</td> <td>18.60%</td> </tr> <tr> <td>2005-06</td> <td>545.10</td> <td>1001.135</td> <td>790.53</td> <td>9.01%</td> </tr> <tr> <td>2006-07</td> <td>484.50</td> <td>1485.635</td> <td>1714.30</td> <td>13.17%</td> </tr> <tr> <td>2007-08</td> <td>268.15</td> <td>1753.785</td> <td>2112.91</td> <td>13.75%</td> </tr> </tbody> </table> <p>It is evident from the table above that the average PLF of wind power projects in Maharashtra over the last 5 years is</p>	Year	Installed capacity in year (MW)	Commulative Capacity (MW)	Generation (Million units)	Plan Load Factor accepted (%)	2003-04	7.93	407.285	705.53	19.71%	2004-05	48.75	456.035	742.96	18.60%	2005-06	545.10	1001.135	790.53	9.01%	2006-07	484.50	1485.635	1714.30	13.17%	2007-08	268.15	1753.785	2112.91	13.75%	<p>All the PLF submitted for all PP's have been verified and accepted.</p>
Year	Installed capacity in year (MW)	Commulative Capacity (MW)	Generation (Million units)	Plan Load Factor accepted (%)																													
2003-04	7.93	407.285	705.53	19.71%																													
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2005-06	545.10	1001.135	790.53	9.01%																													
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2007-08	268.15	1753.785	2112.91	13.75%																													

VCS VALIDATION REPORT



Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
		<p>much less than 20%. Therefore, the individual investors have considered it appropriate to take the MERC recommended value of 20% as PLF for the project activity.</p> <p>2. Additionally, the generated power from all WEGs is supplied to Maharashtra State Electricity Distribution Company Limited (MSEDCL). A Power Purchase Agreement (PPA) is executed between the project participant and MSEDCL during the implementation phase of the project activity. This PPA is a non-negotiable and standard template for all the wind energy projects being set up in Maharashtra. The sale of wind energy under this PPA is also governed by MERC Order dated 24th November 2003. Therefore the project proponent has taken the reference of MERC Order for considering 20% PLF while doing investment analysis for the project</p>	

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
		activity.	
<p>CAR 3 The explanation provided is does not have relevance. Please provide explanation, what could happen in the absence of the project activity</p>	1.6	<p>The grid has power deficit and hence the addition of new generating source would have taken place by a fossil fuel based power plant. This project displaces this new capacity add-on by a renewable wind energy generation will help in the sustaining and catering to the power demand . This explanation has also been provided in the revised PD.</p>	<p>The explanation provided in the PD is Verified and accepted This CAR3 is closed</p>
<p>CL 4 The PD in pg 8, section 1.9 states that the power generation is 26,280 MWh, the detailed calculation need to be provided.</p>		<p>The detailed calculations for 26,280 MWh (power generation) has been provided in section 4.2 of the PD.</p>	<p>The calculations had been provided has tVerified and accepted This CL 4 is closed</p>
<p>CL 5 All the clearances, approvals and licenses obtained for the project activity to be provided for verification.</p>	1.10	<p>All the clearances, approvals and licenses obtained for the project activity has been provided to the DOE for verification.</p>	<p>All the documents had been obtained and verified This CL5 is closed</p>
<p>CL 6 it has been claimed that, the project has not created any other form of environmental credit and an undertaking letter from the PP is</p>	1.13	<p>An undertaking to this effect dated 20th October 2009 has been submitted to the DOE.</p>	<p>The undertaking certificate had been Verified This CL 6 is closed</p>

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
envisaged for verification			
<p>CAR 4 The PP need to be provide explanation how the baseline scenario had been obtained</p>	2.4	<p>The baseline scenario has been obtained in line with AMS I.D., version 13. A clear explanation provided in the PD. is exactly as per AMS I.D., version 14. Please refer to para 9, page 2 of the methodology (http://cdm.unfccc.int/UserManagement/FileStorage/UQ8WZYCH5IVSPBNF276OMGE10TDX9A)</p>	<p>The explanation provided had been verified This CAR4 is closed</p>
<p>CL 7 Additionality: 1. the documented evidence needs to be provided for the PLF from the equipment supplier. 2. The PP is required to carry out sensitivity analysis for investment as well, since the same can have an effect on the IRR of the project 3. O&M costs eventually contribute to about 20% of the total revenues and hence are required to be included in the sensitivity analysis 4. The IRR also need to be</p>		<ol style="list-style-type: none"> 1. As explained in reply to CR 3, PLF has been taken from the MERC tariff order dated 24th November 2003 (please refer to page 33 of the order - http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf). The justification for adopting the same has been given in reply to CR3 above. 2. Sensitivity on the project cost has been carried out in the revised PD and the 	<p>The MERC tariff order is verified and PLF considered is conservative OK. The sensitivity analysis is now been included and verified The discussion provided is verified and accepted</p>

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<p>demonstrated with VCU revenues to confirm that the investment barrier is overcome by additional revenues associated with generation of VCUs.</p> <p>5. for all the assumptions considered, the documentary evidence to be provided for verification.</p> <p>6. what is the actual debt equity ratio for the PP's separately and also actual interest rate</p>		<p>Financial Model.</p> <p>3. As per the “Guidance on the Assessment of Investment Analysis”, (Annex 45, EB 41), only variables that constitute more than 20% of either total project costs or total project revenues should be subject to a reasonable variation. The approach therefore should be to compare the costs incurred to the total cost and the revenues to the total revenues, and then decided the parameter to be included in the sensitivity analysis. Since, the O&M constitutes only approx 2% of the total project cost, sensitivity on O&M has not been considered</p> <p>4. As per VCS guidelines, if a project uses the CDM methodology, the additionality</p>	<p>The discussion provided is found to be conservative. Verified and accepted</p> <p>All the supporting documents for financial analysis had been verified and accepted</p> <p>The debt equity ratio and interest rate is provided This CL7 is closed</p>

VCS VALIDATION REPORT



Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
		<p>requirement should be those set out in the methodology. Thus, “Tool for assessment and demonstration of additionality” has been referred to for proving additionality. The CDM EB has eliminated the step 5 in the tool that was earlier used for substantiating the impact of the carbon revenue on the project activity. Therefore we have considered it appropriate to include only project IRR without VCS benefit in the worksheet.</p> <p>Additionally, VERs do not have a market mechanism to decide the price and thus any estimate will not give a true picture. Further, the projects are additional because the returns of the project don't meet the benchmark requirements. There is no requirement to prove the fact that with VCU revenues, the returns cross the benchmark</p>	

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
		<p>5. For all the assumptions used in the financial analysis, the supporting documents have been provided to the DOE.</p> <p>6. The actual Debt, Equity ratio and the interest rate has been presented in a separate worksheet in the Financial Model.</p>	
<p>CL 8 It is stated that the project has also been applied for the CDM scheme and is under validation. Pls provide details on the project name, and confirm what stage the project is in</p>	<p>1.14</p>	<p>The project title is: “15 MW bundled grid connected renewable energy project in Maharashtra, India”. The project is currently at the validation stage. The weblink to the same is: http://cdm.unfccc.int/Projects/Validation/DB/BNOI43Z8ZEH965H2RX5EI7DRHC772H/view.html</p>	<p>The weblink provided has been Verified and found OK This CL8 is closed</p>
<p>CAR 5 Project participant has not defined the procedures for internal audits and procedures for performance reviews</p>		<p>The details have been included in section 3.2 of the revised PD.</p>	<p>The internal audits and procedures for performance reviews is now included and Verified</p>

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<p>For all the parameters monitored, the following details to be provided for each of the parameter: Metering equipment: Accuracy Class: Data type: Archiving: Recording Frequency: Responsibility: Calibration Frequency:</p>		<p>These details have been included in section 3.2 of the revised PD.</p>	<p>The details had been included in the revised PD. Verified and accepted This CAR5 is closed</p>
<p>CAR 6 The monitoring plan is not evidenced for the method followed for any uncertainties and during emergency situation. The roles and responsibilities for monitoring system need to be provided in the PD</p>		<p>The method for any uncertainty and during emergency situation has been included in section 3.2 of the revised PD. The roles and responsibilities for monitoring system have been provided in section 3.2 of the revised PD.</p>	<p>OK. Now the method for uncertainties and during emergency situation is verified and accepted Ok. Now, the roles and responsibilities is provided Verified and accepted This CAR is closed</p>
	2.5		

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<p>CL 09</p> <p>Common CAR ‘s for all the Projects:</p> <ul style="list-style-type: none"> ➤ The lifetime of project activity needs to be provided. 		<ul style="list-style-type: none"> ➤ The lifetime of the project activity is 20 years (Reference: “Tool to determine the remaining lifetime of equipment”, EB-50, Annex-15. Please refer to page 4 of the document, which gives the default lifetime of wind turbines (offshore) as 20 years). <p>Additionally, the generated power from all WEGs is supplied to Maharashtra State Electricity Distribution Company Limited (MSEDCL). A Power Purchase Agreement (PPA) is executed between the project participant and MSEDCL during the implementation phase of the project activity. This PPA is a non-negotiable and standard template for all the wind energy projects being set up in Maharashtra. The sale of wind energy under this PPA is also governed by MERC Order dated 24th November 2003. Therefore the project proponent has taken the reference of MERC Order for considering 20% PLF while doing investment analysis for the project activity.</p>	<p>The lifetime of the project activity is accepted and CAR closed.</p> <p>The PLF is accepted and CAR is closed.</p>

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> ➤ The reactive energy withdrawal charges are not considered in the profitability statement. Justify ➤ The sensitivity analysis should be presented in Excel sheet. ➤ The tariff per KW is taken as Rs.3.50 from the 14th year onwards. Provide source for considering this tariff rate. 		<ul style="list-style-type: none"> ➤ The reactive energy is the energy required for the start up of the WEG. The project participant is being conservative in not considering the reactive energy withdrawal charges in the profitability statement as the reactive energy charges are being paid by the project participant to the state utility. ➤ Sensitivity analysis has been presented in the revised Financial Model. ➤ The tariff has been taken as 3.50 Rs./kWh to be on the conservative side as ideally, the tariff after the 13th year has to be calculated using cash flow and surplus cash flow approach as used in the MERC tariff order, November 2003 (page 58, for Group III projects). The project 	

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> ➤ Justify how depreciation rate as per Companies Act and MAT be applicable to partnership firms. ➤ Justify for considering overhead expenses in the profitability statement. 		<p>surplus cash is calculated as the (Benefit – Expense). The project expenses after the completion of the loan repayment period are lower than the previous years, and the tariff will accordingly be lower to have a net zero cash surplus at the end of the 20 year period. The tariff using the approach defined in the MERC tariff order works out to be 2.34 Rs./kWh. A detailed note on calculation the tariff after 13th year has been provided to DOE.</p> <p>Thus, adopting tariff of 3.50 Rs./kWh is a conservative estimate.</p> <p>The depreciation as per books and MAT has been deleted from the revised Financial Model.</p> <ul style="list-style-type: none"> ➤ The overheads have been considered as the manpower requirement by the investor to ensure smooth operation of the project. The roles and responsibilities of the manpower directly hired by the investor is to liaise with O 	<p>The CAR is closed.</p> <p>The non consideration of reactive energy withdrawal charges is accepted and CAR is closed.</p> <p>The revised financial models have been verified and CAR is closed.</p> <p>The tariff considered is accepted and CAR is closed.</p>



Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> ➤ The project uses WACC as the benchmark. Clarity is sought on the basis of returns used for project IRR's 		<p>& M team of the EPC contractor, executing invoices and payment follow-up with the utility and keeping the management informed about the performance of the project. C Mahendra has envisaged investment of one person for this task whereas others have envisaged partial role of existing manpower for execution of this much needed coordination task. The record of expenses made by respective investors is available and can be submitted to the DOE.</p> <ul style="list-style-type: none"> ➤ The basis of returns used for project IRRs is as follows: <ol style="list-style-type: none"> 1. Technical lifetime of the project activity (20 years) has been chosen for calculation of project IRR. 2. Depreciation and other non-cash related items have been added back to net profits for calculating project IRR. 3. Taxation is included in the investment analysis as the benchmark is intended for post tax comparisons. 4. The cost of financing expenditures (i.e. loan repayments and interest) has not 	<p>The revised financial models have been verified and CAR is closed.</p> <p>The benchmark of WACC is accepted and CAR is closed.</p> <p>The CAR is closed.</p>

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> ➤ The beta value is average of beta values of six power companies. Justify why the lowest of the beta value amongst the six companies is not considered for calculating cost of equity. 		<p>been included in the calculation of project IRR.</p> <ul style="list-style-type: none"> ➤ Beta value indicates the sensitivity of the company to market risk factors. For companies that are not publicly listed, the beta is determined by referring to beta values of publicly listed companies that are engaged in similar types of business. The project activity type is wind power generation; the approach therefore should be to base the beta for the project on the beta values of listed wind power generation companies in India. However, there was only one wind energy company (BF Utility) listed on any stock exchange in India (both BSE- Bombay Stock Exchange (http://www.bseindia.com) and NSE-National Stock Exchange (http://www.nseindia.com) in year 2005-06. Therefore, in the absence of adequate data on companies which are exclusively into the exactly same type of business (i.e. wind power projects), the next best option for assessing the risk of these 	

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<p>➤ Justify for considering MAT rate for calculating WACC while MAT is not applicable to partnership firms.</p>		<p>projects is to consider the data available on companies which are involved in similar businesses.</p> <p>Therefore, we have considered beta values of all electricity generating companies in India. The group of companies considered includes renewable as well as conventional power generating companies. It is understood that risky businesses are likely to have higher cost of equity than safer businesses; projects in riskier businesses will have to cover these higher costs. Hence, investors demand a higher return from renewable energy projects than from conventional energy ones, given the higher risks in renewable, including risks of technology, risks from significantly varying and unpredictable resource availability (e.g. wind), and a lower established support base for such projects relative to that for conventional power (e.g. grid connections, bank finance, suppliers, etc.). The use of this Beta value is therefore considered conservative, as it does not add for the higher risk of non conventional energy.</p>	<p>The CAR is closed.</p> <p>The revised financial models have been verified and CAR is closed.</p> <p>The PPA's have been verified and the CAR is closed.</p> <p>The PO's have been verified and the CAR is closed.</p> <p>The basis for assumption of all the parameters is accepted and the</p>

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Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> ➤ Justify for considering 90% of cost for calculating depreciation as per books and Income tax Rules. ➤ Justify for considering 5% of the cost as salvage value. ➤ Substantiate with evidence for considering interest on working capital in the profitability statement. 		<p>Additionally, the project relates to wind, therefore, typically weight shall be distributed in a manner that will represent the probability of investment by the companies identified to invest in wind. For the purpose of calculation of the WACC, it will be very difficult to apply the weights as for that share of investment by these companies in the wind power sector shall be required to apply the weights. Therefore we have considered it appropriate to use the average beta.</p> <ul style="list-style-type: none"> ➤ MAT is an ideal representative of the effective tax rates of power companies. Because of huge investment involved in power sector project and absence of accelerated depreciation in other than wind projects, companies end up paying either 0% tax or MAT because of 80 IA benefits. Hence the assumption of MAT is a conservative estimate of effective tax rate. ➤ Book depreciation has been deleted from the revised financial model. 	<p>CAR is closed.</p>

VCS VALIDATION REPORT



Draft report clarification requests and corrective action requests by validation team	Ref. To the section of the PD	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> ➤ Provide complete PPA for Rinidam Exports, Ratnakala Exports and Ambika Diamonds. ➤ Provide the purchase orders for all the PPs: <ol style="list-style-type: none"> 1. Cost of civil works. 2. Cost of erection and commissioning. 3. Cost of land. ➤ Substantiate the basis for considering the following costs : <ol style="list-style-type: none"> 1. O & M cost. 2. Debt-equity ratio at 70:30. 3. Rate of interest on loan at 10.5%. 4. Repayment tenure of 5 years. 5. Insurance cost. 6. Receivables. 		<ul style="list-style-type: none"> ➤ The salvage value has been changed to 10% in the revised Financial Model. ➤ Working capital is the financial metric that is required to operate the business. Interest on working capital is allowed as expense in financial workings. The operation and maintenance cost is payable in advance and the receivable [income] for the electricity generated is at-least deferred by 30 days. Thus, business will require the working capital support for at least 45 days for O&M and 30 days for receivables. The working capital interest is integral part of expenses in the financial working. Therefore we have considered it appropriate to include interest on working capital in the financial analysis. The working 	

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		<p>capital is also being considered in the MERC Order dated 24th November 2004 (please refer to Table 3, page 58 of the tariff order - http://www.mercindia.org.in/pdf/Detail_Wind_Energy_Order.pdf)</p> <ul style="list-style-type: none"> ➤ The PPAs for Rindian Exports, Ratnakala Exports and Ambika Diamonds have been submitted to the DOE. ➤ The requested purchase orders have been submitted to the DOE. ➤ The table below presents the basis of assumptions of the input parameters for 	

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		<p>investment analysis:</p> <table border="1" data-bbox="875 517 1583 1155"> <thead> <tr> <th data-bbox="875 517 965 592">S.No.</th> <th data-bbox="965 517 1144 592">Parameter</th> <th data-bbox="1144 517 1583 592">Basis of assumption</th> </tr> </thead> <tbody> <tr> <td data-bbox="875 592 965 632">1.</td> <td data-bbox="965 592 1144 632">O & M cost</td> <td data-bbox="1144 592 1583 632">Budgetary Offer</td> </tr> <tr> <td data-bbox="875 632 965 743">2.</td> <td data-bbox="965 632 1144 743">Debt – equity ratio at 70:30</td> <td data-bbox="1144 632 1583 743">Normative</td> </tr> <tr> <td data-bbox="875 743 965 895">3.</td> <td data-bbox="965 743 1144 895">Rate of interest on loan at 10.5%</td> <td data-bbox="1144 743 1583 895">Prevailing PLR at the time of investment decision (http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/61834.pdf)</td> </tr> <tr> <td data-bbox="875 895 965 1007">4.</td> <td data-bbox="965 895 1144 1007">Repayment tenure of 5 years</td> <td data-bbox="1144 895 1583 1007">Normative</td> </tr> <tr> <td data-bbox="875 1007 965 1078">5.</td> <td data-bbox="965 1007 1144 1078">Insurance cost</td> <td data-bbox="1144 1007 1583 1078">Insurance document</td> </tr> <tr> <td data-bbox="875 1078 965 1155">6.</td> <td data-bbox="965 1078 1144 1155">Receivables</td> <td data-bbox="1144 1078 1583 1155">Normative</td> </tr> </tbody> </table>	S.No.	Parameter	Basis of assumption	1.	O & M cost	Budgetary Offer	2.	Debt – equity ratio at 70:30	Normative	3.	Rate of interest on loan at 10.5%	Prevailing PLR at the time of investment decision (http://rbidocs.rbi.org.in/rdocs/Wss/PDFs/61834.pdf)	4.	Repayment tenure of 5 years	Normative	5.	Insurance cost	Insurance document	6.	Receivables	Normative	
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