

VALIDATION REPORT FOR SATARA WIND POWER PROJECT IN MAHARASHTRA, INDIA



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Position : Green Carbon Energy & Environment Services- Lead Auditor

Signature of Team Leader:



Summary:

LGAI Technological Center, S.A. (hereafter referred to as Applus+ LGAI) has been contracted by NSL Wind Power Company (Satara) Pvt. Ltd (Project proponent) to conduct the validation of the project - "Satara Wind Power Project in Maharashtra, India.", with regard to the relevant requirements of VCS programme guidelines and standard (VCS standard version 3.5, VCS Validation and Verification Manual version 3.1 & VCS program guide version 3.5). Relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting has been applied for validation.

The purpose of this project activity is to generate electricity using renewable sources (wind) and export it to Maharashtra State Electricity Distribution Company Limited (MSEDCL) which is connected NEWNE grid, thereby displacing the grid generated electricity.

The project proponent has applied the baseline and monitoring methodology ACM0002, Version 16.0: "Grid-connected electricity generation from renewable sources".

The project activity consists of 20 WTGs (1.5 MW capacity each), making the total installed capacity to be 30 MW at Village Mann, Taluka Man in the district of Satara in the state of Maharashtra, India. The WTGs are of Vensys V87 type, supplied by ReGen Power Tech Pvt. Ltd.

The proposed project activity is a Green field project which results in an estimated GHG emission reduction of 51,335 tCO₂ annually and a total of 513,350 tCO₂e over 10 years of the crediting period. The power generated by the project will be replacing the equivalent amount of electricity from the NEWNE Grid system of India, which is dominated by fossil fuel based grid connected power plants.

A risk based approach has been followed to perform this validation. In the course of validation, 05 Corrective Action request (CARs) were raised and successfully closed.

The review of the project design documentation and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and stakeholders have provided Applus+ LGAI with sufficient evidence to validate the fulfilment of the stated criteria.

In detail the conclusions can be summarized as follows:

- The project is in line with all relevant host country criteria (India) and all relevant VCS and UNFCCC requirements for CDM
- The project additionality is sufficiently justified in the PD.
- The monitoring plan is transparent and adequate.
- The calculation of the emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 513,350 tCO₂e are most likely to be achieved within the 10 years crediting period.

The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation. This validation is based on the information made available to Applus+ LGAI and the engagement conditions are detailed in this report. No restrictions or uncertainties were identified related to the validation.

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1 INTRODUCTION

1.1 Objective

Applus+ LGAI has been contracted by NSL Wind Power Company (Satara) Pvt. Ltd., the project proponent (PP), to undertake the validation of the renewable energy project titled “Satara Wind Power Project in Maharashtra, India.”. The purpose of this validation is to have an independent third party assessment of whether the project activity conforms to the qualification criteria set out in the VCS Version 3.5 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. The validation followed the requirements of the current version of the VCS Standard Version 3.5 and VCS program guide 3.5 to ensure the quality and consistency of the validation work and the report.

1.2 Scope and Criteria

The validation scope is given as an independent and objective review of the project design, the project’s baseline study and monitoring plan (ACM0002 Version 16 “Grid-connected electricity generation from renewable sources”) which are included in the VCS PD and other relevant supporting documents.

The scope of work covered in the validation is described below:

- To validate whether the project activity meets the requirements of VCS Standard Version 3.5, VCS Validation and Verification Manual version 3.1 and VCS program guide 3.5 including additionality, proof of title and compliance with local laws.
- To evaluate whether the baseline and monitoring plan are in conformance with the applied methodology from the VCS approved GHG program
- To confirm that the information presented are completed, consistent, transparent and free of omission or material error
- Background investigation and follow up interviews
- Issuance of draft validation report with CARs, CRs & FARs, if any
- Final validation opinion

The information in the PD is reviewed against the criteria of VCS Standard 3.5, the VCS program guide 3.5 and the applied consolidated baseline and monitoring CDM methodology ACM0002, version 16.

Applus+ LGAI has performed validation based on a risk based approach focusing mainly on the significant risks to meet the qualification criteria and the ability to generate Verified Carbon Units (VCUs).

The validation is not meant to provide any consulting towards the Client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the project design.

1.3 Level of Assurance

The level of assurance of the validation report falls under reasonable assurance engagements as selected by the Client. Materiality for the project is 5%.

1.4 Summary Description of the Project

The proposed project activity is a renewable wind electricity generation project and supplying power to the NEWNE Grid. The power generated by the project will be replacing the equivalent amount of electricity from the NEWNE Grid system of India, which is dominated by fossil fuel based grid connected power plants. The project activity is located at Village Mann, Taluka Man in the district of Satara in the state of Maharashtra, India.

The project activity consists of 20 WTGs (1.5 MW capacity each), making the total installed capacity to be 30 MW. The WTGs have been commissioned between 06/03/2014 and 31/03/2014. The same was

verified against the commissioning certificates/7/. All 20 WTGs are fully functional and the assessment team verified this during the site visit.

2 VALIDATION PROCESS

2.1 Method and Criteria

The validation process is undertaken by validation team that involves the following:

- the desk review of documents and evidences submitted by the project proponent in context of the reference VCS rules and guidelines,
- undertaking site visit, interview or interactions with the representative of the project proponent,
- reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and
- preparing a draft validation report
- resolution of outstanding issues and the issuance of final verification report and opinion

In order to ensure transparency, a validation protocol was prepared for the project according to the VVS version 9.0 verification requirements and VCS Standard version 3.5.

The Clarification Requests (CR) were issued where additional information was needed to clarify issues, and Forward Action Requests (FAR) for issues relating to project implementation that required review during the first verification of the project activity.

The Audit Team consisted of the following individuals who were selected based on their validation experience, as well as familiarity with renewable energy operations:

Sr.No	Auditor Name	Role
1	Vivek Kumar Ahirwar	Team Leader
2	Vivek Kumar Ahirwar	Technical expert (TA 1.2)
3	Ajay Singh Thakur	Auditor
4	Pragya Sharma	Auditor in Trainee
5	Miquel Sitjes Cabanas	Technical Reviewer

BACKGROUND INFORMATION OF THE WORK TEAM (Audit team and Review Team):

Vivek Kumar Ahirwar is a BEE-Certified Energy Auditor by Govt of India with over seven years of relevant experience in energy efficiency, energy audit and energy conservation in energy intensive industries, designated consumers and commercial buildings, implementation of energy conservation building codes, research, process and green building projects. He is a certified lead auditor for ISO 14001 EMS and 14064. He has experience under various categories of projects stating from renewable to waste to supercritical projects and WCD. He has successfully audited more than 100 GHG (CDM/VCS/GS) projects in different states across the India. He has done Mater in Technology (Energy Management) from a premier institute, School of Energy & Environmental Studies, DAVV, Indore (M.P.), India and Bachelor of Engineering (Mechanical Engineering) from Govt. Engineering college, Rewa, RGPV, India.

Ajay Singh Thakur is a certified lead auditor for ISO 14001 EMS LA. He has more than five years of work experience across Climate Change, Environmental Management & Monitoring, Health & Safety Management, and Statutory Compliance. He was involved in more than 50 CDM validation and verifications activities and Gold Standard, VER projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1 technical area 1.2. he has experience in design and development of Environment Health & Safety Management System (EHS), ISO 14001:2004 (EMS), OHSAS 18001:2007, ISO 14064:2006, ISO 50001:2011 (EnMS) and ISO 9001:2008 (QMS). Also, he is providing trainings on EHS (ISO 14001:2004 (EMS) & OHSAS 18001:2007) to various industries. He has done Mater in

Technology (Energy Management) from a premier institute, School of Energy & Environmental Studies, DAVV, Indore (M.P.), India and Bachelor of Engineering (Chemical Engineering) from Ujjain Engineering Collage, Ujjain, RGPV, India.

Pragya Sharma has more than five years of work experience across Solar Energy and Other Renewable Technologies, Climate Change, Environmental Management & Monitoring. She was involved in Designing and Installation of 20 kWp Photovoltaic Power Plant by Ministry of New and Renewable Energy, Solar Energy Centre, Gurgaon, India. She has experience in Development of Solar Laboratory, Research, Solar Project Development, Publications in Gujarat Energy Research and Management Institute, Gandhinagar, Gujarat, India and Welspun Energy Ltd. She has knowledge about CDM validation and verifications activities and Gold Standard, VER projects through document review and covering the sectoral scope 1 technical area 1.2. She has done Mater in Technology (Energy Management) from a premier institute, School of Energy & Environmental Studies, DAVV, Indore (M.P.), India and Master in Science in Physics from Holkar Science College, Devi Ahilya Vishwavidyalaya, Indore, M.P., India.

Miquel SITJES CABANAS (B. Sc. degree in Chemistry 1975, Universidad de Barcelona – Spain). He has 15 years of experience in a Spanish chemical group company specialized in the manufacturing of raw chemical products, where he worked as the Manager of Quality Control, Production Manager and Environmental Manager. He also worked in the Spanish pharmaceutical industry for 7 years as Quality, Manufacturing and Environmental Manager. He has been working in the Applus+ LGAI Technological Centre since 1999: he started working there as an auditor (quality, environment, CDM, VCS, greenhouse gas verification and others) and since 2006 he has been the Systems Certification Technical Manager.

2.2 Document Review

The validation team has conducted the validation using the VCS Standard and the ACM0002 version 16 methodology as the reference criteria.

The validation team had done the completeness check of VCS PD submitted by the PP as per the VCS standard Version 3.5 requirements was reviewed. Furthermore a desk review was also carried out to assess the following:

- Information of project details in compliance with VCS PD template
- Appropriateness of methodology ACM0002 version 16 applied to the project activity
- Compliance with relevant laws and regulations
- Correctness of application of baseline and monitoring methodology
- Demonstration of additionality
- Monitoring plan described in the VCS PD
- Stakeholder consultation
- Proof of listing of project under pipeline
- Calculation of grid emission factor, etc. where applicable.

The VCS PD version 02 dated 15/01/2016 was initially reviewed and the PP requested to submit the revised documents along with the supporting information and documents. The revised documents and additional supporting documents were further assessed by the validation team. During the validation process, the revised VCS PD/1/ and the supporting documents were assessed to confirm the actions taken by the PP to the CARs and CLs issued.

The validation team has reviewed the final version of the VCS PD version 03 dated 08/02/2016 to confirm that all changes agreed have been incorporated.

Further, prior to the onsite visit, it was verified by the validation team that the project was listed in the VCS pipeline in line with the requirements (Section 3, Registration and Issuance process, version 3.6) http://www.vcsprojectdatabase.org/#/project_details/PL1519

The details of the documentation reviewed during the validation are provided under appendix 1 of this report.

2.3 Interviews

The validation team has carried out interviews in order to verify the information included in the project documentation and to gain additional information regarding the compliance of the project with the VCS requirements. Before and during the on-site visit, the validation team has interviewed the representatives of the PP to confirm selected information and to clarify issues identified during the document review. Representatives of the PP and ReGen Power Tech Pvt. Ltd (O&M contractor) were also interviewed. The names and designations of the personnel interviewed are mentioned in section 2.4 below.

The main topics covered during the interview are as follows:

- General Aspects of the project
- Project Implementation
- Equipment and operation
- Staff Training procedures
- Calibration procedures
- Monitoring & Measuring System
- Data collection, recording and archiving procedure
- QA/QC procedures
- VCS documentation
- Emission reduction calculations

2.4 Site Inspections

As part of the verification, an on-site inspection has been performed by the validation team and. The site visit was carried out on 18/01/2016 to 19/01/2016. During the site visit representatives of the PP and ReGen Power Tech Pvt. Ltd (O&M contractor) were interviewed; i.e. personnel responsible for monitoring of the project activity, data collection and management, and QA/QC procedure. The details of the people interviewed and the topics discussed are mentioned in the table below:

Location: Wind Project Site at Village Mann, Taluka Man in the district of Satara, Maharashtra, India	Date: 18/01/2016 to 19/01/2016
Coverage	Source of Information / Persons Interviewed
Project implementation, start date as per the VCS requirements. Electricity Generation Records (monthly energy statements, Invoices) Reliability & accuracy of readings considered for emission reduction calculations, Calibration procedure	Mr. Sanjay Kadam (Technician- ReGen Power Tech Pvt. Ltd)
Monitoring and measuring system <ul style="list-style-type: none"> Collection of measurements Observations of established practices Data Verification of monitoring parameters 	Mr. Sachin Sakate (Site Manager- NSL Wind Power Company (Satara) Pvt. Ltd.)
QA/QC procedures, data management, internal audits to maintain data quality & reliability, maintenance Practices Consideration of monitoring period, monitoring methodology, project documentation and emission reduction calculations	Mr. Sagar S. (Technician- ReGen Power Tech Pvt. Ltd)

2.5 Resolution of Findings

As an outcome of the validation process, the team can raise different types of findings

A Clarification Request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met

Where a non-conformance arises the team leader shall raise a **Corrective Action Request (CAR)**. A CAR is issued, where:

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

The validation process may be halted until this information has been made available to the team leader's satisfaction. Failure to address a CL may result in a CAR. Information or clarifications provided as a result of a CL may also lead to a CAR. No CL has been raised during the validation of the project activity.

During the validation process, total 05 CARs were raised and resolved satisfactorily. The list of CARs/CLs/FARs raised and the response provided, the mean of validation, reasons for their

closure and references to correction in the relevant documents are provided in Appendix 2 of this report.

2.6 Forward Action Requests

A Forward Action Request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the VCS requirements for registration.

No FAR has been raised during the validation of the project activity.

3 VALIDATION FINDINGS

3.1 Project Details

Project type, technologies and measures implemented, and eligibility of the project:

As per the project type defined by the UNFCCC and VCS version 3.5 Guidelines, the project activity falls under type-I (Renewable energy projects) and the list of Sectoral the sectoral scope 1 - Energy Industries (renewable/ non-renewable sources).

The project activity consists of 20 WTGs (1.5 MW capacity each), making the total installed capacity to be 30 MW. The WTGs are of Vensys V87 type, supplied by ReGen Power Tech Pvt. Ltd. The proposed project activity is a Green field project which results in an estimated GHG emission reduction of 51,335 tCO₂ annually and a total of 513,350 tCO₂e over 10 years of the crediting period.

The technology employed by project activity involves, generation of electrical energy using wind power. The technology used in the project does not generate any GHG emissions, hence considered as an environment friendly. The project activity is a Greenfield project and there was no electricity generation at the project site prior to the implementation of project activity. The WTGs under the project activity is having an average lifetime of 25 years. The equipment's are based on manufacturer's specifications and as per industry standards. Technical specifications of WTGs will be as follows:

MODEL	Vensys V87
Power Data	
Rated power	1.5 MW
Cut-in wind speed	3 m/s
Rated wind speed	12 m/s
Cut-out wind speed	22 m/s
Survival wind speed	52.5 m/s
Generator	Variable Speed, Multi-pole Synchronous with Permanent Magnet Excitation
Tower and Foundation	
Hub height	85 m
Design	Tubular, Four sections
Foundation type	Floating foundation
Rotational Speed	15 to 17.6 rpm
Rotor	
Speed range (variable)	9 to 17.3 rpm

Diameter	87 m
Swept area	5942 sq m ²
CONTROL AND SAFETY SYSTEMS	
Control of output	Pitch Regulation
Speed Control	Variable, Micro-controller based
Low Voltage Ride Through (LVRT)	3 seconds
Primary brake system	Aerodynamic Brake, Single Pitch Control/triple redundant
Pitch System	Electromechanical, Maintenance Free Toothed Belt Drive (Patented)
Remote Monitoring	VPN, Visualization via web-browser
Wind turbine type class	GL III B

The purpose of the project activity is to generate the electricity and supplying to grid by the utilization of wind power. The project activity will generate greenhouse gas (GHG) emission reductions by avoiding GHG emissions which otherwise would have been generated by the operation of grid connected power plants and by the addition of new sources. Hence the project accomplishes VCS conditions.

Project proponent and other entities involved in the project-

M/s NSL Wind Power Company (Satara) Pvt. Limited is the project proponent and no other entities involved in the project activity.

Project start date-

The project start date is 06/03/2014/7/. This is because the first WTG was commissioned as on the said date.

Project crediting period-

The crediting period of the project activity is fixed for 10 years .The crediting period is from 06/03/2014 to 05/03/2024.

Project scale and estimated GHG emission reductions or removals-

The estimated annual emission reductions for the project activity are 51,335 tCO₂e which is less than 300,000 tCO₂e. Hence the category is applicable under "Project".

Project location-

The wind power project is located Mann village, in the district Satara, state of Maharashtra.

Geo-coordinates of the project location is verified as:

Latitude: 17 ° 29' 44.64" -17 ° 32' 21.37" N

Longitude: 74 °39 '47.83" -74 ° 42' 40.12"E

Conditions prior to project initiation-

The project activity is set up to produce clean power from the wind energy converters (WEC's) which can be also named as Wind Turbine Generator (WTG). The project activity involves supply, erection, commissioning and operation of 20 machines of rated capacity 1.5 MW. The project is Greenfield project. There was no project installed prior to commissioning of this project.

Project compliance with applicable laws, statutes and other regulatory frameworks:

The project is a voluntary initiative by the project proponent and has not been implemented to meet any local / national laws or regulatory compliances. The project activity is in compliance with current laws and regulations and there are no legal and/or regulatory requirements that prevent the project implementation. Also the validation team has confirmed that there is no such compliance requirement with an emission trading program or any binding limits on GHG emissions for the project activity in India (host country) as it is a non-annex 1 country. The project has obtained valid consents/17/,/18/ for the installation and operation from the state nodal agencies and is in compliance with local laws and regulations.

Ownership and other programs-

Right of use

The project activity comprises of 20 WTGs with a capacity of 1.5 MW each owned by NSL Wind Power Company (Satara) Pvt. Ltd. The ownership of the project activity is verified through the following documents:

- Commissioning certificates /7/
- Power purchase agreement signed by the PP with state utility/8/
- Purchase order issued by the PP to technology supplier /16/

Emissions trading programs and other binding limits

Project activity does not reduce GHG emissions from activities that are included in emissions trading program or any other mechanism that includes GHG allowance trading. This is verified through the declaration submitted by the PP /31/ which states that the net GHG emission reductions generated by the project activity will not be used for compliance with any other emissions trading program or to meet binding limits on GHG emissions for the same monitoring period.

Other forms of environmental credit sought or received and eligible to be sought or received:

The project activity has not sought or received another form of GHG related environmental credits. The project seeking registration under the VCS and not listed under REC mechanism/28/ as verified from https://www.recregistryindia.nic.in/index.php/general/publics/registered_regens.

Participation under other GHG programs:

The project has not been participated under other GHG programs. Also the PP has submitted the declaration/31/ which states that the net GHG emission reductions generated by the project activity will not be used for compliance with any other emissions trading program or to meet binding limits on GHG emissions for the same monitoring period.

Rejection by other GHG programs:

The project has not been rejected by other GHG programs.

Additional information relevant to the project, including:

- ***Eligibility criteria for grouped projects***

The project activity is not a grouped project, hence not applicable to the project activity.

- ***Leakage management for AFOLU projects***

Not applicable to the project activity.

- ***Commercially sensitive information***

No commercially sensitive information has been excluded from the public version of the project description.

Conclusion:

In view of the assessment of VCS PD/1/ and supporting documents as listed in Appendix 1 of this report, the validation team is able to confirm that the description contained in the VCS PD of the project activity provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation. Consequently, **Applus+ LGAI** confirms that the project description of the project contained in the VCS PD/1/ to be complete and accurate. The VCS PD complies with the relevant forms and guidance for completing the VCS PD.

3.2 Application of Methodology

3.2.1 Title and Reference

The project activity has applied CDM approved methodology ACM0002 version 16.

Title: Grid-connected electricity generation from renewable sources

Reference: Approved consolidated baseline and monitoring methodology ACM0002, Version 16.0(EB 81, Annex 09)

Tools referenced in the applied methodology:

Tool for the demonstration and assessment of additionality, version 07(EB 70, Annex 08)

(<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>)

Tool to calculate the emission factor for an electricity system, version 05 (EB 87, Annex 09)

(<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v5.0.pdf>)

3.2.2 Applicability

The project activity applies the approved consolidated baseline and monitoring methodology ACM0002, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" version 16.0/4/. The applicability of the methodology is justified through the following paragraphs of the methodology;

As per the ACM0002, version 16.0

Applicability criteria 1:

This methodology is applicable to grid-connected renewable energy power generation project activities that: (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s).

Justification for project activity:

The project activity is the installation of a new Grid connected renewable (wind) power project activity at a site where no renewable power plant was operated prior to the implementation of the project activity (greenfield plant); Therefore, the project activity applicable under this methodology. Hence, the criterion is satisfied as per point (a)

VVB Conclusion:

The current project activity is a grid-connected renewable power generation. The connection of the project activity with the grid is substantiated and confirmed by means of the Power Purchase agreements/8/ and the Commissioning certificates/7/.The project activity is a new wind power plant at the project site where no renewable power plant was operated prior to the implementation of the project activity; same has been confirmed during the site visit. The Purchase order/16/for the windmills indicates that the windmills are new and do not involve retrofit and/or modifications. Thus the criterion is fulfilled by the proposed project activity.

Applicability criteria 2:

The methodology is applicable under the following conditions:

(a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;

(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity.

Justification for project activity:

The project is installing a wind power plant. Hence the criterion is satisfied as per Point (a) of Para 04 of ACM0002, version 16.0. The project is not a capacity additions, retrofits or replacements. Hence this criterion Point (b) of Para 04 of ACM0002, version 16.0 is not applicable.

VVB Conclusion:

- As verified above the project activity involves installation of wind power plant hence point (a) is applicable and The project activity does not involve any capacity additions, retrofits or replacements of an existing facility because it is a greenfield wind power generation project activity, same has been confirmed from physical inspection during the validation site visit., hence point (b) is not applicable for the project activity.

Applicability criteria 3:

In case of hydro power plants, one of the following conditions shall apply:

(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or

(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m² ; or

(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m² ; or

(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m² , all of the following conditions shall apply:

(i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m² ;

(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;

(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project.

Justification for project activity:

The project is a wind power project; hence none of the conditions discussed above are applicable for the project activity.

VVB Conclusion:

The project activity is the installation of a wind based Power Generation project; it is not a hydro project, thus all conditions related to hydro plants are not applicable to the project activity (and not included in this section).

Applicability criteria 4:

The methodology is not applicable to:

(e) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;

(f) Biomass fired power plants/units.

Justification for project activity:

The project is a wind power project, hence none of the conditions discussed above are applicable for the project activity.

VVB Conclusion:

The project activity neither involve fuel switch nor a biomass fired power plant hence this criteria is not applicable for the project activity.

Applicability criteria 5:

In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance".

Justification for project activity:

The project is not of retrofits, rehabilitations, replacements, or capacity additions. Hence the condition discussed under here is not applicable for the project activity

VVB Conclusion:

The project activity does not involve any capacity additions, retrofits or replacements of an existing facility because it is a Greenfield wind power generation project activity, same has been confirmed through physical inspection during the validation site visit.

Applicability criteria 6:

In addition, the applicability conditions included in the tools referred to below apply

Justification for project activity:

All the applicability conditions included in the tools applicable for the project activity.

VVB Conclusion:

The applied methodology refers to latest available versions of the following tools;

1) Tool to calculate the emission factor for an electricity system

The VCS PD refers and correctly applies the latest version of tool to calculate the emission factor for an electricity system, version 5.0/5/.Also the PP has referred the CEA Baseline CO₂ Emission Database version 10 dated December 2014/19/ which was the latest available database at the time of PD submission for validation of the project activity. The locations of windmills are in the state of Maharashtra, in India. As per CEA Baseline CO₂ Emission Database/19/, the state of Maharashtra comes under the NEWNE regional electricity grid in India, the geographic and system boundaries of which are clearly identified; information on the characteristics of the grid is available. Thus, the tool is applicable for the project activity.

2) Tool for the demonstration and assessment of additionality

The latest version 7.0.0 of the “Tool for the demonstration and assessment of additionality”/12/ has been used by the PP. Since the additionally tool is included in an approved methodology, additionality tool needs to be applied for the project activity. Also PP is neither proposing new methodology nor proposing alternative methods to demonstrate additionality for consideration by the Executive Board. This it is concluded that the Tool for the demonstration and assessment of additionality is applicable for the project activity.

3) Combined tool to identify the baseline scenario and demonstrate additionality

- The PP has used the “Tool to demonstration and assessment of additionality” in demonstration of additionality and the baseline has been developed in accordance with the applied baseline methodology. Hence, the combined tool is not used by the project participant.

4) Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion

- Since there is no fossil fuel combustion involved in the project site or in the project boundary, this tool is not applicable to the proposed project activity and not used/applied by the project participant.

Thus all the applicability conditions of the applied methodology are confirmed in line with paragraphs 86 of VVS version 09. Based on the above discussion, the validation team confirms that the proposed project activity meets all the applicability conditions and all other stipulations of the selected methodology ACM0002 Version 16.0.

3.2.3 Project Boundary

As per the guidelines mentioned in the methodology ACM0002, version 16.0, “*The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to*”. The project

activity will supply electricity to the NEWNE Grid. The project boundary includes the WTGs, the metering points and the NEWNE grid, which has been illustrated in the Section 2.3 of the PD and gives clear understanding of the project boundary; thus it is acceptable. The same has been confirmed during the site visit and is found to be appropriate.

The consideration, by the PP, of only CO₂ gas for the baseline emissions is conservative and also in line with the methodology. The exclusion of CH₄ & N₂O in the baseline scenario is appropriate. The project activity involves the generation of electricity using wind energy. Hence, there are no project emissions associated with this project activity. Hence, the exclusion of CO₂, CH₄ & N₂O in the project scenario are appropriate. The electricity imported by the project activity will be accounted in the net electricity exported to the grid by the project activity. There are no other sources of project emissions. Hence, the project participant has considered the project emissions as zero for project activity; this is in line with the methodology.

The project boundary gives a clear understanding of emission sources related to the baseline scenario. There are no sources attributable to project emissions or leakage emissions, which can contribute more than 1% of overall expected annual emission reductions, and which are not addressed by the applied methodology, involved, as the project activity is electricity generation through windmills. No leakage emissions involved as equipment's were not transferred from another activity or to another activity. The project boundary in section 2.3 of the VCS PD/1/ properly explains the physical description of the project activity. Also it is found that all the components and facilities to mitigate GHG gases are included in the project boundary. The validation team is of the opinion that the project boundary has been correctly identified in the VCS PD in line with paragraphs 92 to 96 of VVS version 09.0/11/.

3.2.4 Baseline Scenario

As the project activity involves the installation of a newly built and grid-connected renewable power plant that exports the generated electricity to the NEWNE grid system in India, hence, according to the methodology ACM0002 version 16.0, the baseline scenario is determined properly as:

“Electricity delivered to the grid by the Project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

The latest available version for “Tool to calculate the emission factor for an electricity system” is version 05 /5/ and the PP has correctly referred to the same in the section 3.1 of the final PD/1/ for determining baseline grid emission factor and it is found to be correct.

The calculation for the operating margin and combined margin for the Indian Grid is readily available and published by the Central Electricity Authority, Government of India/19/. The CEA power sector data is referred by all CDM project in India in the ER calculation and it is yearly updated with recent data. The project activity has referred the CEA Baseline Carbon Dioxide Emission Database is version 10/19/ dated December 2014, which was the latest version available during submission of the PD.

The PP has used the simple operating margin calculation. The simple operating margin is calculated as an average of the latest available three years (at the time of PD submission for validation) i.e. 2011-12, 2012-13 and 2013-14. The value for operating margin has been validated and used as 0.9857 tCO₂/MWh. The Build margin for the NEWNE grid is considered as 0.9495 tCO₂/MWh. The weighted average combined margin has been calculated by the PP, considering the 75% weighted for operating margin and 25% for build margin; this is in accordance with the tool. The weighted average combined margin emission factor for the project activity comes to 0.9767 tCO₂/MWh. The PP has provided the calculation for the same in the ER calculation sheet and it was validated by the validation team. The baseline emission factor for the electricity system has been calculated on ex-ante basis and will remain fixed for the entire project crediting period.

The discussion on baseline is comprehensive in the VCS PD section 3.1 and it is in line with the approved consolidated baseline and monitoring methodology ACM0002 version 16.0. Also the identified baseline for the project activity is the most likely scenario of what would have occurred in the absence of the project activity and is confirmed by TA expert on the team; thus it is accepted. The project participant has included all sources and references used for baseline determination for the project activity in the PD/1/ and the identified baseline is justified appropriately by the project participant. The Baseline scenario and baseline emission calculations are found as per ACM0002 version 16.0/4/. The combined margin approach is the ex-ante approach as per tool to calculate the emission factor for an electricity system. Based on the requirements of paragraph 105 of the VVS version 09 /11/, the validation team confirm that:

- (a) All the assumptions and data used by the PP are listed in the VCS PD, including their references and sources;
- (b) All documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PD;
- (c) Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable;
- (d) Relevant national and/or sectoral policies and circumstances are considered and listed in the PD;
- (e) The approved baseline methodology has been correctly applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed project activity.

3.2.5 *Additionality*

The proposed project activity is a large scale project and the additionality of the project activity was demonstrated on the basis of the "Tool for the demonstration and assessment of the additionality", Version 07.0.0, approved by the CDM EB 70 and required by the methodology ACM0002, Version 16.0.

PP has adopted the step-wise approach for demonstrating and assessing the additionality of the project activity as follows:

Step 0: Demonstration whether the proposed project activity is the first-of-its-kind

This step is optional and not used for this project.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

As per the methodology paragraph 21, the project activity is the installation of a Greenfield power plant, then the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”. Thus the baseline scenario is applied as per the methodology and no alternative selection is required.

Sub-step 1a: Not applicable

Sub-step 1b: Not applicable

Step 2: Investment analysis

For the proposed project activity, the PP has demonstrated investment barrier through step 2 of “Tool for the demonstration and assessment of additionality” (version 07.0.0).

The input parameters in the financial analysis have been taken as per the values and assumptions applicable and available at the time of decision to invest in the project activity in line with Paragraph 6, Annex 05 of EB 62/29/.

The approach used in the PDD has been assessed based on a document review, whilst the following relevant documents have been reviewed:

- Board Resolution by the project proponent to invest into the proposed project activity considering carbon credit revenue/15/
- Proposal submitted by technology supplier to PP/14/.
- Equity IRR and Benchmark Analysis calculation sheet/3/
- MERC tariff order ,dated 22/03/2013/20/

On site, the additionality of the project activity has been discussed with representatives of the PP and finally the data, rationales, assumptions; justifications and documentation provided have been checked using local knowledge and sectoral and financial expertise of the Assessment Team, and cross checked by:

- Power Purchase Agreements (PPAs)/8/
- Purchase order for WTGs/16/
- Commissioning Certificates for WTGs/7/
- Third Party PLF/CUF assessment report/10/

The financial calculations for the project activity have been discussed as below in detail;

Financial Indicator (Equity IRR):

The PP has selected equity IRR (post-tax) as the financial indicator for the Benchmark Analysis. The appropriateness of the financial indicator has been verified by the assessment team, it was confirmed that the equity IRR is a widely accepted financial metric used by many corporations and financial institutions for investment decision-making and is a long-established benchmark for investment decisions in the Indian power sector. The PP has selected Return on equity as the benchmark which is in line with paragraph 12 of EB 62 Annex 5/29/.

The post-tax equity IRR for the project activity at the time of investment decision comes out to be 11.51%. The data, rationales, assumptions and justifications mentioned in the PD/1/ and investment analysis excel sheets/3/ were checked against the local knowledge of the validation

team, sectoral scope expertise, regulatory and applicable legal requirements in the Host country India. The documents were also verified by the financial expert. The appropriateness of the input values, used for financial calculation have been checked in line with paragraph 6 of the Guidance on the Assessment of Investment Analysis (EB 62 Annex 05).

1. Project Cost:

The Project cost for the project activity has been considered from the budgetary offers/14/ received from the technology supplier provided by M/s. ReGen Power Tech Pvt. Ltd (technology supplier) to the project participant during conceptualization stage of the project.

The project cost includes cost of materials and equipment, labour and services, identification, selection and allocation of land, cost for obtaining all government permissions and infrastructure development charges. This is found to be appropriate and it is accepted. The project cost for the project activity has been considered as INR 2,060 million. The appropriateness of the same is further cross-checked against the actual purchase order/8/ placed for the project activity. The actual project cost for the project activity is INR 1,981.71 million and it is evident from purchase order/16/ placed to M/s. ReGen Power Tech Pvt. Ltd the project activity.

The actual project cost as per purchase order is 3.8% lesser than the cost mentioned in the supplier offer as considered for IRR calculation. Equity IRR crosses the benchmark with 15.70% decrease in the project cost which is unlikely scenario, as discussed above, as the purchase order has already been placed.

2. Operation and Maintenance Cost and its escalation:

The O & M cost for the project activity is considered from the technology supplier offer/14/. Operation and maintenance cost considered is INR 1.5 million per annum per WTG aggregating INR 30 million for the project activity (including the service tax). O&M will be free of cost for 2 years of operation of the project activity. For 3rd year O & M cost will apply and an escalation of 6% will be applicable from 4th year onwards. Also O&M cost considered for the project activity is further checked with the MERC tariff order dated 22nd March 2013 (Latest applicable at the time of investment decision) which indicates O&M cost ranging from 1.8% - 1.9% of the capital cost with 5% escalation every year.

The appropriateness of same has been crosschecked with recently registered wind power projects bearing UN reference numbers 7537, 8606, 8551 and 8495 (all with the same state with O & M cost ranging 1.03% – 1.33% of project capital cost and all having the same time of investment decision); the comparison indicates 5% - 6% annual escalation on O & M cost. Hence, it is concluded that the O&M cost of project cost with annual escalation of 6% for the project activity is considered to be appropriate and it is accepted.

3. Plant Load Factor:

The Plant Load Factor as 20% is considered from the third party PLF assessment report prepared by AWS True power , dated 12/09/2012/10/ available to the PP at the time of decision. The Project Participant had contracted third party for PLF assessment in line with paragraph 3 (b) of Annex 11 of EB 48 and the PLF is verified as 20% through the PLF assessment report prepared by third party. Hence it can be concluded the PLF considered by the PP is appropriate.

To further crosscheck the appropriateness of the PLF considered for the project activity, MERC tariff order dated 22/03/2013/20/ is checked which is the latest available document at the time of decision making and on page 16 of the MERC tariff order indicates PLF 20%. This is covered in the sensitivity analysis variation range and the Equity IRR remains additional under the investment benchmark value. Thus it is concluded that PLF of 20% considered by the PP is

appropriate; and the same has been considered in IRR calculations for the project activity. Also this parameter is considered under +/-10% sensitivity.

4. Electricity Tariff:

The Project participant had considered INR 5.81/kWh as average electricity tariff fixed for the 20 years of the project's lifetime. It is checked and confirmed through MERC tariff order/20/. Since, it was the latest available and applicable at the time of decision making of the project activity, paragraph 6 of EB 62 Annex 05 is followed and it is accepted. Thus it is concluded that electricity tariff considered for the project activity is found to be appropriate and it is accepted.

Also the validation team has assessed the impact on the IRR value and project additionality using the actual electricity tariff as per PPA/8/ signed with the state electricity board (MSEDCL) and it is concluded that the tariff rate considered for IRR calculation is same as mentioned in PPA.

The Electricity Act, 2003, the policies framed under the Act, as also the National Action Plan on Climate Change (NAPCC) provide for a roadmap for increasing the share of renewable energy in the total generation capacity in the country. Central Electricity Regulatory Commission (CERC) has notified Regulation on Renewable Energy Certificate (REC) in fulfilment of its mandate to promote renewable sources of energy and development of market in electricity. Thus the project applicability for these benefits under REC mechanism has been checked. Detailed procedure on REC mechanism dated 01/06/2010 published by Central Electricity Regulatory Commission/28/ (http://www.nerlrc.org/Docs/Order_for_Detailed_Procedure_01-06-2010.pdf) is checked for REC eligibility of the project activity and it is confirmed that the procedure was applicable at the time of projects investment decision. It is confirmed that REC is not applicable for the projects taking benefits of preferential tariff, hence it is concluded that REC benefits are not applicable to the project activity. Also in the actual scenario, PP will not be claiming REC benefits for the project activity and it is confirmed during the site visit while interviewing the PPs representative and further checked from the official web site of REC registry/28/ hence it is accepted.

5. Debt to Equity Ratio:

The project activity is funded by 30% equity and 70% debt. This is in line with the paragraph 18 of Guidelines on the assessment of Investment Analysis (version 05) i.e. EB 62 Annex 05 which talks about typical debt/equity finance structure in the sector in the country. Typical debt-equity ratio is 70:30 in wind energy sector and this is checked from MERC tariff order dated 22/03/2013 /20/ which is latest available at the time of investment decision.

In addition, the actual debt equity ratio was confirmed to be 70:30 from the actual loan sanction letter/21/. There is no variation and IRR remains well below the benchmark and hence it is found appropriate and thus it is accepted.

6. Insurance Cost:

Insurance cost for the project activity is considered as INR 0.28 million per annum per WTG aggregating total insurance cost of INR 5.60 million per annum for the project activity. The cost is taken from the proposal submitted by the insurance agency, hence the insurance cost considered for the project activity is found to be appropriate. Thus it is accepted.

7. Life Time of project activity: 25 years

The lifetime of the project activity is 25 years which has been considered from the proposal/14/ issued to the PP by the WTG supplier. This is consistent with the lifetime of wind power projects and has been confirmed by the technical expert. The crediting period of the proposed project activity is 10 years as mentioned in the VCS PD. However the period of assessment considered for the investment analysis is 20 years. This has been confirmed from the IRR-benchmark

spreadsheet submitted by the PP. Hence the considered assessment period of 20 years meets the requirement of paragraph 3 of EB 62 Annex 5.

8. Interest rate on term loan: 12.87%

The interest on term loan considered for the investment analysis from the MERC tariff order, dated 22/03/2013. This was available to the PP at the time of the investment decision. Hence the considered rate is appropriate and in line with applicable guidance in paragraph 11 of EB 62 Annex 5.

9. Loan tenure ,Repayment period and Moratorium period:

The PP has considered loan tenure as 10 years, a repayment period of 9 years months with a moratorium period of 1 year as per the MERC tariff order, dated 22/03/2013/20/. The considered repayment schedule was available to the PP at the time of investment decision and hence found to be acceptable.

10. Book Depreciation Rate and Income Tax Depreciation Rate:

The Depreciation on plant and machinery is calculated at 5.28% and civil works as 3.34% on Straight Line Method (SLM) as per the Companies Act, Schedule XIV, Item II (i) (b) published by the Government of India/23/. Furthermore, the PP has considered 10% as salvage value and 90% as depreciable component on plant and machinery as per publically available source (Schedule XIV, The Companies Act 1956/23/), which is found justified.

The income tax depreciation rate of 90% on WEC block of assets and 10% on other assets has been considered as per the Income Tax Act 1961 (Source: Appendix IA of Income Tax Rules/22/) published by the Government of India. As the Income tax India website is official data, it eliminates any ambiguity that there could have been in this regard.

11. Rate of WDV Depreciation on civil cost and plant and machinery cost:

The WDV depreciation rate on civil cost is 3.4% and 7.69% on plant & machinery cost has been considered as per the Income Tax Act 1961 (Source: Appendix IA of Income Tax Rules/22/) published by the Government of India. As the Income tax India website is official data, it eliminates any ambiguity that there could have been in this regard.

12. Corporate Tax Rate and Minimum Alternate Tax (MAT) rate:

The PP has considered the corporate tax rate as 32.45% and MAT rate as 20.01% from the Income tax act /24/ published by the Government of India. The service tax rate has been considered from the service tax guidelines published by the Government of India. The values and sources were available to the PP at the time of decision making. This is found to be appropriate and hence accepted.

13. Administration charges:

The PP has considered the admin cost as INR 0.27 million per MW per annum,hence total INR 8 million per annum for the project activity. Making an allowance for personnel involved in the project salary revision every year and also price hike for travel and other things, 8% annual escalation is considered. The admin cost and its escalation is considered based on the prior experience of PP in the similar projects and the available information. Furthermore the CA has assessed & confirmed the administrative expenditure detail for the project activity for Board decision. The validation team therefore is of the opinion that the 8% escalation in administration charges is appropriate in host country. Thus the escalation of the administrative charges is appropriate and accepted.

14. Salvage value:

Salvage value of 10% of plant and machinery and 100% of land cost has been assumed based on the publically available source (Schedule XIV, The Companies Act 1956) published by the Government of India. As the data has been published by the government, the same is acceptable to the assessment team. Furthermore, the MERC tariff dated 22/03/2013/20/ mentions that "The salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the asset". The salvage value has been correctly used in the calculation of Equity IRR.

15. Income tax holiday (Section 80I/A benefit)

The PP has considered the income tax holidays for 10 consecutive years in the first 15 years of the of the project lifetime as per section 80IA of income tax act 1961. The tax holiday is considered as per Income Tax Act, Government of India (http://law.incometaxindia.gov.in/dittaxmann/incometaxacts/2008itact/sec_080-ia.htm). The appropriateness of the same has been checked and confirmed by financial expert involved in the project activity. This is found to be appropriate and it is accepted.

16. Project Capacity: 30 MW

The project capacity has been checked against the proposal/14/ issued by technology supplier to the PP for 20 WTGs of capacity 1.5 MW each. The assumption on project capacity 30 MW has been cross-checked against the Supply agreement (purchase order) placed /16/ and the PPA signed/8/ by the PP with MSEDCL specifically for this project activity.

17. GBI Benefits:

The total GBI revenue for 10 years is considered as INR 26.3 million with a cap of INR 75 million for first 4 years. The PP had Generation based incentive for the project activity at the rate of INR 0.5/kWh. This value is further checked and confirmed with the official web site of Ministry of New and Renewable Energy (Web link: http://mnre.gov.in/file-manager/UserFiles/faq_wind.pdf). Since PP is aiming to claim GBI benefits for the project activity, PP is not eligible to claim accelerated depreciation benefits for the project activity as indicated in Guidelines for scheme on generation based incentives (GBI) for Grid interactive wind power projects/32/ (Source: <https://workspace.imperial.ac.uk/rajivgandhicentre/public/WPP.pdf>). This is found to be appropriate and it is accepted.

Conclusion:

The values considered for all the above discussed parameters were available at the time of investment decision and hence are valid and applicable to the project activity. All input values have been consistently mentioned and applied in all calculations. This meets the requirement of paragraph 6 of EB 62 Annex 5. The assessment team confirms that in the calculation of equity IRR only the portion of investment costs which is financed by equity has been considered as the net cash outflow and the portion of the investment costs which is financed by debt has not been considered a cash outflow. This meets the requirement of paragraph 10 of EB 62 Annex 5.

Based on the above parameters, the Equity IRR for the project activity is calculated to be 11.51%. This is lower than the calculated benchmark of 17.75%. This signifies that the proposed project activity is not financially attractive and is therefore additional.

Sub-step 2a: Determine appropriate analysis method:

The project activity identified in Step 1 generates revenues from the sale of electricity; therefore, the Simple Cost Analysis (Option I) cannot be applied. Instead, the Benchmark Analysis (Option III) is selected as the appropriate analysis method.

Sub-step 2b: Apply benchmark analysis (Option III)

The proposed VCS project activity is a wind power project which could be developed by an entity other than the PP. Hence the benchmark has been based on parameters that are standard in the market, which is suitable in the context of the underlying project activity. This meets the requirement of paragraph 13 of EB 62 Annex 5.

The PP has provided the calculation of the benchmark in the VCS PD and investment analysis spreadsheets. The benchmark has been calculated in line with paragraph 15 of EB 62 Annex 5 and paragraph 7 of Appendix-A of EB 62 Annex 5. Based on the option in paragraph 15, the PP has selected the default value for the expected return on equity (in real terms) from Appendix-A (EB 62 Annex 5). The default value has been obtained as 11.75% for India corresponding to Group 1 (Energy Industries).

The IRR calculation has been carried out on in nominal terms. Hence as per the requirement of paragraph 7 of Appendix-A of EB 62 Annex 5, the PP has converted the default value (i.e. 11.75%) which is in real terms to nominal terms by adding an inflation rate. The inflation rate has been sourced from the Reserve Bank of India's (RBI) Survey of Professional Forecasters: Results of 22nd Round (Q1:2012-13) dated 28/01/2013/25/. It was verified that the inflation rate is expected to be 6% over the next 10 years. The RBI is the Central Bank of India and hence the source for the inflation rate is appropriate. The assessment team has confirmed that the default value was available at the time of decision making and has been appropriately applied by the PP.

Therefore the benchmark is calculated to be 17.75% (i.e. 11.75%+ 6%).

The validation team is of the opinion that the above benchmark, which is based on the parameters that are standard in the market, is suitable in the context of the project activity. Since the benchmark is based on parameters that are standard in market, the ROE is calculated by using best financial practices and data sources have been clearly validated by validation team. The suitability of the benchmark considered for the project activity is confirmed in line with paragraph 130 of VCS version 9.0 as follows:

- a. The financial indicator used for the project investment analysis is post-tax Equity IRR, and the benchmark has been calculated as ROE which is suitable to the type of financial indicator chosen by the PP.

- b. Since this is a wind energy generation project, and RBI's WPI minimum inflation rate for host country i.e. India is applied as per the EB 62 Annex 5 and hence no risk premiums are applied.
- c. The financial analysis of the project at the time of investment decision as well as with actual parameters, along with the respective sensitivity analysis, shows that the Equity IRR of the project, under no scenario crosses the benchmark returns. Therefore it can be concluded that the project is not financially viable and hence it can be assumed that no investment would be made at a rate lower than the benchmark return.

Sub-step 2d: Sensitivity analysis:

The sensitivity analysis has been carried out by the project participant for a reasonable range of variations i.e. +/-10% of major parameters, and this was found to be as per paragraph 21 of Guidance on Assessment of Investment Analysis (EB 62 Annex 05). At the time of decision, the PP had considered the project cost and O&M cost for project activity, as per proposal submitted by WTG supplier/14/. The PLF is nature dependent and varies depending on wind velocity and density. Also electricity tariff is assessed under sensitivity analysis though tariff considered for the project activity is average electricity tariff for 20 years period of the project activity conservatively. These parameters have material impact on the investment analysis.

The project participant has considered all the variables that constitute more than 20% of either total project costs or total project revenue i.e. PLF, Project Cost, tariff and O&M cost in the sensitivity analysis and hence this is found to be in line with paragraph 20 of Guidance on Investment analysis (EB 62 Annex 05).

The impact of +/-10 % variation in these variables is summarized as below;

Percentage Variation	+10%	0%	-10%
Parameter	Plant Load Factor(Energy generation)		
Equity IRR (%)	14.93	11.51	8.28
Parameter	Project Capital Cost		
Equity IRR (%)	8.70	11.51	15.18
Parameter	Electricity Tariff		
Equity IRR (%)	14.70	11.51	8.45
Parameter	Operation and Maintenance Cost		
Equity IRR (%)	11.23	11.51	11.78

It is verified that the Equity IRR crosses the benchmark if:

1. Project cost reduced by 15.70%:

This is not a likely scenario as actual project is only 3.8% lesser than the same considered for IRR calculation. This is verified through the purchase order/16/, hence no more variation is possible.

2. PLF increases by 17.80%:

PLF considered by the project participant is appropriate in line with paragraph 3 (b) of EB 48 Annex 11. Equity IRR is crossing the benchmark if PLF is increased by more than 17.80% and it is very unlikely that PLF to increase by 17.80% as the actual PLF assessment at site reveals the PLF as 20% only

3. Tariff increases by 19.20%

Further increase in tariff rate is highly unlikely scenario as the tariff rate is fixed for 20 years as verified through the MERC tariff order/20/ and further confirmed with the PPA signed/8/ with state electricity board.

Outcome of Step 2:

In view of the above discussion the assessment team has concluded that the project activity is additional and it is found to be financially not viable.

Step 3: Barrier analysis:

This option is not opted for the project activity.

Step 4: Common practice analysis

PP has demonstrated common practice analysis as per “Tool for the demonstration and assessment of additionality” – Version 7.0.0, EB 70, Annex 8. The stepwise approach to validate common practice analysis for the project activity is discussed as below;

As per paragraph 13 of “Tool for the demonstration and assessment of additionality” – Version 7.0.0, project activity belong to measure “Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies”; hence sub-step 4a) of the tool is applicable for the project activity.

Sub-step 4a): The proposed CDM project activity (ies) applies measure(s) that are listed in the definitions section above

As per sub-step 4a), paragraph 58 of the “Tool for the demonstration and assessment of additionality” – Version 7.0.0, latest version of the “Guidelines on common practice” available on the UNFCCC website shall be applied.

The PP applied latest version 3.1 of “Guidelines on common practice” and same has been as below;

Applicable Geographical Area: As per paragraph 9 of EB 84 Annex 7, “Applicable geographical area should be the entire host country. If the project participants opt to limit the applicable geographical area to a specific geographical area (such as province, region, etc.) within the host country, then they shall provide justification on the essential distinction between the identified specific geographical area and rest of the host country.”

The PP had considered geo-graphical area as the state of Maharashtra as regulatory regime since applicable power tariff structure for renewable energy projects is unique for each of the

states across national boundary of India; which is based on Electricity Act 2003 (EA 2003), section 82 which clearly mentions “Every State Government shall, within six months from the appointed date, by notification, constitute for the purposes of this Act, a Commission for the State to be known as the (name of the State) Electricity Regulatory Commission” Appropriateness of the same has been checked and confirmed from EA 2003 (<http://www.cercind.gov.in/08022007/Act-with-amendment.pdf> /33/).

Furthermore with reference to Section 2 of Indian Wind Energy Outlook 2009, 2011 and 2012; Published by Global Wind Energy Council (<http://www.gwec.net/publications/country-reports/>) the following significant points on the State specific policy & regulatory framework on the renewable energy projects with special emphasis to wind power projects have been validated:

Electricity Act 2003 (EA 2003) has changed the legal and regulatory framework for the renewable energy sector in India. The EA 2003 mandates policy formulation to promote renewable sources of energy by the federal government, the State governments and the State Electricity Regulatory Commissions (SERCs) within their jurisdictions.

- The Electricity Act 2003, introduced some enabling provisions conducive to accelerated development of grid connected renewable energy sources. Under Section 61(h), promotion of cogeneration and generation of electricity from renewable sources of energy has been made the explicit responsibility of SERCs, which are bound by law to take these considerations into account while drafting their terms and conditions for tariff regulations. Nearly all SERCs have issued their tariff regulations incorporating suitable clauses, which will enable them to provide a preferential treatment to renewable energy (RE) during the tariff determination process. The SERCs determine the tariff for all renewable energy projects across the States, and the state-owned power Distribution Companies (DISCOMs) ensure grid connectivity to the renewable energy project sites.
- EA 2003 has initiated the adoption of the National Tariff Policy, 2006 as one of the key policies, National Tariff Policy (2006) framed under the Section 3 of the EA 2003. As per the excerpt from National Tariff Policy, 2006; pursuant to provisions of section 86(1)(e) of the EA 2003, the Appropriate Commission shall fix a minimum percentage for purchase of energy from such sources taking into account availability of such resources in the region and its impact on retail tariffs. Such percentage for purchase of energy should be made applicable for the tariffs to be determined by the SERCs latest by April 1, 2006.
- As mandated under section 86(1) (e) of the Electricity Act (2003), by June 2012, 26 SERCs had fixed quotas (in terms of % of electricity being handled by the power utility) to procure power from renewable energy sources. The mandate, which is called a Renewable Purchase Specification (RPS), varies from 0.5% to 14% in various states over varying time-scales. Few states have come out with technology specific RPSs. Besides, the state regulators determine the tariff for all RE projects in the states and ensure connectivity to the grid through extension of power evacuation from the RE project sites.
- -At present thirteen SERCs have declared preferential feed-in tariffs (FITs) for purchase of electricity generated from wind power projects established in respective states, which

varies from state to state in India. All the SERCs have adopted a 'cost plus' methodology to fix the feed-in tariff, which varies across the states depending upon the state resources, project cost and more importantly the tariff regulations of SERCs. Wind power related tariff policies in different states also has difference in regulatory and policy incentives. Several states have implemented fiscal and financial incentives for renewable energy generation, including; energy buy back (i.e. a guarantee from an electricity company that they will buy the renewable power produced); preferential grid connection and transportation charges and electricity tax exemptions.

Also during site visit to the project activity, it is confirmed that the project activity is implemented especially as per provisions of state tariff order i.e. MERC tariff order dated 22/03/2013/20/

Therefore based on the above discussed objective information validated, it has been concluded that the investment climate for the renewable energy projects varies from State to State within India due to state specific local policy & regulatory framework as outlined by the State Electricity Regulatory Commissions of the respective state. This difference in investment condition leads to essential distinction among wind energy projects between different States of the host country India.

Thus, consideration of the specific geographical area i.e. federal state of Maharashtra for the common practice analysis of the proposed project activity found to be reasonable and justified. The PP has submitted the excel spreadsheet of common practice analysis/3.1/ as per steps below for projects identification for similar and different projects and found to be appropriate.

Step 1: *calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.*

The capacity of the project activity is 30 MW; hence applicable output range is 15– 45 MW.

Step 2: *identify similar projects (both CDM and non-CDM) which fulfill all of the following conditions:*

- (a) *The projects are located in the applicable geographical area;*
- (b) *The projects apply the same measure as the proposed project activity;*
- (c) *The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;*
- (d) *The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;*
- (e) *The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;*

(f) *The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.*

There were total 64 wind power generation projects identified in applicable geo-graphical area in applicable output range of +/-50% of the total design capacity of 30 MW i.e. output range of 15 – 45 MW. The assessment team has checked and confirmed that all these 64 projects have started their commercial operation before the VCS PD for the project activity was submitted for validation or before start date of the project activity whichever is earlier. This data has been sourced from Directory Indian Wind Power 2013 (13th Edition) /26/ and CDM Pipeline (<http://www.cdmpipeline.org/>). This is cross checked and found to be appropriate, thus it is accepted.

Step 3: *within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all}*

It is verified that all the 64 wind power projects are found to be either registered, submitted for registration or undergoing validations. It is checked and confirmed from UNFCCC project database and CDM Pipeline. After exclusion of the projects, registered, submitted for registration or undergoing validations, the number of similar projects identified are $N_{all} = 0$

Step 4: *within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff}*

There are no projects identified as N_{all} , hence different project is $N_{diff} = 0$

Step 5: *calculate factor $F=1-N_{diff}/N_{all}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.*

$$\begin{aligned}\text{Hence, } F &= 1 - 0/0 \\ &= 1\end{aligned}$$

Step 6: *The proposed project activity is a “common practice” within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all} - N_{diff}$ is greater than 3*

$$\text{Hence, } N_{all} - N_{diff} = 0 - 0 = 0$$

Thus assessment team had concluded that the project activity is not a common practice as $N_{all} - N_{diff}$ is not greater than 3. This is found to be appropriate and it is accepted.

3.2.6 Quantification of GHG Emission Reductions and Removals

The proposed project activity has applied baseline methodology as mentioned in the large scale methodology ACM0002 version 16.0, “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.

Baseline indicated by the applied methodology for grid connected wind power projects is “Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”.

The baseline emissions are the product of electrical energy baseline EG facility, y expressed in MWh of Net electricity supplied by the WTGs in the project activity to the grid multiplied by the grid emission factor.

Since the proposed project activity is an installation of a new grid connected renewable power plant, the baseline for the project activity is the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. Therefore, as per the requirement of ACM0002 version 16.0, the baseline emissions are the product of electrical energy baseline $EG_{\text{facility},y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor ($EF_{\text{grid,CM},y}$).

The Project proponent has adopted the combined margin approach for determination of the grid emission factor as per Tool to calculate the emission factor of an electricity system’ Version 5.0. The PP opted for combined margin emission factor ($EF_{\text{grid,CM},y}$) for the project activity and it has been estimated ex-ante as 0.9767 tCO₂/MWh (for NEWNE regional electricity grid in India). It will remain fixed throughout the crediting period for the project activity as opted by PP. The combined margin emission factor is obtained from the three years generation weighed average of the operating margin emission factor and the latest year build margin emission factors by applying suitable weights (i.e. 75 % to operating margin emission factor ($EF_{\text{grid,OM},y}$) and 25 % to build margin emission factor ($EF_{\text{grid,BM},y}$)) as referred to the EF tool version 5.0.

The simple operating margin value of 0.9857 tCO₂/MWh and build margin value of 0.9495 tCO₂/MWh for NEWNE regional electricity grid in India have been referred from CO₂ baseline database published by Central Electricity Authority, Govt. Of India, version 10 dated December 2014/19/. This is the latest available CO₂ baseline database at the time of the VCS PD submission for validation of the project activity. This is found to be appropriate and it is accepted.

The following algorithm to calculate the emission reductions from the project activity has been appropriately adopted as per the Equation no. 13 of ACM 0002 version 16.0:

$$ER_y = BE_y - PE_y$$

Where,

ER_y = Emission Reduction in tCO₂/year

BE_y = Baseline emission in tCO₂/year

PE_y = Project emissions in tCO₂/year

The project emissions are considered as “zero” for the project activity, which is found and justified considering the project description and consistent with the provision of applied methodology. With reference to the applied methodology, project activity does not lead to any leakage emissions, hence accepted.

The baseline emissions have been calculated by the following algorithm as per the equation no. 07 of ACM0002 version 16.0:

$$BE_y = EG_{\text{facility},y} * EF_{\text{grid}, CM,y}$$

Where,

BE_y = Baseline Emissions in year y (tCO₂)

EG_{facility,y} = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

EF_{grid, CM,y} = CO₂ emission factor of the grid in year y (tCO₂/MWh)

As per the paragraph 48 of the applied methodology, EG_{PJ,y} has been correctly identified as EG_{facility,y} (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y) in line with the equation no. 08 of ACM0002 version 16.0 as applicable for Greenfield renewable energy power plants.

The validation team assessed the calculations of ex-ante estimated ERs as provided by the project participant in the emission reduction calculation spreadsheet/3/. Emission reduction due to project activity in the year y (tones/year) is arrived at by multiplying the net energy generation from the project activity multiplied by the emission factor of the NEWNE grid system of India adopted from the CEA Baseline Carbon Dioxide Emission Database, version 10.0 dated December 2014 and found consistent.

Determination of EG_{facility,y} (Quantity of net electricity generation supplied by the project plant/unit to the grid in year y):

The PP has considered the value of EG_{facility,y} as 52,560 MWh per year for the project activity as per the third party PLF assessment report/10/ and the estimated annual average of emission reductions is arrived as 513,350 tCO₂e over the 10 year crediting period. The validation team confirms that the estimates of baseline emissions can be replicated using the information provided in the final VCS PD/1/. It can also be verified using the emission reduction calculation spreadsheet/3/. Hence, it is concluded that the approach to calculate emission reductions is clearly demonstrated in the VCS PD/1/ is appropriate. The selection of baseline scenario and assumptions used for the emission reduction calculations have been checked as per paragraphs 97 to 103 of VVS version 9.0.

Based on the above discussion and the requirements of paragraphs 105 of VVS version 09.0, the validation team confirm that:

- All assumptions and data used by the PP are listed in the PD, including their references and sources.
- All documentation used by the PP as the basis for assumptions and source of data is correctly quoted and interpreted in the PD.
- All values used in the PD are reasonable in the context of the proposed project activity.
- The relevant national and/or sectoral policies and circumstances are considered and listed in the PD.
- The baseline methodology ACM0002 version 16.0 has been applied correctly to calculate project emissions, baseline emissions, and leakage and emission reductions

3.2.7 Methodology Deviations

There are no methodology deviations applicable for project activity.

3.2.8 Monitoring Plan

The present CDM project activity uses monitoring methodology ACM0002 version 16.0, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources." The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period.

The PP has defined the monitoring parameters as per the requirements of section 6.1 of the methodology ACM0002 Version 16 and taking into consideration the actual procedure followed on the site. In line with this, the PP has defined the monitoring plan includes the below parameters in section 4.2 of the VCS PD.

1. **EG_{facility,y} : Quantity of Net Electricity exported to the grid by the project WTGs to the grid during the year y (MWh)-**

This parameter will be calculated and based on the measured values of export and import on the MSEDCL meter and metered value of electricity in CMS monitoring system. This is the difference of Electricity supplied to the grid from the project activity and Electricity imported from the grid by the project activity. This parameter will be calculated on a monthly basis and verified with monthly statements issued by state utility. The net electricity exported to the grid on the monthly statements will be cross checked with the invoices raised by the PP to state utility.

$$EG_{\text{facility},y} = EG_{\text{JMR, NSL, export},y} - EG_{\text{JMR, NSL, import},y}$$

The net electricity exported by the project activity will be compared with the electricity generation by the project activity measured at the controller panel for the same period and conservative value will be used for emission reduction calculations.

2. $EG_{JMR, NSL, export, y}$: Quantity of Electricity exported by the Project WTGs connected to the feeder i to the grid during the year y (MWh)-

This parameter will be calculated on the basis of electricity generation recorded at the controller meter of project activity WTGs, generation recorded at controller meter of all the WTGs (project and non-project WTGs) and the electricity exported at the main meter as mentioned in the JMR.

The electricity exported by all the WTGs (Projects WTGs and non-project WTGs) is metered at common metering point through given feeder. The metering point consists of a main meter & check meter (ABT meters), having accuracy of 0.2s. This meter reading is taken jointly by the representative of the State Utility & representative of the promoter.

The meters are in the custody of State Utility and are sealed in presence of both the state utility official & representative of PP. The meters will be calibrated at least once in 3 year by the State Utility. The monitoring & measurement of electricity at the common metering point is being done on continuous basis; while monthly recording is done in the monthly JMRs.

This monthly export value for the project WTGs is arrived by using the apportioning procedure as illustrated in section 4.3 of VCS PD and can be verified through monthly statements & cross checked from the invoices raised to the state utility. The monitoring frequency of the data parameter will be on monthly basis.

3. $EG_{JMR, NSL, import, y}$: Quantity of Electricity imported by the Project WTGs connected to the feeder i to the grid during the year y .

This parameter will be calculated on the basis of electricity generation recorded at the controller meter of project activity WTGs, generation recorded at controller meter of all the WTGs (project and non-project WTGs) and the electricity exported at the main meter as mentioned in the JMR.

The electricity imported by all the WTGs (Projects WTGs and non-project WTGs) is metered at common metering point through given feeder. The metering point consists of a main meter & check meter (ABT meters), having accuracy of 0.2s. This meter reading is taken jointly by the representative of the State Utility & representative of the promoter.

The meters are in the custody of State Utility and are sealed in presence of both the state utility official & representative of PP. The meters will be calibrated at least once in a year by the State Utility. The monitoring & measurement of electricity at the common metering point is being done on continuous basis; while monthly recording is done in the monthly statements/credit notes.

This monthly import value for the project WTGs is arrived by using the apportioning procedure as illustrated in section 4.3 of VCS PD.

4. $EG_{Controller, gen}$: Quantity of Electricity generated at the controller of project activity WTGs connected to the feeder, i (MWh)-

Quantity of electricity generated by the project activity WTGs will be measured at respective LCS meters (Controller meter) continuously and recorded on monthly basis.

This data parameter will be logged electronically on a monthly basis by O&M contractor on its online portal. The value of this parameter shall be compared with the value of $EG_{\text{facility},y}$ and the conservative approach would be taken by the PP for estimating the net electricity supplied value for the calculation of emission reduction.

Apportioning Procedure:

It is worthwhile to note that the WTGs belongs to project activity are connected to the State Grid Authority sub-stations through different feeders where other WTGs of other promoters (not part of the project activity) are also connected. Thus, apportioning of the generated electricity by the project WTGs at grid interface is carried out to calculate electricity exported by the project activity.

The apportioning of electricity generated by project activity is entirely under jurisdiction of MSEDCL and project participant has no role in computing and furnishing the apportioned electricity for themselves. This procedure was verified by checking the same with the personnel in the sub-station during the site visit and was found to be correct.

The following parameters are used in the calculation of $EG_{\text{facility},y}$:

$EG_{\text{JMR, Export}}$ = Electricity exported by all the WTGs (project WTGs & non-project WTGs), as recorded by the main meter at the substation

$EG_{\text{JMR, Import}}$ = Electricity imported by all the WTGs (project WTGs & non-project WTGs), as recorded by the main meter at the substation

$EG_{\text{Controller, gen}}$ = Electricity exported by a project WTG, as measured at the controller

$EG_{\text{Controller, gen, total}}$ = Electricity exported by all the WTGs (project activity & non project activity) connected to the main meter at the substation, measured at the controller of each WTG

$\sum EG_{\text{Controller, gen}}$ = Summation of electricity generated by the project activity WTGs recorded at respective LCS meters.

$EG_{\text{JMR, NSL, export}}$ = Electricity exported by a WTG to the grid, calculated

$EG_{\text{JMR, NSL, import}}$ = Electricity imported by a WEC from the grid, calculated.

Electricity exported by each WTG is apportioned on the basis of electricity exported recorded at the controller of each WTG and the electricity exported at the main meter and mentioned in the JMR. The export multiplication factor is calculated as follows-

$$\text{Export Multiplication Factor} = EG_{\text{JMR, Export}} \div EG_{\text{Controller, gen, total}} \dots\dots\dots (1)$$

Thus the energy exported by a WTG to the grid is given by the equation-

$$EG_{\text{JMR, NSL, export}} = \text{Export Multiplication factor} \times \sum EG_{\text{Controller, gen}} \dots\dots\dots (2)$$

As the controller meter doesn't record import, the apportioning of energy imported by each WTG is also done on the basis of electricity exported recorded at the controller of each WTG and the electricity imported at the main meter and mentioned in the JMR. The import multiplication factor is calculated as follows-

$$\text{Import Multiplication Factor} = \text{EG}_{\text{JMR, Import}} \div \text{EG}_{\text{Controller, gen, total}} \dots\dots\dots (3)$$

Thus the energy imported by a WTG to the grid is given by the equation-

$$\text{EG}_{\text{JMR, NSL, import}} = \text{Import Multiplication factor} \times \sum \text{EG}_{\text{Controller, gen}} \dots\dots\dots (4)$$

The net electricity exported by the WTGs of the project is given by the equation-

$$\text{EG}_{\text{facility, y}} = \sum \text{EG}_{\text{JMR, NSL, export}} - \sum \text{EG}_{\text{JMR, NSL, import}} \dots\dots\dots (5)$$

$$\sum \text{EG}_{\text{JMR, NSL, export}} = \text{EG}_{\text{JMR, NSL, export, y}}$$

$$\sum \text{EG}_{\text{JMR, NSL, import}} = \text{EG}_{\text{JMR, NSL, import, y}}$$

Note: The net electricity supplied to the grid by the project activity is a calculated value which is arrived by using the value of electricity generation by project WTGs, non-project WTGs at individual energy meters and the cumulative value of electricity import and export of the entire number of WTGs connected to substation (i.e. including project and non-project WTGs) as measured at the pooling substation. Since the measurement of electricity generation of non-project WTGs at energy meter is non- feasible for PP and The main meter & check meter reading at the substation and ABT meter are under the jurisdiction of MSEDCL only and are not shared with the individual project developers, hence, these parameter have not been included as the monitoring parameters in section 4.2 of VCS PD.

Conclusion:

The monitoring methodology applies consistently the choice of the option selected for monitoring of baseline emissions. The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period.

The project participant has the ability to implement the monitoring plan. This is checked through discussion with consultant, the project participant and O&M contractors of the project activity during the physical site inspection .The staffs at the sub-station and the representative of the technology providers were also interviewed to verify the accuracy in the documents. This has been checked during the site visit and is found to be acceptable.

The WTG supplier is involved in the operation, maintenance and data monitoring. The final PD has been reviewed to check that the procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mention in the PD. The monitoring plan completely describes all measures to be implemented for monitoring all parameters required. Based on the above discussion and the requirements of paragraphs 148 and 150 of the VVS version 9.0/11/, the validation team confirm that:

- The monitoring plan included in the PD is based on the approved methodology ACM0002 version 16.0 which has been applied to the proposed VCS project activity
- The monitoring arrangements described in the monitoring plan are feasible within the project design
- The PP has the ability to implement the monitoring plan as per the PD.

3.3 Non-Permanence Risk Analysis

The project activity does not require a non-permanence risk analysis. Hence this is not applicable.

3.4 Environmental Impact

The project proponent has mentioned in the PD/01/ that the present project activity does not require EIA to be carried out because as per the schedule 1 of Ministry of Environment and Forest notification dated 14/09/2006/27/ <http://envfor.nic.in/legis/eia/so1533.pdf> and further notification number 3067 from MoEF dated 01/12/2009/27/ <http://moef.nic.in/downloads/rules-and-regulations/3067.pdf>, activities are required to undertake environmental impact assessment studies. The proposed project activity does not fall under the listed categories and hence not required an EIA to be done. The project participant has nevertheless submitted a No Objection Certificates from Maharashtra Renewable Energy Corporation Limited/18/. Thus the adequacy of the analysis carried out by the project participant for the impact of the implementation of the project activity on the environment has been validated as per paragraphs 157 and 160 of VVS version 9.0.

The validation team is of the opinion that the project complies with environmental regulations in India.

3.5 Comments by Stakeholders

The local stakeholder consultation process has been described in detail, by the PP, in section 6 of the PD. The project participant identified the relevant stakeholder like the local village head and the villagers (from the villages listed in the PD) and ReGen Power Tech Pvt Ltd officials as local stakeholders for the project activity. Thus, the validation team is of the opinion that the relevant stakeholders have been consulted appropriately and adequately.

The PP has conducted the stakeholder consultation meeting on 06/10/2012 at P.C Shah Memorial Hall, Hotel Pankaj Executive, Pune-Bangalore highway, Karad in coordination with ReGen Power Tech Private Limited, the technology provider. Stakeholders were invited through public notices and newspaper advertisements (dated 29/09/2012) given by the PP. The documentary evidence provided as proof of date of the invitation, meeting; and mode of invitation/9/ has been checked by the assessment team and found to be appropriate.

After sharing information with the local stakeholders about the company and the purpose of proposed activity, the stakeholders were briefed about non-conventional energy sources and their

importance. The PP also informed the stakeholders about their intention of securing carbon credit benefits for the proposed project activity. The Minutes of the meeting of the stakeholder meeting and attendance sheet/9/ have been submitted by the PP.

During the site visit the assessment team interviewed some of the local villagers. Based on the replies of the villagers, the validation team was convinced that the process of stakeholder consultation was carried out as described in the PD/1/. The villagers also confirmed that they were invited for the meeting through public notice. This was found to be consistent with the invitation process mentioned in the PD/1/.

Overall, there was agreement among the stakeholders that the proposed project activity would lead to the overall development of the area, mainly by generating employment opportunities and improving the infrastructure leading to an improved life for the villagers. The local stakeholders interviewed during the site visit endorsed this view.

It is also confirmed that local stakeholders were invited by the project proponent to comment on the proposed project activity prior to the submission of the PD for validation.

4 VALIDATION CONCLUSION

M/s. NSL Wind Power Company (Satara) Pvt. Ltd has contracted the LGAI Technological Center, S.A. (also referred to as Applus+ LGAI) to validate the project: "Satara Wind Power Project in Maharashtra, India." with regard to VCS Version 3 requirements and the information provided by the project proponent related to the project design, operation, monitoring and reporting.

Applus+ LGAI has reviewed the project description documents and subsequently carried out site visit interviews to confirm the fulfilment of stated criteria.

The purpose of this project activity is to generate electricity using renewable sources (wind) and export it to Maharashtra State Electricity and Distribution Company limited (MSEDCL) which is connected NEWNE grid, thereby displacing the grid generated electricity.

A risk-based approach has been followed to perform this validation. In the course of the validation 05 Corrective Action Requests (CARs) were raised and successfully closed.

The project activity has applied the baseline and monitoring methodology, ACM0002: Grid-connected electricity generation from renewable sources, Version 16.0, which is an approved methodology under the CDM programme and is acceptable under VCS Version 3. The baseline has been determined in accordance with the stated approved baseline methodology.

As summary the validation team able to conclude that:

- The project is in line with all relevant host country criteria (India) and all relevant VCS version 3 program guidelines requirements.
- The project additionality is sufficiently justified in the VCS PD.

- The monitoring plan is transparent and adequate and in line with applied baseline and monitoring methodology of ACM0002, version 16.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 513,350 tCO₂e/year is most likely to be achieved within the 10 years (fixed) crediting period.
- The conclusions of this report show, that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation as outlined under VCS version 3.

No limitations or doubts were identified related to the validation.

Signed on behalf of the Verification Body by Authorized Signatory

LGAI Technological Center, S.A. (Applus)

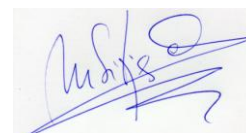
Date: 10/02/2016

Signature:



Date: 11/02/2016

Signature:



Team Leader

Name: Vivek Kumar Ahirwar

Technical Reviewer

Name: Miquel Sitjes Cabanas

APPENDIX 1: Document Reference

Ref. No	Document
1	VCS PD, version 03, dated 08/02/2016 VCS PD, version 02, dated 15/01/2016 VCS PD, version 01, dated 28/12/2015
2	Emission Reductions Calculation Spreadsheet
3	Investment Analysis Spreadsheets
3.1	Common Practice Analysis sheet
4	Approved consolidated methodology ACM0002, Version 16.0
5	Tool to calculate the emission factor for an electricity system, version 5.0(EB 87,annex 09)
6	VCS pipeline http://www.vcsprojectdatabase.org/#/pipeline_details/PL1519
7	Commissioning Certificates for all the WTGs involved in the project activity
8	Power purchase agreement signed by PP with state electricity authority
9	Local stakeholder documents – Minutes of meeting, attendance sheet, invitation letters,newspaper announcement
10	Third party PLF assessment report
11	Clean Development Mechanism Validation and Verification Standard Version 9.0
12	Tool for the demonstration and assessment of additionality – Version 7.0.0, EB 70, Annex 8
13	Guidelines for Common Practice Analysis, version 3.1 (EB 84 Annex 7)
14	Proposal submitted by the ReGen Power Tech Pvt Limited to PP
15	Copy of Board resolution ,dated 11/10/2013
16	Purchase Order raised by PP to WTGs supplier
17	No Objection Certificates for installation of WTGs from Grampanchayat
18	No Objection Certificates for installation of WTGs from MEDA(Maharashtra Energy Development Authority)
19	CO ₂ baseline database published (in December 2014) by Central Electricity Authority, Govt. Of India, version 10 available at http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm
20	MERC tariff order dated 22/03/2013
21	Loan Sanction Documents for the project activity
22	Income Tax Act 1961 (Source: Appendix IA of Income Tax Rules) http://taxguru.in/income-tax/rates-of-depreciation-as-per-income-tax-act-for-a-y-2010-11.html
23	Companies Act 1956 (Schedule XIV) www.fastfacts.co.in/resources/DepCoAct.rtf and Electricity (Supply) Act, 1948 http://www.icaai.org/resource_file/11398p012-14.pdf
24	Income tax rate and Minimum Alternate Tax (MAT) rate http://www.incometaxindiapr.gov.in/incometaxindiapr/contents/taxrates/COMPANIES_2013_14.htm
25	Reserve Bank of India's Survey of Professional Forecasters: Results of 22 nd Round (Q1:2012-13) dated 28/01/2013 http://www.rbi.org.in/scripts/PublicationsView.aspx?id=14917 , (Table A.7)
26	Directory on Indian Wind Power 2013 Volume I
27	i. SCHEDULE (Page no 10) of the notification S.O. 1533 (E) dated 14/09/2006 published by the Ministry of Environment and Forests (MoEF), Government of India ii. Schedule of the notification S.O. 3067 dated 01/12/2009 published by the Ministry of Environment and Forests (MoEF), Government of India http://www.moef.nic.in/legis/env_clr.htm
28	Detailed procedure on REC mechanism dated 01/06/2010 by Central Electricity Regulatory Commission (http://www.nerlrc.org/Docs/Order_for_Detailed_Procedure_01-06-2010.pdf)

	REC registry(https://www.recregistryindia.nic.in/index.php/general/publics/accredited_regens)
29	Guidelines on the Assessment of Investment Analysis, Version 05, EB 62, Annex 05
30	VCS Version 3.5; Program Guidelines; VCSA Rules; and VCS Guidance Document issued on 08/10/2013
31	Declaration issued by the PP
32	Guidelines for scheme on generation based incentives (GBI) for Grid interactive wind power projects https://workspace.imperial.ac.uk/rajivgandhicentre/public/WPP.pdf
33	Electricity Act 2003 http://www.cercind.gov.in/08022007/Act-with-amendment.pdf dated 26/05/2003
34	No Objection Certificates for installation of WTGs from Mining & Geology Permission Department of India
35	GBI registration certificate for project activity

APPENDIX 2: Resolution of Findings

Findings Overview Summary

Type	CAR	CL	FAR
Total Number raised	05	00	00

Type:	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/> FAR		Number:	#1
Raised by:	Vivek Kumar Ahirwar	Guidance Reference :	VCS Version 03	
Description of the audit finding			Date:	29/01/2016
<p>The PP requested to clarify , how the following specific requirement of VCS PD is appropriately mentioned:</p> <ol style="list-style-type: none"> 1. Please clarify how the scale of project considered is in line with the criteria mentioned section 3.9.1 of VCS standard 3.5. 2. Please provide description of technology used in section 1.8 of the VCS PD. 3. Please provide geo-coordinates of the project location in section 1.9 of the VCS PD. 4. Please mention the relevant NoC /Approval taken for project in section 1.11 of the VCS PD. 				
Project Proponent's response			Date:	08/02/2016
<ol style="list-style-type: none"> 1. The scale of the project is corrected as "Project" as the total annual emission reduction is less than 300,000 tCO₂e. The information is now consistent with the criteria mentioned under the section 3.9.1 of the VCS standard 3.5 2. The technical specification of the project WTGs are included in the VCS PD. 3. The geo-coordinates of the Project WTGs are included in the section 1.9 of the PD 4. The relevant NOCs and Approvals are listed in the section 1.11 of the VCS PD. Please refer to version 3 of the VCS PD. 				
Documentation provided as evidence by Project Participant				
<ol style="list-style-type: none"> 1. VCS PD, version 03, dated 08/02/2016 2. Copies of NOCs and Approvals. 				
Auditor's assessment comment			Date:	10/02/2016

The PP has submitted the revised PD and the assessment team has review the following responses provided by the PP:

1. The PP is corrected the criteria in revised PD as the scale of the project is corrected as "Project" as the total annual emission reduction is less than 300,000 tCO₂e. The information provided by the PP is found to be consistent with the criteria mentioned under the section 3.9.1 of the VCS standard 3.5; hence issue is closed.
2. The PP has provided the technical specification of the project WTGs in the VCS PD. Same was verified by assessment team and found to be correct, hence accepted.
3. The PP has provided the geo-coordinates of the Project WTGs in the section 1.9 of the PD. Same was verified by assessment team and found to be correct, hence accepted.
4. The PP has listed the relevant NOCs and Approvals in the section 1.11 of the VCS PD. Same was verified by assessment team and found to be correct, hence accepted.

Conclusion by Lead Auditor

Date:

10/02/2016

Based on above discussion and review of the response, revised PD; assessment team confirms that the revised PD is appropriately provide all requested information in relevant section; same has been found to be correct and accepted. Therefore, CAR#1 is satisfactorily closed.

Type:	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/>	Number:	#2
	FAR		
Raised by:	Vivek Kumar Ahirwar	Guidance Reference :	VCS Version 03
Description of the audit finding		Date:	29/01/2016
<p>The PP requested to clarify, how the guidance provided in the "tool to calculate EF "is followed for calculation of the emission factor in section 2.4 of the VCS PD. Also requested to clarify that how the each step of the tool is applied and clearly document the outcome of each step.</p>			
Project Proponent's response		Date:	08/02/2016
<p>PP would like to refer that the calculation of EF has been already demonstrated under the section 3.1 of the PD. Hence same has not been repeated in the initial section 2.4 of the VCS PD. The section 3.1 consists of information on how each step of the tool was applied and also the outcomes are reported.</p>			

Documentation provided as evidence by Project Participant		
VCS PD, version 3, dated 08/02/2016		
Auditor's assessment comment	Date:	10/02/2016
The PP has provided the revised PD and same was verified by the assessment team and found the calculation of EF has been demonstrated under the section 3.1 of the PD and each step of the tool is applied correctly; hence accepted.		
Conclusion by Lead Auditor	Date:	10/02/2016
Based on above discussion and review of the response, revised PD; assessment team confirms that the revised PD is appropriately applied "tool to calculate EF" in revised PD; same has been found to be correct and accepted. Therefore, CAR#2 is satisfactorily closed.		

Type:	<input checked="" type="checkbox"/> CAR FAR	<input type="checkbox"/> CL	<input type="checkbox"/>	Number:	#3
Raised by:	Vivek Kumar Ahirwar	Guidance Reference :			VCS Version 03
Description of the audit finding				Date:	29/01/2016
The PP is requested further clarify followings regards to discussion of "Demonstration and assessment of additionality" Version 07.0.0. as discussed under section 2.5 of VCS PD:					
<div>1. Please report the outcome of sub step 1(a) and sub-step 1(b).</div> <div>2. Please mention why option 1 and 2 is not applicable for step 1.</div> <div>3. Please justify the suitability of financial indicator (Equity IRR) selected under Sub-step 2b</div> <div>4. Please mention specific para number of guidelines refereed for all paragraphs mentioned under section 2.5 of the VCS PD.</div> <div>5. Please provide the sufficient information for input values (including all relevant data and parameters, with sources) as per PD completion guidance.</div> <div>6. The IRR value mentioned in VCS PD is not consistent with IRR calculation sheet.</div> <div>7. Please provide the sensitivity analysis results here and also the threshold limit of variation in the parameters will result in the project activity passing the benchmark.</div> <div>8. Please submit the common practice analysis sheet.</div> <div>9. Please clarify why the latest version of the tool is not referred for common practice analysis.</div> <div>10. Please clarify which version of Wind power directory is used for common practice analysis.</div> <div>11. Please clarify how the value of F is appropriately calculated.</div>					
Project Proponent's response				Date:	08/02/2016

<ol style="list-style-type: none"> 1. The sub step 1(a) and 1(b) are now included in the description. 2. The justification on applicability of option under step 1, have been included. 3. The justification of choice of Equity IRR as financial indicator has been reported under Sub-step 2(a). 4. The specific para nos. of the applied guideline has been referred in the section 2.5. 5. The input values of the IRR analysis have been tabulated under the Appendix 2. 6. The value reported for IRR in the VCS PD is now made consistent with the IRR sheet. 7. The details of sensitivity analysis have been included, also the break even points of respective parameter (i.e. % variation in sensitivity) at which the IRR meets the benchmark have been reported in the section. 8. The common practice analysis sheet is now submitted to DOE. 9. The common practice analysis has been made using the latest version of the tool, i.e. 3.1 (Annex 07, EB 84) 10. Indian Wind Energy Directory (2013) has been referred during the common practice analysis. The same is now reported in the PD. 11. The value of F has been calculated using the appropriate formula prescribed. However, as the factors N_{all} & N_{diff} both are zero, hence the component "N_{diff}/N_{all}" is considered as zero. 		
Documentation provided as evidence by Project Participant		
VCS PD, version 03, dated 08/02/2016		
Common Practice analysis sheet, version 01, 14/01/2016		
Auditor's assessment comment	Date:	

The PP has submitted the revised PD and Common Practice Analysis sheet; the assessment team has review the following responses provided by the PP:

1. The PP has included the sub step 1(a) and 1(b) in the description in PD. Same was found to be correct, hence accepted.
2. The PP has provided the justification on applicability of option under step 1, Same was found to be correct; hence accepted.
3. The PP has provided the justification of choice of Equity IRR as financial indicator has been reported under Sub-step 2(a). This found to be correct, hence accepted.
4. The PP has mentioned the specific para nos. of the applied guideline in the section 2.5. This is found to be correct; hence accepted.
5. The PP has provided the input values of the IRR analysis in the Appendix 2 of the PD. These all verified by assessment team, found to be correct, hence accepted.
6. The PP has made consistency in reporting of value for IRR in the VCS PD and IRR sheet. Hence, accepted.
7. The PP has included the details of sensitivity analysis and the break even points of respective parameter (i.e. % variation in sensitivity) at which the IRR meets the benchmark in the PD and IRR sheet. Same was found to be correct, hence accepted.
8. The PP has submitted the common practice analysis sheet, same was verified and found to be correct and accepted.
9. The PP has applied latest version of the tool, i.e. 3.1 (Annex 07, EB 84) for analysis of common practice; this is found to be correct, hence accepted.
10. The PP has provided the reference of Indian Wind Energy Directory (2013) in common practice analysis sheet and same is also mentioned in the PD. This is found to be correct, hence accepted.
11. The PP has clarified that the value of F has been calculated using the appropriate formula prescribed. However, as the factors N_{all} & N_{diff} both are zero, hence the component " N_{diff}/N_{all} " is considered as zero. This is found to be correct, hence accepted.

Conclusion by Lead Auditor

Date:

10/02/2016

Based on above discussion and review of the response, revised PD, IRR sheet and common practice analysis sheet; assessment team confirms that all documents are appropriately revised as per additionality tool and common practices analysis tool; same has been found to be correct and accepted. Therefore, CAR#3 is satisfactorily closed.

Type:	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/>	Number:	#4
	FAR		
Raised by:	Vivek Kumar Ahirwar	Guidance Reference :	VCS Version 03
Description of the audit finding		Date:	29/01/2016

<p>The PP is requested to clarify following information mentioned in monitoring plan of the project activity in section 4.2 of the VCS PD:</p> <ol style="list-style-type: none"> 1. Please clarify how the parameter "$EG_{PJ,y} = EG_{facility,y}$" can be continuously monitored. 2. Please clarify how the apportioning procedure applied for calculation of both Export and Import parameters. 3. Please confirm if the parameter $EG_{All_controller,i,y}$ is available to PP at the time of verification 4. Please provide the calculation for $EG_{export,i,y}$ and $EG_{import,i,y}$ separately and subsequently for $EG_{facility,i}$. 		
Project Proponent's response	Date:	08/02/2016
<p>PP would like to clarify that the Monitoring plan prescribed under the section 4.2 of the VCS PD is now revised suitably. Therefore, the parameters reported and descriptions provided in the monitoring section are now revised and appropriate. Please refer to the revised VCS PD, version 03, dated 08/02/2016.</p>		
Documentation provided as evidence by Project Participant		
VCS PD, version 03, dated 08/02/2016		
Auditor's assessment comment	Date:	10/02/2016
<p>The PP has submitted the revised VCS PD and same has been verified by assessment team as the PP has modified the Monitoring plan in the section 4.2 of the VCS PD as per actual scenario observed during project site visit by assessment team. Also, the parameters reported and descriptions provided in the monitoring section are revised appropriately and hence accepted.</p>		
Conclusion by Lead Auditor	Date:	10/02/2016
<p>Based on above discussion and review of the response, revised PD; assessment team confirms that VCS PD are appropriately revised as per actual monitoring practices followed by the PP at project site; same has been found to be correct and accepted. Therefore, CAR#4 is satisfactorily closed.</p>		

Type:	<input checked="" type="checkbox"/> CAR <input type="checkbox"/> CL <input type="checkbox"/>	Number:	#5
	FAR		
Raised by:	Vivek Kumar Ahirwar	Guidance Reference :	VCS Version 03
Description of the audit finding		Date:	29/01/2016

The PP is not provided the ER calculation sheet for estimation of emission reduction calculation.		
Project Proponent's response	Date:	08/02/2016
ER calculation sheet has been prepared separately for estimation of emission reduction calculations. The same has been now submitted to DOE.		
Documentation provided as evidence by Project Participant		
ER sheet, version o1, dated 14/01/2016		
Auditor's assessment comment	Date:	10/02/2016
The PP has submitted the ER calculation sheet, same was checked and found to be correct, hence accepted.		
Conclusion by Lead Auditor	Date:	10/02/2016
Based on above discussion and review of the response, ER calculation sheet; assessment team confirms that ER calculation in ER sheet are appropriate and correct, hence, CAR#5 is satisfactorily closed.		

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