



Voluntary Carbon Standard 2007.1

VALIDATION REPORT

51 MW Wind Power Project at Chitradurga

Project No.: V-3-I-01-L-0108

Version No.: 01

Name of Validation company:	Date of issue:
Perry Johnson Registrars CDM Inc.	2010-06-01
Report Title:	Approved by:
VCS Validation report for “51 MW Wind Power Project at Chitradurga”.	S. V. Jamble
Client:	Project Title:
Nuziveedu Seeds Limited.	“51 MW Wind Power Project at Chitradurga”
Summary:	
Nuziveedu Seeds Limited has commissioned Perry Johnson Registrars Clean Development Mechanism Inc. (PJRCMD) to perform validation of the project – “51 MW Wind Power Project at Chitradurga” 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. The project activity involves installation and operation of wind turbine generators (WTGs) of 28x1.5 MW and 4x2.1 MW capacities at Karnataka. The power generated from the project activity is sold to the Southern grid of the India. The project activity has correctly applied the ACM0002 methodology version 11 and relevant tools from Clean Development Mechanism (CDM) to determine baseline, establish additionality and frame the monitoring plan. PJRCMD conducted a physical verification of the WTGs, interviewed representatives of the project proponent and carried out a review of relevant documents. A number of Clarification Requests (CLs) and Corrective Action Requests (CARs) were issued which were subsequently resolved by the project proponent. Total GHG emission reduction achievable by the project activity has been estimated at be 114,894 tonnes of CO₂ equivalent per annum. Based on the documentation verified, it is PJRCMD’s opinion that the emission reductions from the project activity would be real, measurable, additional and permanent.	
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Work carried out by:	Work reviewed by
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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
KPTCL	Karnataka Power Transmission Corporation Limited
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
NSL	Nuziveedu Seeds Limited
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

Nuziveedu Seeds Limited (NSL), (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 “51 MW Wind Power Project at Chitradurga” (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 ACM0002 version 11. 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 involves installation and operation of wind turbine generators (WTGs or machines) totalling 51 MW capacity in the state of Karnataka in India. The power generated from the 28x1.5 MW and 4x2.1 MW WTGs is exported to the Karnataka Power Transmission Corporation Limited (KPTCL), state electricity grid operator to the Southern grid in India. Since, August 2006 the grid is operating in synchronised mode with the integrated Northern Eastern Western and North Eastern (NEWNE) grid of India. The WTGs of Regen’s and Suzlon’s are expected to generate power with an average plant load factor (PLF) of 32.48% and 22.83% [09]

respectively. The unique identification details of the machines including the geographical coordinates are included below:

Company name	WTG Location	Village / Town	District, State	State	Longitude	Latitude
Nuziveedu Seeds Limited	HK-1	Bhimasamudra	Chitradurga	Karnataka	N 14°11'02.7"	E 76°12' 32.2"
	HK-2	Bhimasamudra	Chitradurga		N 14°10'49.7"	E 76°12' 25.7"
	HK-3	Bhimasamudra	Chitradurga		N 14°10'42.7"	E 76°12' 26.8"
	HK-4	Bhimasamudra	Chitradurga		N 14°10'33.7"	E 76°12' 26.6"
	HK-5	Bhimasamudra	Chitradurga		N 14°10'23.2"	E 76°12' 25.6"
	HK-6	Bhimasamudra	Chitradurga		N 14°10'08.8"	E 76°12' 25.0"
	HK-7	Bhimasamudra	Chitradurga		N 14°10'00.7"	E 76°12' 23.3"
	HK-8	Bhimasamudra	Chitradurga		N 14°09'53.1"	E 76°12' 22.1"
	HK-9	Bhimasamudra	Chitradurga		N 14°09'45.3"	E 76°08' 43.7"
	HK-10	Bhimasamudra	Chitradurga		N 14°13'10.6"	E 76°08' 39.2"
	HK-11	Bhimasamudra	Chitradurga		N 14°12'43.4"	E 76°08' 57.4"
	HK-12	Bhimasamudra	Chitradurga		N 14°12'23.7"	E 76°09' 02.5"
	HK-13	Bhimasamudra	Chitradurga		N 14°12'18.9"	E 76°09' 02.5"
	HK-14	Bhimasamudra	Chitradurga		N 14°12'12.5"	E 76°09' 07.5"
	HK-15	Bhimasamudra	Chitradurga		N 14°12'06.4"	E 76°09' 11.9"
	HK-16	Bhimasamudra	Chitradurga		N 14°11'59.5"	E 76°09' 16.8"
	HK-17	Bhimasamudra	Chitradurga		N 14°11'37.0"	E 76°09' 38.3"
	HK-18	Bhimasamudra	Chitradurga		N 14°11'30.3"	E 76°09' 43.3"
	HK-19	Bhimasamudra	Chitradurga		N 14°11'24.4"	E 76°09' 48.0"
	HK-20	Bhimasamudra	Chitradurga		N 14°11'16.6"	E 76°09' 50.9"
	HK-21	Bhimasamudra	Chitradurga		N 14°11'10.9"	E 76°09' 56.4"
	HK-22	Bhimasamudra	Chitradurga		N 14°11'04.4"	E 76°09' 59.9"
	HK-23	Bhimasamudra	Chitradurga		N 14°10'57.8"	E 76°10' 03.4"
	HK-24	Bhimasamudra	Chitradurga		N 14°10'41.1"	E 76°10' 39.9"
	HK-25	Bhimasamudra	Chitradurga		N 14°10'34.0"	E 76°10' 44.3"
	HK-26	Bhimasamudra	Chitradurga		N 14°10'26.9"	E 76°11' 47.8"
	HK-27	Bhimasamudra	Chitradurga		N 14°10'19.8"	E 76°11' 51.3"
	HK-29	Bhimasamudra	Chitradurga		N 14°10'02.1"	E 76°11' 14.3"
	HK-30	Bhimasamudra	Chitradurga		N 14°09'55.0"	E 76°11' 18.0"
	HK-31	Bhimasamudra	Chitradurga		N 14°09'48.9"	E 76°11' 23.0"
	HK-32	Bhimasamudra	Chitradurga		N 14°09'42.0"	E 76°11' 26.8"
	HK-33	Bhimasamudra	Chitradurga		N 14°09'35.0"	E 76°11' 30.4"

All the WTGs installed under the project activity have been supplied by M/s Suzlon Energy Limited (4 WTGs of the make S-88 (2.1 MW)) and M/s Regen Powertech Private Limited (28 WTGs of make vensys-77 (1.50 MW)). The proposed project activity is a bundled wind power project with a total installed capacity of 51 MW [9] [12]. The net energy generation for the projects in Karnataka and Tamil Nadu were confirmed by PJRCMD (Pls see section 3.1 of the report below)

The lifetime of the machines stated is 20 years. PJR was able to confirm the same against the certificate provided by the manufacturer, Suzlon Energy Ltd and Regen Powertech Private Limited [19]

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 ACM0002 (version 11) 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
Ajay Verma	GHG Auditor	Desk review , Site visit, Resolution of CLs and CARs, draft validation report and final validation report preparation
Mathsy Kutty	CDM validator/Project Manger	Supervision of the resolution of issues, Desk review , Resolution of CLs and CARs, Draft report and final report preparation
Anjana Sharma	Technical reviewer	Technical review for the project activity.

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

A site visit was carried out by PJRCMD, Inc. team Mr. Ajay Verma on 14th April 2010 for the WTGs site visit in Chitradurga, Karnataka to resolve the issues identified during the desktop review of the documents submitted by the project developer.

Following table provides the list of the personnel interviewed and issues discussed during the site visit:

<i>Name / Designation / Company</i>	<i>Interviewed on</i>
Mr M. T . Chakradhara Rao, Site incharge-Chitradurga,NSL	• Project technical details, • Monitoring system, • Calibration practice, • Joint meter readings • Proof of title, • Baseline scenario • additionality and the assumptions used, emission reduction calculations, • stakeholder comments
Mr. Sudhakar Adusumilli Site Engineer, NSL	
Mr. Md. Pattini Regen Powertech Private Limited, O&M	
Mr. Md. Zameer Asst Manager, O &M Regen Powertech Private Ltd	

Furthermore, interactions with Mr. Palla Rama, Anil Kumar and Mr. Mysore Raghavendra from Ernst & Young Private Limited, (the consultants for the project) were used to confirm selected information and to resolve issues identified in the document review.

During the site visit, PJRCMD 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 includes a bundle of thirty two (32) WTGs installed by Nuziveedu Seeds Limited., (*as mentioned in section 1.3 of the report above*). The project activity involves installation of WTGs of capacity 1.5 MW and 2.1 MW, totalling to an installed capacity of 51 MW [9] [12]. All the WTGs installed under the project activity have been supplied by M/s Suzlon Energy Limited (4 WTGs of the make S-88 (2.1 MW) and by M/s Regen Powertech Private Limited (28 WTGs of the make vensys-77 (1.5 MW). The annual net energy generation for the projects is estimated to be 122535 MWh, which has been arrived at based on the PLFs of 22.83% for the Suzlon's WTG models S-88(2.1 MW) and 32.48% for the Regen's WTG models Vensys 77(1.5 MW) [9].

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

The project proponent has considered 6th June 2008 as the project start date, being the date of commissioning of first turbine included in the bundle of all the 32 WTGs considered under the 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 the 17 WTGs under the project activity from the commissioning certificates issued by the KPTCL. [12] and remaining 15 WTGs will be commissioned later.

The project proponent has opted for a crediting period of 10 years starting from 6th June 2008, which can be renewed once. 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[19].

c) Ownership:

▪ Proof of title:

The proposed project includes 32 WTGs installed by M/s Nuziveedu Seeds Limited. The project activity includes this entity as project participants and hence, owns the emission reductions resulting from the bundled project under consideration. PJR was able to confirm the ownership of the emission reductions against the copies WTGs commissioning certificates issued by KPTCL[12] and purchase orders for the wind turbines in below table placed with M/s Suzlon Energy Limited and M/s Regen Powertech Private Limited [9]. The same has been accepted by PJR CDM.

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

The proposed bundled project has been applied under CDM. However, in the event the PP applied for CDM, it has been confirmed that the PP will claim emission reductions only under one GHG program at any given point of time (either VCUs or the other CERs from CDM program). PJRCMD was able to confirm the same against the letter of undertaking provided by the project participant [18].

e) **Project applicability to the VCS for projects rejected under other GHG programme (if applicable):** The proposed project is under CDM validation, however, is not rejected under the same scheme.

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 completed the validation activity within 2 years from the commissioning date. [12]

3.2 Baseline and demonstration of additionality

Assessment of applicability conditions of the methodology:

The project proponents have applied approved consolidated baseline methodology ACM0002, version 11, which has been approved under the CDM programme. The application of baseline methodology is justified:

- The project installs a new wind power project with a total capacity of 51MW, at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant).
- The project is a green field project that represents electricity generation from a new wind generating machines and is not a capacity add-on or replacement/retrofit to an existing facility.
- The grid boundary selected for the project activity is the South 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.

This methodology also refers to the latest approved versions of the following tools:

- CDM Tool for demonstration and assessment of additionality version 5.2.
- Tool to calculate the emission factor for an electricity system, version 02

Baseline:

Baseline scenario for the proposed project has been identified in line with the baseline methodology – ACM0002. In the absence of project activity, *same amount of electricity would have been generated by the Southern regional grid as per the current grid mix and expected future capacity expansions*. The current grid mix and the expected future capacity expansions are reflected as the emission factor which is arrived at as the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

Furthermore, the baseline emission is estimated as a product of the CM and the electricity delivered to the grid by the project. As proposed project activity is exporting the power to the Southern grid, this becomes the baseline of the project activity. Validation team has verified this is from PPAs [11] provided by PP.

Additionality:

Since the project activity applies the CDM approved methodology, ACM0002, the project proponent used the “Tool for demonstration and assessment of additionality”, version 5. for the assessment and demonstration of additionality [08].

The project participant has provided the steps for identification of the baseline scenario and additionality in section 2.5 of the PD. The validation team confirms that these steps are in line with the provision of the methodology.

- i. The PP identified 3 possible alternatives to the project activity, viz., “Implementation of the project without carbon revenues”, “Setting up of other NG or renewable based power plant” and “no project activity” under step-1a. All of these alternatives are legally allowed in India under step-1b.

Implementation of the project without carbon revenues: Scenario 1, has been eliminated from being the baseline scenario, since the IRR for the project activity without carbon revenues is 8.94%, This is below the benchmark of 14.17%. (See additionality section below for more details). The proposed project itself, if undertaken without carbon revenues, is unlikely to be the baseline scenario.

Setting up of other NG or renewable based power plant:

PP has justified that it is not feasible setup a large scale NG power plant, biomass power plant, hydro power plant and solar based power plant as below:

- There is no sufficient natural gas available in the region
- There is no sufficient availability of biomass in the region to setup similar capacity power plant.
- Hydro based power plant is not a credible alternative as there is no resource availability to set-up a large scale hydro based power plant.
- Solar based power plant is not a credible alternative as levelized cost of generation of power is more expensive than the project activity.

PJRCDM has reviewed the justification and identified that due to the above mentioned reasons, setting up a natural gas based power or renewable based power plant can be ruled out as credible alternative.

No project activity:

No project activity would include electricity import from the grid and there would be no displacement of electricity from Southern grid mix.

This is in line with the tools of additionality, step 1.a. Thus, it has been adequately demonstrated in PDD that the only realistic and credible alternative for the baseline scenario 2 that is the equivalent capacity imported/provided by the Southern regional grid.

- ii. The project activity generates electricity, which is sold to the Southern regional grid. Thus the project generates economic benefits from the sale of power. 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.
- iii. PP has chosen the financial indicator as “*post tax project IRR*”.
- iv. Applied benchmark is as per EB guideline “Guidelines on the assessment of investment analysis” – EB 51, para-12.

- v. PP has chosen the Weighted Average Cost of Capital (WACC) as the benchmark. The cost of equity used in the WACC has been calculated using the Capital Asset Pricing Model (CAPM) while the interest rate on term loan has been used as the cost of debt.

The calculation procedure for WACC has been demonstrated below:

Capital Asset Pricing Model:

The required return on equity investment is the return of a risk-free security plus suitable market risk premium. While considering a new project, CAPM can provide the required risk premium that the project needs to yield, taking into account the market premium and the volatility (risk) of the stock relative to the market (Beta). This required return on equity represents the cost of equity for the project.

The formula used for the calculation of the expected return on equity is

Expected Return = Risk free rate of Return + Beta x (Market returns – Risk free rate of return) (or)

$$r = R_f + \text{Beta} \times (R_M - R_f)$$

Where:

- r is the expected return rate on a security
- R_f is the rate of risk-free rate of return
- Beta is the Asset class volatility
- R_M is the return rate of the appropriate asset class.

Risk free rate of return (R_f):

The yield rate offered on central government securities have been considered to represent the risk free rate of return as it is devoid of default risk. PP has taken monthly yield to maturity rate offered on the Central Government Securities for the year 2007-08 8.1887 % from RBI.

Beta :

The Beta in the CAPM equation helps to account for the systematic risk by quantifying the risk associated with an asset class. Beta represents the volatility of the asset class relative to the volatility of the market. The Beta value taken for this analysis is based on the beta values of the listed private companies engaged in business similar to the project activity (i.e. the power sector) before the start of the project activity. The beta values have been calculated using 5 years of data if available.

The beta values for these companies have been provided in the table given below have been taken from Bloomberg terminal:

Company Name	Beta (2002-2007)
NTPC Limited	0.714
Tata Power	1.126
Reliance Infrastructure	1.067
Neyveli Lignite	1.303
BF Utilities	2.325
Gujarat India Power Company Limited	1.120
CESC	1.289

After analysis of the WACC calculation with actual project cost and debt equity ratio, the leveraged beta for NSL is arrived at 0.97.

Market Rate of Return (R_M):

PP has used returns generated by BSE-500 since 1999 for the calculation of the market returns as the BSE-500 represents a well diversified portfolio of actively traded stocks. The data used for the calculation of market returns has been used since 1999.

$R_m = \left[\left\{ \frac{\text{BSE index at the time of start of project}}{\text{BSE index at its start in 1999}} \right\}^{1/\text{no. of years from 1999 till start of project}} - 1 \right]$

After analysis based on above equation market rate of return R_m is 26.64%.

Market Risk Premium (R_m-R_f):

PP has estimate the Market Risk Premium as 18.45% and cost of equity of companies engaged in similar business as that of the project is calculated as 26.07%.

Weighted Average Cost of Capital (WACC):

The weighted average cost of capital has been calculated using the following formula:

$$C_c = (D \cdot C_D \cdot (1 - TR)) + (E \cdot C_E) / T$$

Parameter	Description
CE	Cost of equity
CD	Cost of Debt
TR	Tax Rate
D	Debt
E	Equity
T	Total Investment
C _c	Weighted Average Cost of Capital

PP has arrived the WACC for the project activity works out to be 14.17%, which is considered the benchmark for the project IRR.

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.

Salvage value: A salvage value of 5% of initial equipment cost in addition to the total land cost has been also considered for financial analysis at the end of the lifetime of project activity. This is deemed conservative.

Tariff: The average tariff with no yearly escalation of INR 3.40 is in line with the KERC tariff order [15], for the all 32 WTGs installed by NSL. PJRCMD has further confirmed against the power purchase agreement signed between the PP and the KPTCL [11]

The operation and maintenance cost (O&M), Plant load factor, machine availability, line losses have been sourced from the purchase order. PJRCMD was able to confirm the total equipment cost against the orders placed with M/s Suzlon Energy Ltd., and M/s Regen Powertech Private Limited for the supply and erection of the WTGs and other equipment [9, 10].

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.

Plant load factor (PLF): PLF has been sourced from purchase orders of the WTGs. PP has estimated the PLFs for Suzlon' and Regen's WTGs based on annual average generation given in their purchase orders. The project promoter's selection is deemed reasonable in PJRCMD's opinion. The estimated figure by technology supplier is a very idealistic figure and is on 95% grid availability (which is never the case in practical). Hence, considering the same PLF for the entire crediting period is very conservative.

The calculations were provided in the spreadsheet and verified to be correct. PP has shown that the post IRR of the project activity is 8.94% without revenues from carbon credits.

It can be seen that the project IRR for the project activity is less than the benchmark PLR of 14.17%. PJRCMD was able to confirm the same against the RBI prime Lending rate. Source: RBI Bulletin year 2007-08 [17]

Sensitivity analysis: To further demonstrate the robustness of the financial analysis, the project developer has also carried out the sensitivity analysis. Project developer has justified the following key indicators for carrying out the sensitivity analysis:

Plant load factor (PLF): The project proponent has carried out the sensitivity analysis to check the value of PLF at which the project IRR touches the benchmark of 14.17%.

Changes in the Capacity Utilization Factor	Project IRR (Without CDM) %
0%	8.94%
+10%	10.03%
-10%	7.80%

From the analysis presented above, it can be noted that even on increasing the PLFs for investor by 10%, the IRR for the project activity does not touch the benchmark IRR. In view of the evidences and justification presented, it is PJRCDM's opinion that the PP has already presented a very conservative base case (considering the guaranteed generation for financial analysis), hence, the increase of further 10% in the guaranteed generation/PLF is highly unlikely during the operational lifetime of the project activity.

Tariff: It needs to be brought out that an increment in the tariff rate for electricity sale to the respective State Electricity Board (SEBs) is not a plausible option in view of the fact that the same is governed by the Karnataka Electricity Regulatory Commission's (KERC) Wind Tariff Order dated 18 January 2005 [15]. The PP has however, carried out a sensitivity analysis on the tariff and the results of the same are presented below:

Change in the of Tariff	Project IRR (Without CDM) %
0%	8.94%
+10%	9.71%
-10%	8.21%

The Karnataka projects consider an average tariff rate of INR 3.40/kWh for the first 10 years of WTG operation and then from 11th year revised by KEREC. Furthermore, the PPA signed by the project proponent with the KPTCL is also in the same lines. Furthermore, even on considering a 10% increase in the tariff, the IRR for the project does not cross the benchmark. Hence, it is reasonable to assume that it is highly unlikely for the project proponent to realise such tariffs through the project lifetime so as to make the project financially viable.

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.

Investment cost: Since the investment cost used for the IRR analysis has been sourced from the purchase orders placed by the project proponents with the equipment supplier, it is highly unlikely that the same can be subject to change.

Common Practice Analysis:

PP has chosen the state as region in which common practice has been done for the proposed project activity and analyzed similar projects operational in the region (Karnataka) that are similar in technology and scale (more than 15 MW) and were invested in a comparable regulatory and investment environment (time period when real action was taken towards the proposed project).

PP has included all the VCS, CDM and other GHG programme projects into their analysis for common practice. This clearly establishes that diffusion of similar project

activities (without carbon revenues) in the relevant region is very less. The project participant has therefore demonstrated that the project activity is not a common practice.

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 approved methodology ACM0002, version 11 – ***Consolidated baseline methodology for grid-connected electricity generation from renewable sources***, 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 main energy meters and check meters at each WTGs. 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. This data is measured monthly in the presence of third party, State Electricity Board officials as a Joint Meter Reading (JMR) exercise.

The responsibility of measuring parameters rests with the operations and maintenance (O&M) 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 of the energy meters at the sub-station shall be carried out annually by the KPTCL authorities. The meters installed are of 0.2 accuracy class.

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

In case of meter failures, and back up meter reading being unavailable, it has been confirmed that the PP shall not claim for VCUs during that respective period. In the event, both meters fail during the monitoring period, PP will claim zero VCUs for that period.

The grid emission factor has been determined and fixed *ex-ante*.

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. According to the approved methodology ACM0002, version 11, Emission Reductions are calculated using “Tool to calculate emission factor for the electricity system”

The baseline emissions for the project activity is estimated as the 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).

The project activity is a greenfield wind power project and it does not having any emission sources in project boundary hence the project emissions and leakage emissions for this project activity are nil.

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 southern 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 has been calculated to be 0.9451 tCO₂e/MWh for the Southern grid of India. This has been sourced from Central Electricity Authority CO₂ Baseline Database version 05. 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 5.0) [16]. 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 2006-07, 2007-08 and 2008-09. BM is calculated ex-ante. The latest 5 power plants do not add up to 20% of the total generation in the system. Hence the BM has been calculated based on the set of power capacity additions that have been built recently, in the electricity system that comprise at least 20% of the system generation. PJRCMD was able to confirm that this is in line with the 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 114,894 tCO₂e per annum.

3.5 Environmental Impact

The project activity is a renewable energy project with a cumulative capacity of 51 MW, with the WTGs being implemented in Karnataka. Projects of such category and scale do 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

VCS 2007.1 requires discussion on relevant outcomes from stakeholder consultations and mechanisms for on-going communication for the project activity. A stakeholders' meeting was organized by the project proponent as per below table:

Nuziveedu Seeds Limited	14 th November ,2008
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The identified stakeholders included the local villagers, employees and the O&M contractor. The relevant stakeholders were invited for the meeting through public notices and local news paper [21].

No negative comments have been received for the project activity.

4. VALIDATION CONCLUSION

PJRCDM Inc. has performed the validation of the project “51 MW Wind Power Project at Chitradurga”. 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 51 MW to the grid, thereby displacing grid power. The VCS approved CDM baseline and monitoring methodology ACM0002, version 11 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 114894 tCO₂e per annum. This estimate is fair given that the underlying assumptions do not change.

To summarize, it is PJRCDM’s opinion that the project as described in the version 05 31st May, 2010 of the VCS PD 51 MW Bundled Wind Power project in states of Karnataka, India meets the VCS 2007.1 requirements and correctly applies the baseline and monitoring methodology ACM002, version 11.

A handwritten signature in blue ink, appearing to read "Mathsy Kutty".

Mathsy Kutty
Project Manager
PJRCDM

A handwritten signature in blue ink, appearing to read "Vidya Murali".

Vidya Murali
Site Program Manager
PJRCDM

APPENDIX I: DOCUMENTS REVIEWED

Sl. No.	Document reference
[01]	VCS PD: “51 MW Wind Power Project at Chitradurga”, version 05, dated 31 st May 2010
[02]	Financial Calculation for Nuziveedu Seeds Limited.
[03]	ACM0002, Version 11, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, EB 52.
[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]	Version 01.1 of “Tool to calculate the emission factor for an electricity system”
[08]	Tool for the demonstration and assessment of additionality version 05.2, Annex 10, EB 39
[09]	Purchase Order placed by - Nuziveedu Seeds Limited with Suzlon Energy Ltd. on 11th December 2009 for model no. S88. (2.1 MW) - Nuziveedu Seeds Limited with Regen Powertech Private Limited on 10th December 2007 for model no. Vensys 77 (1.5 MW)
[10]	Work Order for Civil & electrical work, and the Erection, Installation & Commissioning between - Nuziveedu Seeds Limited with Suzlon Energy Ltd. on 11th December 2009 for model no. S88. (2.1 MW) - Nuziveedu Seeds Limited with Regen Powertech Private Limited on 10th December 2007 for model no. Vensys 77 (1.5 MW)
[11]	Power Purchase Agreement between - Nuziveedu Seeds Limited and BESCOM on 1st January 2009 for 25.5 MW. - Communication between Nuziveedu Seeds Limited and BESCOM for another 25.5 MW on 4th February 2010 and 3rd April 2010.

[12]	Commissioning Certificates of the WTGs for SWPPL and SUWPPL. • Nuziveedu Seeds Limited., Location number: HK-1 & HK-6 from the KPTCL, vide letter dated 30th September 2008, . • Nuziveedu Seeds Limited., Location number: HK-2 from the KPTCL, vide letter dated 2nd July 2008, . • Nuziveedu Seeds Limited., Location number: HK-3 from the KPTCL, vide letter dated 9th June 2008. • Nuziveedu Seeds Limited., Location number: HK-4 & HK-5 from the KPTCL, vide letter dated 9th September 2008. • Nuziveedu Seeds Limited., Location number: HK-7 , HK-8 & HK-9 from the KPTCL, vide letter dated 9th June 2008. • Nuziveedu Seeds Limited., Location number: HK-10, HK-11 , HK-13 & HK-14 from the KPTCL, vide letter dated 16th December 2009. • Nuziveedu Seeds Limited., Location number: HK-12, HK-14 , HK-22 & HK-23 from the KPTCL, vide letter dated 22nd January 2010.
[13]	Contract with Validator , PJRCMD signed by • Nuziveedu Seeds Limited. dated 3rd March 2010
[14]	Minutes of Stakeholders meeting of stakeholders at Karnataka dated 14 th November 2008.
[15]	• KERC tariff order dated 18 January 2005
[16]	Version 05 of the CO ₂ database by the official website of Central Electricity Authority (CEA), Ministry of Power, Government of India. (www.cea.com)
[17]	Reserve Bank of India Annual Report http://rbidocs.rbi.org.in
[18]	Undertaking Letter from the PP to declare that PP will not claim another emission trading programme during crediting period of registered VCS project.
[19]	Certificate of Lifetime of WTGs issued by • Suzlon infrastructure Private Limited • Purchase orders form Regen Powertech Private Limited.
[20]	Operation & Maintenance Agreement between • Nuziveedu Seeds Limited and Suzlon Energy Ltd. on 7th August 2007 for model no. S82. (1.5MW). • Nuziveedu Seeds Limited with Suzlon Energy Ltd. on 11th December 2009 for model no. S88. (2.1 MW).
[21]	Public notice of Local News Papers dated 12 th November 2008.

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Resolution of Corrective Action and Clarification Requests:

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
CL 1: Add sources of the installed capacity for the power generation in Southern Region in PD Section 1.4.	1.6	The source of the installed capacity for the power generation in southern region is added in the revised VCS-PD (Version 02 dated 04 May 2010). Source: http://www.srpc.kar.nic.in/march07/march07.pdf	PJRCMD has verified the provided data source and found the same to correct. This CL 1 is closed.
CL 2: Add table of all WTGs with details of WTG identification, Geographical Coordinates [in format of deg, minute, second], Location [details with district, talluka, village] and commissioning dates in the PD section 1.5.	1.10	A table containing the details of WTG identification, Geographical Coordinates, Location and commissioning dates has been included in the revised VCS-PD section 1.5 (Version 02 dated 04 May 2010) Source for Geographical coordinates: NSL Source for commissioning dates: Commission certificates of KPTCL. The documents are provided along with the	PJRCMD has verified the provided data source and found the same to correct. . PP has added the location details as per EB guidelines. This CL 2 is closed.

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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
		revised VCS-PD for DOE's assessment. Response 3: A separate column stating the district has been added in the revised VCS-PD version 03 dated 21 May 2010. Response 4: A separate column stating the district has been added in the revised VCS-PD version 04 dated 25 May 2010.	
CL 3: PD section 1.6: a) Add table of details for all WTGs commissioning dates, WTG identification number. b) Clearly put the start date of the project activity based on all WTGs commissioning dates. c) Add details of crediting periods. Table of VCUs with chosen crediting periods in proper format.	1.13	a) A table of details for all WTGs commissioning dates, WTG identification number has been included in the revised VCS-PD (Version 02 dated 04 May 2010). b) Start date which corresponds to the date of commissioning of first WTG, which is 06 June 2008, has been mentioned in the revised VCS-PD section 1.6. (Version 02 dated 04 May 2010). c) The crediting period of the project will be 10 years (renewable for another 10 years) from the commissioning date of first WTG i.e., from 06 June 2008 to 05 June 2018.	PJRCDM has verified the provided data source and found the same to correct. This CL 3 is closed

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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
		However for all the other WTGs the crediting period will be from the commissioning date of the respective WTG till 05 June 2018.	
CL 4: Correct numbering on the all VCS PD sections	1.14	The section numbers have been corrected in the revised VCS-PD (Version 02 dated 04 May 2010).	PJRCMD has verified the provided data source and found the same to correct. This CL 4 is closed
CL 5: a) Please confirm how the PP will take the account if in case RECs trading schemes are enforced in India, over the crediting period in PD section 1.13. b) PD states that the project is currently under CDM validation as well. Please provide details of the project name and weblink for the same. Further more please describe the procedures to be followed to avoid double counting section in		<u>Response:</u> a) NSL conceptualized the project considering revenues from carbon credits as the additional revenues are expected to improve the financial viability of the project. At the time of conceptualization and start date of the project activity, the project proponent had the option of going for the UNFCCC based Clean Development Mechanism (CDM) and the Voluntary Carbon Standard (VCS) credits. As mentioned in the revised VCS-PD (Version 02 dated 04 May 2010), along with VCS, project proponent has applied for CDM benefits. However in order	a) PJRCMD has verified the provided data source and found the same to correct. Ok, Please has provided undertaking letter and identified by PJRCMD.. b) OK. PJRCMD has crosschecked the against the weblink for the CDM project. This CL5 is Closed.

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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
the PD section 1.14. Please provide the undertaking for the same.		to avoid double counting, project proponent will have an undertaking stating that any one of the carbon benefits would be availed by the project proponent for the generated emission reductions during the crediting period. The same would be applicable to any other Carbon/Renewable credits applicable to the project activity. Response 3: The undertaking letter from PP is provided as Annex 2 b) As stated, project is currently at the validation stage with respect to the availing of carbon benefits under CDM. The details of the CDM project are as given below Name: 51MW Wind Power Project at Chitradurga. Link: http://cdm.unfccc.int/Projects/Validation/DB/69J8TNRR5CNV4D9LWCAG623YGZQO3F/view.html The same has been stated in the revised	

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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
		VCS-PD (Version 02 dated 04 May 2010).	
CL 6: Clearly justify the each applicability of the methodology in PD section 2.2.	2.5	Each applicability criteria has been explained in detail in the section 2.2 of revised VCS-PD (Version 02 dated 04 May 2010).	OK . PJRCMD has reviewed the revised PD. This CL 6 is closed
CL 7: Correct the project activity source in the section 2.3.		Emission source at the project activity has been updated in the section 2.3. of revised VCS-PD (Version 02 dated 04 May 2010).	OK . PJRCMD has reviewed the revised PD. This CL is 7 closed
CL 8: Why not any other renewable power project like biomass, hydro or non-renewable project like NG, FO or coal based project is alternative for NSL. Please clarify that.	2.5	The project is located on hill sites located around Bhimasamudra village, which has high wind velocities. The project proponent, NSL, has prior experience in setting up of wind power projects. By leveraging its prior experience in wind power projects, NSL has decided to set-up wind power plant, which is renewable, zero GHG intensive and environmental friendly. However the project	PP has analysis all the other alternative in revised PD and justified that no project activity is only option for NSL without the project activity. PJRCMD has identified the same in revised PD. OK This CL 8 is closed.

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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
		proponent needs carbon revenues for project to sustain and make it financially attractive. Response 3: It is not feasible for project proponent to set a large scale NG power plant as there is no sufficient natural gas available in the region. The other alternatives to the project activity such as development of power from renewable energy sources are not credible alternatives for the below reasons • there is no sufficient availability of biomass in the region to set up a biomass based power plant similar capacity. • hydro based power plant is not a credible alternative as there is no resource availability to set-up a large scale hydro based power plant. • solar based power plant is not a credible alternative as it is more expensive than the project activity.	

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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
		Response 4: As suggested, the alternatives available to the PP has been identified and eliminated after proper justification in the Section 2.5 of revised VCS-PD version 4 dated 25 May 2010.	
CL 9: Clearly show how NSL has been arriving at option III benchmark analysis.		The project activity involves generation of power for sale to the grid. The Option I of carrying out the Simple Cost Analysis can be ruled out as the alternative identified, which is generation of power in the grid, can generate financial or economic benefit other than the CDM revenues. The Option II of carrying out the investment comparison analysis can be ruled as there is no suitable alternative scenario to compare. Hence the project participant selected Option III: Benchmark analysis. The same has been updated in section 2.5. of revised VCS-PD (Version 02 dated 04 May 2010).	OK. PJRCMD has reviewed the revised PD. This CL is 9 closed
CL 10: Financial Analysis: a) The basis for PLF provided for wind turbines in the IRR analysis is not		(a) The basis for PLF considered for Regen make WTGs is IL&FS report prepared for the project. With revision in configuration of the WTGs, four Suzlon made 2.1MW WTGs will be installed in the project	a) PP has revised the PLF as per guaranteed generation as stated by the Suzlon/Regen Purchase orders. PJRCMD has verified against the copy of purchase orders and

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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
transparent. Clarification is sought as to why the PP has considered different PLF rates for Regen made WTG's and Suzlon made WTG's. b) The number of machines purchased from Sulon Energy is 5 machines of 2.1 MW capacity each as per the spreadsheet analysis and the PO submitted is for 4 machines. Clarify. c) The cost as per the PO and the estimates differ. Please provide in the xls sheet the break-up of the WTGs cost for each manufacturer. As per Suzlon PO total per WTG cost is 953.3 lakhs but in the IRR calculation it has been taken as 1100 lakhs. d) The total cost estimated is Rs.35,533.33 lakhs whereas the cost considered for the purpose of depreciation is Rs.30,325 lakhs. Provide break-up of the total project cost considered in the analysis. e) Clarification is sought as to why land		activity. The PLF for these WTGs is based on micro-siting study (attached as Annex 1) conducted at the location. Hence the same has been considered in the VCS project. Response 3: a) The sources for PLF values for WTGs are the micro-siting study carried out at the site and the PLF as provided by the technology supplier of WTG. For the financial calculations, the PLF value as provided in the purchase order has been considered to be more appropriate. The same has been updated in revised financial calculation assumption sheet. (b) The number of 2.1MW WTG machines purchased from Suzlon Energy Limited is 4. The same has been updated in CER and IRR calculation spreadsheets. (c) The costs considered for WTGs supplied by both Regen and Suzlon Energy has been updated in the financial calculation sheets.	identified correct. OK. b) PJRCMD has verified the change in IRR calculation sheet and found correct. OK. c) PJRCMD has verified the change in IRR Sheet and found OK. d) PJRCMD has reviewed the total project cost change in IRR Sheet. The IL& FS report reviewed and cross check the additional cost of project. PJRCMD identified the total project and cross checked with provided evidences. OK e) PJRCMD has verified and identified the change and found as per guidelines. OK. f) PJRCMD has confirm against the PPA and found OK. g) PJRCMD has verified the change in IRR Sheet and found OK h) PJRCMD has verified the change in IRR Sheet and found OK

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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
lease cost is not considered in the profitability analysis. f) The PP has not considered wheeling charges. Clarify whether the power is sold entirely to the BESCOM. g) The total number of machines installed is 32. Substantiate for considering 34 machines as per the project cost and depreciation spreadsheet. h) Substantiate the basis of assumption considered for calculating the percentage of phasing of expenditure in 6 quarters (IRR Sheet _Project cost). i) Substantiate for not considering interest on term loan during the moratorium period. j) The total of senior and sub-debt is Rs.26,650 lakhs as per the assumption and Rs.23,500 lakhs as per the debt repayment spreadsheet. Clarify. k) The total project cost considered for the purpose of depreciation differs. Please		The project cost break-up has been provided in the 'Project Cost' sheet. The total cost considered for the 28 Regen WTGs is INR 28900 lakhs and total cost considered for 4 Suzlon WTG is INR 3813 lakhs. (d) The total cost of the project considered is INR 32713.48 lakhs. However the value considered for depreciation is INR 27613.48 lakhs which is the total cost minus the other non-depreciable assets. Response 4: The cost of project activity considered for financial calculations, along with the cost of the WTGs include, Land procurement from Forest/ Revenue department, infrastructure development charges , allotment charges to KPTCL/KREDL, preliminary, pre-operative and financing expenses, margin money for WC, wind resource assessment and miscellaneous expenses. The data has been considered based on the IL&FS feasibility report carried out for the project activity. The same report has been considered for	i) PJRCMD has verified the change in IRR Sheet and found OK j) PP has to clearly mention the references of the debt equity ratio.OK k) PJRCMD has verified the change in IRR Sheet and found OK l) PJRCMD has verified the change in IRR Sheet and found OK m) The total cost (equity & debt) considered for WACC calculation has been revised as per total project cost. PJRCMD has identified the changes. OK.. n) PJRCMD has verified the change in IRR Sheet and found OK o) PJRCMD has verified the change in IRR Sheet and found OK p) PJRCMD has verified the change in IRR Sheet and found OK q) PJRCMD has verified the change in IRR Sheet and found OK r) PJRCMD has verified the change in

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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
also provide break up for project costing financial calculation sheet. l) Salvage value is considered as 5% of cost when the total cost is 100% depreciated. m) The total cost (equity & debt) considered for WACC calculation differs. n) The total number of machines considered for the analysis differs. o) The estimated cost calculation to be re-checked. p) The rate of higher and secondary education cess is 3%. q) Deduction u/s.80IA to re-check. r) Loan sanction date is after commissioning date of the project activity. So PJRCMD can not consider loan interest in IRR calculation. Please use with prevailing PLR given by RBI for calculation of the IRR. s) Risk free return (Rf) is considered from RBI interest rates on Central		obtaining the necessary bank loans for the project activity. (e) In the revised financial calculation sheet, the land lease cost has been considered for profitability analysis by amortizing the total land value. (f) The power generated by the WTG will be exported to the BESCO only. No amount of the power generated will be wheeled. (g) The total number WTGs that were initially conceptualized were 34. However due to various reasons, the number of WTGs have been revised to 32, with 28 WTGs being of Regen make and 4 WTGs being of Suzlon Energy make. The project costs and depreciation sheets have been updated accordingly. (h) The basis for assumptions considered for phasing of expenditure is based on IL&FS report prepared for the project. (i) The interest rate on term loan during moratorium period has been considered and updated in the revised financial calculations.	IRR Sheet and found OK. PP has provided RBI link in the IRR calculation sheet in soft copy. OK s) OK. t) OK. Beta: a) PJRCMD has verified the Weblink documents in soft copy for WACC calculation sheet. OK. b) PJRCMD has verified the change in WACC Sheet and found OK c) i. PJRCMD has identified the changes and found correct. OK. ii. PJRCMD has verified the change in IRR Sheet and found OK. iii. PJRCMD has verified the change in IRR Sheet and found OK iv. PJRCMD has verified the change in IRR Sheet and found OK This CL-10 is closed.

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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
government securities at 8.12 % for the period of 2007-08. However the same period the rates on State Government securities was found to be 8.25 %. Please justify. t) Page 18 of the PD states the Rf to be at 8.12 % however for all calculation purposes the Rf is considered as 8.27%. Please justify and revised accordingly. Beta: a) The source of the debt equity ratio considered for the companies used to arrive at the beta value needs to be confirm (current given source not opening). b) Please clarify the calculation of the unleveraged beta considered. c) Benchmark: Justify for considering		(j) The total of senior and sub-debt is INR 25200 lakhs. The bank loan sanction agreements proving the same are herewith provided. Response 3: j) The actual debt value at the time of the start date of the project activity i.e., a conservative of 70% of the total project cost has been assumed for financial calculations. Response 4: The debt –equity ratio considered for financial calculations is the most conservative estimate as per the KERC Tariff Order 2005. The ratio considered is 70:30. (k) The total project cost break up considered has been provided in the financial calculation sheet. Accordingly the depreciation sheet has been updated in revised financial calculations.	

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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
the following data: i. WACC is considered for calculation of benchmark. The WACC calculated is pre-tax. ii. CAPM is considered for calculation of cost of equity. iii. BSE 500 index is considered for calculating Return on market. iv. Seven power companies are considered to calculating Beta.		Response 3: k) The total cost of 28 Regen WTGs excluding other costs like land, infrastructure development expenses, preliminary expenses is INR 850 lakhs per WTG and hence INR 23800 lakhs for 28 WTGs. The same has been updated in the revised documents. (l) Since the total 100% of the asset value is getting depreciated, salvage value would be the sum of the closing value of the asset at the end of its life after depreciation and scrap value of the assets. A conservative value of the 5% of the total asset value has been assumed as the scrap value for the assets. The same has been considered in the depreciation sheet of the financial calculation. (m) The total cost (equity & debt) considered for WACC calculation has been updated in the revised WACC calculation sheets. The updated value has been used as the	

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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
		benchmark for the project activity. (n) During the initial conceptualization of the project activity, the number of WTGs planned was 34. However due to various reasons, the configuration has been revised and the number of WTGs which will be installed is 32. The same has been updated and the VERs occurring in the project activity will be due to these WTGs. (o) The cost calculations have been rechecked and updated wherever required. (p) The rate of higher and secondary education cess has been updated from 2% to 3%. (q) The accelerated depreciation considered u/s. 80IA is updated in the financial calculation sheet. (r) As per the suggestion, the loan interest in the IRR calculation is revised to the Prime Lending Rate prevailing at the time of conceptualization. (s) Rf corresponds to the risk free return which is provided by the RBI. In the WACC calculations returns achieved by all national companies have been assumed. Hence, it is	

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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
		appropriate to use the risk free return on national level than at the state level. Hence the value 8.2733% has been assumed for calculations. (t) Rf has been updated to the 8.2733%. The same has been used for the calculating weighted average cost of capital. Response 3: s and t) The value for Rf has been sourced from the Central government Securities for the month of October 2007 before the Board Meeting of considering carbon revenues. The value considered (i.e. 8.1887%) is updated in the financial calculations. Beta: Response: a) The debt equity ratios considered for the companies for arriving at the beta value is sourced from the MoneyControl site:	

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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
		Source: http://www.moneycontrol.com b) Unlevered beta value for a company can be arrived based on the following equation $\beta_u = \frac{\beta_l}{\left[1 + (1 - t) \left(\frac{D}{E}\right)\right]}$ Where Beta U is unlevered beta Beta L is levered beta t is corporate tax rate. D/E is debt to equity ratio. This value is further used in calculating weighted average cost of capital. The equation can be referred in the book “Investment Valuation by Aswath Damodaran” c) Benchmark analysis: - The tax rate has been updated from 2% to 3%. Hence the tax calculated is post-tax. - At the time of conceptualization and start of the project activity, the project cost was considered to be INR 340 crores for	

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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										
		34 WTGs (based on the IL & FS project report). The debt to equity ratio was considered to be in the ratio of 70:30. From the above parameters, the Weighted Average Cost of Capital (WACC) was observed to be 14.175%. The Prime Lending Rate (PLR) during the same period is in the range of 12.75 – 13.5%. The benchmark can be also be justified with the weighted average calculated for different of the bank loan rate obtained for the project. The quantum of loan and the lending rates in actual are as stated below <table><tr><td>Amount (INR crores)</td><td>Interest rate</td></tr><tr><td>100</td><td>12.25%</td></tr><tr><td>17</td><td>13.75%</td></tr><tr><td>35</td><td>12.75%</td></tr><tr><td>100</td><td>14.50%</td></tr></table> From the above, weighted average of the	Amount (INR crores)	Interest rate	100	12.25%	17	13.75%	35	12.75%	100	14.50%	
Amount (INR crores)	Interest rate												
100	12.25%												
17	13.75%												
35	12.75%												
100	14.50%												

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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
		bank lending rate is computed to be 13.31% which is in line with the benchmark considered for the project activity. Based on the above considerations, in order to remain competitive in the market, the project proponent has considered WACC as the benchmark for the project activity. iii. BSE 500 index considers the performance of top 500 companies listed in the BSE. This index comprises of maximum list of companies than any other index. With a view to eliminate the unsystematic risk associated with the projects, a period starting since 1999 till the start date of the project activity has been considered to remove the impact of short term volatility. Selection of BSE 500 represents a more robust and efficient face of the market. iv. For arriving at WACC, a list of companies listed in BSE 500, which represent similar sector as the project	

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		activity has been considered. There are totally seven companies which are listed in the index in this power generation sector. Response 3: Weblinks for Beta calculations is provided along with the revised VCS-PD version 03 dated 21 May 2010. Response to d): The generation estimated by Regen as mentioned in the PO is 52.4 Lakhs kWh per WEG. However, the corrected annual average generation estimate arrived at after considering the machine availability, grid availability, losses due to long term uncertainty of wind, array efficiency is 42.68 Lakhs kWh per WEG per annum. It is to be noted that this value is considered for arriving at the PLF of the Regen machines.	

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		ii. The expenses incurred for land procurement are detailed in Page 89 of the IL&FS Financial Analysis document provided to the DOE. The costs provided are the actual expenses incurred. However, as the supporting documents for all the expense heads are not available, the same has not been considered in the project cost. The revision has been made in the IRR sheet, WACC sheet as well as in the VCS PD. iii. The Miscellaneous expenses have been deducted from the total project cost in the revised VCS PD, revised IRR sheet and WACC sheet. iv. The preliminary, pre-operative and financing expenses includes the provision for insurance, salaries and wages, rent rates and taxes, repairs and maintenance, startup expenses, consultancy and professional charges, travel, transport, security, communication, ordinary tools, audit	

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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
		and accounts charges, surveys, model studies etc. However, as the supporting documents for all the expense heads are not available, the same has not been considered in the project cost. The revision has been made in the IRR sheet, WACC sheet as well as in the VCS PD.	
CL 11: Sensitivity Analysis: a. Add tariff variation for sensitivity analysis in financial calculation and its effect on the project IRR. b. Add sensitivity analysis in financial calculation xls sheet.		1. The sensitivity analysis for variation in tariff price has been added in the section 2.5 of revised VCS-PD (Version 02 dated 04 May 2010). s 2. Sensitivity analysis has been added in the revised financial calculation xls sheet. Response 3: Sensitivity analysis table along with summary has been added in the financial calculations	PJRCDM has identified the Change and found satisfactory. OK. This CL 11 is Closed.
CL 12: Barriers Analysis:		i. The usage of gearless technology in wind turbine generators is relatively new compared to the WTG with gearbox,	PP has now applied only investment analysis to prove additionality. OK This CL 12 is closed.

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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
i. Provide justification for the Regen Powertech supplied WTGs have the gearless type construction technology coupled with synchronous generator with permanent magnet excitation and this is the first of its kind in the region. ii. Provided substantial justification on 2100 kW capacity machine of Suzlon is the highest capacity machine is available and it also poses a higher risk of technological failure.		commonly used in India. Nuziveedu Seeds Limited is one of first proponent to use such technology in the region. The same has been updated in the revised VCS-PD (Version 02 dated 04 May 2010). The MNRE report on the wind energy (August 2005) states that the unit capacities of WTGs installed in India ranges from 225kW to 2MW. Hence the usage of 2.1 MW of Suzlon is the highest capacity machine available. Source: http://mnre.gov.in/booklets/Book6-e.pdf Response 3: The Barrier analysis has been removed from the revised VCS PD. version 03 dated 21 May 2010.	
CL 13: Common Practice analysis:		An analysis of the activities that are operational and similar to the proposed project activity has been conducted. The criteria for identifying	PP has carried out common practice analysis on more than 15 MW project under VCS, CDM and CCX and

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The common practice analysis currently provides a list of project, mainly falling under the CDM stream. As per the additionality tool, the project proponent is required to discuss projects other than those that are already included in CDM (or other relevant schemes). The same is to be correct.		similar project activities include the location of the project activities, the scale of the project, broadly similar technology and whether they have been set up in a comparable environment with respect to regulatory environment and investment climate. Based on the above criteria and identified projects, it could be said that all projects of similar project activities, scale of the project and similar technology have approached for carbon benefits. An analysis fully detailing the projects has been stated in the revised VCS-PD (Version 02 dated 04 May 2010) Response 3: The analysis does not restrict to the CDM and includes all GHG programmes. However, at the time of start date of project activity, there are no large scale wind power projects of similar capacity registered under VCS, CCX, etc GHG mitigation mechanisms. As per the analysis it can be	successfully satisfied the common practice analysis. This CL 13 is closed.

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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
		understood that all large scale wind power projects in Karnataka have considered Carbon funds to become viable. Hence, the Common Practice Analysis is Justified.	
CL 14: Monitoring plan: a) 1. Add clearly that generation data will be taken form JMR and cross checked against invoice. b) Add calibration frequency, c) What procedure will be adopted when both meters will fail?	3.3 3.4	a) The monthly meter readings (both the check and the main meter) will be taken jointly by the parties on the first day of the following months at 12 Noon. In case it is not possible to take the readings on the specified date, the readings will be taken the next day. From the WTG, the power generated will be exported to a sub-station located near the project site. The generation data (Joint meter reading) recorded at the sub-station will be cross checked with the meter readings (main & check) available at the WTG. At the conclusion of the each meter reading, an appointed representative of KTPCL and NSL will sign the document indicating the number of kilowatt hours indicated by the meter. b) As per the PPA signed by NSL with BESCOM, all export and import meters	PJRCDM has verified the all change in PD and identified to be correct. This CL 14 is closed.

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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
		installed at the project site are under the control of BESCOM. As per the Article 7.5 of PPA, calibration of these meters is expected to be carried out by BESCOM every quarter. c) As per the Point 7.5 of Article 7 of PPA, at any point, if both the main and check meter fail, then meters will be immediately calibrated and the correction applied to the reading registered by the main meter to arrive at the correct reading of energy supplied for billing purposes for the period from the last month's meter reading up to the current test.	
CL 15: Please include in the PD, the details of the stakeholder identified for the project activity, add stake holder meeting date, venue and stakeholders comments if any. Also provide documentary evidence for the stakeholder's consultations.	6	The details of the stakeholder meeting have been added in the revised VCS-PD (Version 02 dated 04 May 2010). The documentary evidence for the stakeholder's consultation is provided along with the revised VCS-PD (Version 02 dated 04 May 2010) for DOE's assessment.	PJRCDM has verified the all change in PD and identified to be correct. This CL 15 is closed.

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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
CL 16: Please provide evidence for the proof of title.	8.1	The commissioning certificates received from KPTCL for the project activity prove the evidence for the title. The Host Country Approval (HCA) obtained for the UNFCCC based CDM project activity also proves the title. The same is provided along with the revised VCS-PD.	PJRCMD has verified the provided commissioning certificate and identified to be correct. This CL 16 is closed.