Wind Power Project in Tamil Nadu by Green Infra Renewable Energy Limited

Document Prepared By **LGAI Technological Center S.A.** (Applus+ Certification)

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Summary:

Validation purpose: The main purpose of this project activity is to generate clean form of electricity through renewable wind energy source. The project involves installation of 249.9 MW wind power project in Tamil Nadu state of India. The project aims at providing electricity to the state grid by effective utilization of renewable resources. The electricity generated from the project activity would be supplied to the national grid of India.

During the 10 years of first crediting period i.e. 08/10/2018 to 07/10/2028, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 707,515 tCO_2e per year, thereon displacing 755,247 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel-based power plant.

The objective of this validation activity is to have an independent third party for the assessment of the project design, estimated ER sheet and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002- Version 19.0"
- the project's monitoring plan is assessed against "ACM0002- Version 19.0"
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM Validation and Verification Standard for project activities version 02
- CDM Project Standard for project activities version 02
- CDM project cycle procedure for project activities version 02
- VCS standard v3.7[1]
- VCS guideline v3.7

Validation is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of estimated verified emission reductions (VERs).

A risk-based approach has been followed to perform this validation and verification activity. In the course of Validation, 07 Corrective Action requests (CARs) and 00 Clarification Requests (CLs),0 Forward action request (FARs) were raised and successfully closed (for validation). The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and project owners have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

[1] http://www.v-c-s.org/project/vcs-program/rules-and-requirements/

Verification purpose:

The proposed project activity will assist development of renewable energy generation plants based on Wind energy technology in India and delivering electricity to the grid.

The proposed project is a voluntary action being undertaken by the project owner of the project activity. EKI Energy Services Limited (hereafter referred as "EKIESL") is acting as the other party for this project activity.

The main purpose of this project activity is to generate clean form of electricity through renewable energy sources. The project activity involves installation of 249.9 MW wind power projects in the state of Tamil Nadu, India. The project aims at providing electricity to the state grid by effective utilization of renewable resources. The electricity generated from the project activity would be supplied to the national grid of India. The Project activity is a new facility (Greenfield) and the electricity generated by the project will be exported to the Indian electricity grid.

During the Current Monitoring Period from 08/10/2018 to 30/11/2019 (including first and last dates) the project activity contributed to the GHG reductions 706,167 tCO_2e.

The Project activity is a new facility (Greenfield) and the electricity generated by the project will be exported to the Indian electricity grid. The project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The Project Proponent plans to avail the VCS benefits for the project.

During the current monitoring period, project activity undergoes continued operation since their commissioning and no major breakdown had taken place

The objective of this verification activity is to have an independent third party for the assessment of the project design, Actual ER sheet and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002- Version 19.0"
- the project's monitoring plan is assessed against "ACM0002- Version 19.0"
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM Validation and Verification Standard for project activities version 02
- CDM Project Standard for project activities version 02
- CDM project cycle procedure for project activities version 02
- VCS standard v3.7[2]

[2] http://www.v-c-s.org/project/vcs-program/rules-and-requirements/

- VCS guideline v3.7

A risk-based approach has been followed to perform this verification activity. In the course of verification, 02 Corrective Action requests (CARs) and 00 Clarification Requests (CLs), 00 Forward action request (FARs) were raised and successfully closed (for verification). The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and project owners have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfillment of the stated criteria of VCS.

Table of Contents

CONTENTS

1 INTRODUCTION 6
1.1 Objective 6
1.2 Scope and Criteria 6
1.3 Level of Assurance 7
1.4 Summary Description of the Project 7
2 VALIDATION AND VERIFICATION PROCESS 7
2.1 Method and Criteria 9
2.2 Document Review 11
2.3 Interviews 11
2.4 Site Inspections 11
2.5 Resolution of Findings 11
2.5.1 Forward Action Requests 12
3 VALIDATION FINDINGS 13
3.1 Project Details 13
3.2 Participation under Other GHG Programs 20
3.3 Application of Methodology 21
3.3.1 Title and Reference 21
3.3.2 Applicability 21
3.3.3 Project Boundary 25
3.3.4 Baseline Scenario 26
3.3.5 Additionality 27
3.3.6 Quantification of GHG Emission Reductions and Removals 36
3.3.7 Methodology Deviations 38
3.3.8 Monitoring Plan 38
3.4 Non-Permanence Risk Analysis 39
4 SAFEGUARDS 39
4.1 No Net Harm 39
4.2 Environmental Impact 40
4.3 Local Stakeholder Consultation 41
4.4 Public Comments 42
5 VERIFICATION FINDINGS 42
5.1 Accuracy of GHG Emission Reduction and Removal Calculations 42
5.2 Quality of Evidence to Determine GHG Emission Reductions and Removals 43
6 VALIDATION AND VERIFICATION CONCLUSION 45
Appendix 1: Documents reviewed during validation and verification 47
Appendix 2: Clarification requests, corrective action requests (CAR/CL/FAR) 49
Appendix 3: Competence of team members and technical reviewers 52
Appendix 4: Abbreviations 53
Appendix 5: calibration details 54

1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Hereinafter referred as Applus+ Certification) has been appointed by "**Green Infra Renewable Energy Limited**" to perform the validation and verification of the project entitled "Wind Power Project in Tamil Nadu by Green Infra Renewable Energy Limited" under VCS standard and guideline version 3.7. The objective of this joint validation& verification activity is to have an independent third party for the assessment of the project design, ER sheet and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "ACM0002- Version 19.0"
- the project's monitoring plan is assessed against "ACM0002- Version 19.0"
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM Validation and Verification Standard for project activities version 02
- CDM Project Standard for project activities version 02
- CDM project cycle procedure for project activities version 02
- VCS standard v3.7[3]
- VCS guideline v3.7

Validation& verification is a requirement for all VCS projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of estimated verified emission reductions (VERs).

1.2 Scope and Criteria

The scope of the Joint validation and verification is the independent and objective review of the Joint Project Description & Monitoring Report. The Joint VCS PD & MR are reviewed against the relevant criteria (see 1.1) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The validation and verification were based on the guidance given in the CDM Project Standard for project activities version 02, CDM Project Cycle Procedure for project activities version 02, VCS guideline and standard version 3.7

The assessment team has employed a risk-based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the Joint VCS PD & MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of

[3] http://www.v-c-s.org/project/vcs-program/rules-and-requirements/

VERs. The validation and verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design and monitoring report combined.

The only purpose of the validation and verification is its usage during the registration /issuance process as part of the VCS project cycle. Therefore, LGAI Technological Center S.A. (Applus+ Certification) can't be held liable by any party for decisions made or not made based on the validation/verification opinion, which will go beyond that purpose.

1.3 Level of Assurance

The verification and validation have been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS.

1.4 Summary Description of the Project

The main purpose of this project activity is to generate clean form of electricity through renewable energy sources. The project activity involves installation of 249.9 MW wind power projects in the state of Tamil Nadu, India. The project aims at providing electricity to the state grid by effective utilization of renewable resources. The electricity generated from the project activity would be supplied to the national grid of India. Thus, energy supplied to the Indian grid is sold to the respective state utility.

During the 10 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 707,515 tCO_2e per year, thereon displacing 755,247 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

The details of the projects and their location of installation are mentioned in the table below:

Name of Investor	Capacity	Commissioning Date	State	Usage
Green Infra Renewable Energy Limited	249.9 MW	08/10/2018	Tamil Nadu	Sale to State DISCOMs

During the Current Monitoring Period from 08/10/2018 to 30/11/2019 (First and last date included) the project activity contributed to the GHG reductions 706,167 tCO_2e.

Project Technology Details –

The project activity involves installation of 249.9 MW wind power projects in the states of Tamil Nadu, India. The technical specifications of the plants are described below:

The technical specification for 2.1 MW Suzlon[4] make 119 WTG at project site Tamil Nadu is being provided:

WTG Make and Model No.	Suzlon S111-120 – 2.1 MW

[4] https://www.suzlon.com/pdf/media_kit/Product_bochure_July_2017.pdf

Generator Type & Rating	Doubly-Fed Induction generator, 2000 kW
Rotor Diameter	111.8 m
Hub Height	90m
Tower Type & Shape	Steel Tubular
Cut-in-wind speed	3.0 m/s
Rated wind speed	12.5 m/s
Cut-out wind speed	30.0 m/s (3-second average) 21.0 m/s (10-minute average)

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

Validation and Verification Scope: The scope is defined as an independent and objective review of the Joint project design document and Monitoring report. The Joint VCS PD and MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard and guideline version 3.7, including the approved baseline and monitoring methodology ACM0002- Version 19.0 (for the present scenario in the project). The validation and verification were based on the requirements in the Validation and Verification Standardfor project activities version 02, project standard for project activities version 02, project cycle procedure for project activities version 02 and VCS guideline and standard version 3.7.

The validation and verification are not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the combined project document and the Monitoring report.

Validation and Verification Process: The project assessment is based on the Clean Development Mechanism Validation and Verification Standard for project activitiesversion 02 and VCS standard and guideline version 3.7 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

Once the project is received by the assessment team, the members of the assessment team carried out:

I A desk review of the Joint project design documentation and monitoring report;

II Follow-up interviews with project stakeholders;

III The resolution of outstanding issues and the issuance of the final Joint –VAL & VER report and opinion.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. LGAI TECHNOLOGICAL CENTER S.A. (APPLUS+ CERTIFICATION) has developed a specific checklist customized for the project. The checklist demonstrates, in a transparent manner, the project criteria (requirements), discussion on each criterion by the assessment team, and the results from validating/verifying the identified criteria.

Appointment of the assessment team

According to the sectoral scope / technical area and experience in the sectoral or national business environment, LGAI Technological Center S.A. (Applus+ Certification) has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of LGAI Technological Center S.A. (Applus+ Certification).

The composition of audit team shall be approved by the LGAI Technological Center S.A. (Applus+ Certification) ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as pres ented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by t he assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Dr. Atul Takarkhede	LA/TE	YES	YES	YES	YES
Simon Shen	TR	YES	YES	YES	NA

The complete list of CVs is included as Appendix 3 of this report.

Document review

The Joint VCS PD & MR submitted by the Client was reviewed against the approved methodology and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in appendix 1.

Follow-up interviews

A site visit is conducted by LGAI Technological Center S.A. (Applus+ Certification) who performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report in the below sections.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the joint validation and verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification) positive conclusion on the project design and Monitoring report. The Corrective Action Requests and Clarification Requests raised by LGAI Technological Center S.A. (Applus+ Certification) were resolved during communications between the Client and Applus+ Certifications to guarantee the transparency of the validation process, the concerns raised and responses given are summarized below in the appendix 2.

The Joint VCS PD & MR Version 02 submitted by project owners on 23/12/2019 serves as the basis for the final assessment presented. Additional changes to the project during the joint validation and verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a joint validation and verification of the final documentation including the final Joint validation and verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the project owners the positive validation/verification opinion and relevant documents are submitted to the VCS secretariat through the VCS web-platform.

2.2 Document Review

The details of the document observed during the joint validation and verification process are listed below in appendix 1 of this report.

2.3 Interviews

The site visit for the project activity was carried out from 16/11/2019 to 17/11/2019. No sampling procedures were adopted either in document verification and all the document were cross checked to ensure conservative estimation of emission reduction. Kindly find below names of the persons interviewed (during onsite and telephonic interview later) for the site.

Sr. No.	Name of Persons	Role/Designation
1)	Mr. Mayank Tyagi	PP Representative
2)	Mr. A Chndra Prabha	Assistant Manager, Suzlon
3)	Shri. K. Senthodoprandi	Agriculture
4)	Shri. V. Pooludaiyar	Agriculture
5)	Mr. Prakash Kumar	Consultants
6)	Mr. Kingshuk Das	Consultants

2.4 Site Inspections

Duration of on-site inspection: 16/11/2019 to 17/11/2019				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring.	Mela Thattaparai, Tuticorin, Tamil Nadu, India	16/11/2019 to 17/11/2019	Dr. Atul Takarkhede

2.5 Resolution of Findings

The objective of this phase of the joint validation and verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification)'s positive conclusion on the project design and Monitoring report. The Corrective Action Requests and Clarification Requests raised by LGAI Technological Center S.A. (Applus+ Certification) were resolved during communications between the

Client and LGAI Technological Center S.A. (Applus+ Certification) to guarantee the transparency of the validation process, the concerns raised and responses given are summarized below in the appendix 2.

The final Joint VCS PD & MR Version 02 submitted by project owners on 23/12/2019 serves as the basis for the final assessment presented. Additional changes to the project during the validation and verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	01	00
Description of project activity	00	02	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
- Demonstration of additionality	00	01	00
- Emission reductions	00	01	00
- Monitoring plan	00	01	00
-Stakeholders consultation process	00	01	00
- Public comments	00	00	00
Others (please specify)-Matter related to double counting- **for validation**	00	00	00
Others (please specify)-Matter related to Emission reduction calculation- **for verification** ER achieved – Actual ER achieved calculations & Calibration	00	02	00
Total (Validation + Verification)	**00**	**09**	**00**

The list of findings and their resolution is presented in appendix 2 of this report.

2.5.1 Forward Action Requests

No FAR was raised during this joint validation and verification process. Please refer Appendix 2 for details.

3 VALIDATION FINDINGS

3.1 Project Details

The main purpose of this project activity is to generate clean form of electricity through renewable energy sources. The project activity involves installation of 249.9 MW wind power projects in the Tamil Nadu, State of India. The project aims at providing electricity to the state grid by effective utilization of renewable resources. The electricity generated from the project activity would be supplied to the national grid of India.

The Project activity is a new facility (Greenfield) and the electricity generated by the project will be exported to the Indian electricity grid. The project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The Project Proponent plans to avail the VCS benefits for the project.

During the 10 years of first crediting period, the project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 707,515 tCO_2e per year, thereon displacing 755,247 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian grid, which is mainly dominated by thermal/fossil fuel based power plant.

Details of the capacity & installation dates are mentioned in Section 1.4 above.

Project location

Assessment team during the validation site visit confirms via google map that the Wind power plant is located in Mela Thattaparai, village, Tuticorin, Tamil Nadu, India and the details are as follows[5]:

SL. No	Turbine ID	Latitude N	Longitude E
1.	KME011	8° 58' 15.31"	77° 59' 24.10"
2.	KME029	8° 59' 03.20"	77° 59' 46.18"
3.	KUM102	8° 58' 03.63"	77° 58' 47.67"
4.	KIIM104	8° 58' 43.08"	77° 59' 47.98"
5.	KUM267	8° 58' 28.14"	77° 59' 01.82"
6.	MAN106	8° 50' 11.63"	77° 59' 17.99"
7.	MANI08	8° 50' 38.04"	77° 59' 05.65"
8.	MMS076	8° 51' 00.39"	77° 59' 53.46"
9.	MNS086	8° 49' 18.40"	77° 59' 42.85"
10.	MNS090	8° 51' 36.58"	77° 59' 42.80"
11.	MMS095	8° 51' 25.17"	77° 59' 11.02"
12.	MMS097	8° 50' 12.85"	77° 58' 43.42"
13.	MNS099	8° 49' 32.77"	77° 59' 01.99"
14.	MMS100	8° 49' 03.33"	77° 59' 07.86"
15.	MMS103	8° 47' 43.39"	77° 59' 52.87"

[5]Sourced from Detail Project Report of the project activity. The same is checked during the validation site visit via GPS meters.

SL. No	Turbine ID	Latitude N	Longitude E
16.	MMS105	8° 47’ 38.79”	77° 59’ 01.64”
17.	MMS120	8° 47’ 15.50”	77° 59’ 57.60”
18.	OTA031	8° 53’ 03.28”	77° 58’ 43.08”
19.	OTA038	8° 53’ 50.31”	77° 58’ 08.26”
20.	GTA067	8° 55’ 51.51”	77° 58’ 32.50”
21.	OTA112	8° 57’ 06.12”	77° 59’ 00.90”
22.	OTA114	8° 57’ 42.21”	77° 58’ 57.10”
23.	OTA120	8° 54’ 11.14”	77° 58’ 58.19”
24.	OTA121	8° 54’ 12.12”	77° 59’ 47.16”
25.	OTA132	8° 56’ 23.64”	77° 58’ 28.22”
26.	KME044	8° 56’ 55.44”	78° 02’ 08.45”
27.	KUM128	8° 57’ 05.92”	78° 01’ 00.63”
28.	KUM159	8° 57’ 17.60”	78° 02’ 06.15”
29.	KUM162	8° 55’ 56.68”	78° 03’ 23.14”
30.	KUM164	8° 56’ 47.66”	78° 02’ 52.31”
31.	KUM165	8° 57’ 12.98”	78° 02’ 55.51”
32.	KUM166	8° 57’ 29.15”	78° 02’ 47.79”
33.	KUM211	8° 57’ 42.11”	78° 03’ 30.17”
34.	KUM212	8° 56’ 36.86”	78° 04’ 43.40”
35.	KUM214	8° 56’ 51.57”	78° 03’ 38.33”
36.	KUM215	8° 56’ 21.71”	78° 04’ 02.61”
37.	KUM216	8° 56’ 46.77”	78° 04’ 12.51”
38.	KUM21S	8° 57’ 38.28”	78° 04’ 45.04”
39.	KUM249	8° 58’ 09.48”	78° 05’ 48.41”
40.	KUM250	8° 57’ 31.54”	78° 05’ 22.18”
41.	MAN113	8° 48’ 24.99”	78° 00’ 17.31”
42.	MNS041	8° 48’ 24.29”	78° 02’ 30.48”
43.	MNS042	8° 48’ 41.57”	78° 02’ 03.46”
44.	MNS052	8° 51’ 42.92”	78° 01’ 00.38”
45.	MMS054	8° 50’ 12.27”	78° 01’ 18.11”
46.	MMS056	8° 50’ 38.03”	78° 01’ 18.98”
47.	MMS060	8° 48’ 52.30”	78° 01’ 34.80”
48.	MMS061	8° 48’ 05.85”	78° 03’ 00.34”
49.	MMS062	8° 48’ 19.66”	78° 01’ 57.07”
50.	MMS065	8° 48’ 30.51”	78° 00’ 49.27”
51.	MMS067	8° 49’ 12.16”	78° 00’ 44.20”
52.	MMS070	8° 50’ 16.07”	78° 00’ 41.36”
53.	MMS071	8° 50’ 50.66”	78° 00’ 40.00”
54.	MMS073	8° 47’ 49.58”	78° 03’ 10.64”
55.	MMS075	8° 51’ 18.96”	78° 00’ 08.16”
56.	MMS082	8° 47’ 30.43”	78° 00’ 22.46”
57.	MMS085	8° 47’ 34.29”	78° 01’ 11.01”

SL. No	Turbine ID	Latitude N	Longitude E
58.	MMS106	8° 49’ 42.79”	78° 00’ 19.20”
59.	MMS111	8° 47’ 17.83”	78° 01’ 01.72”
60.	OTA020	8° 56’ 29.86”	78° 02’ 51.90”
61.	OTA026	8° 55’ 01.46”	78° 02’ 22.36”
62.	OTA027	8° 54’ 58.93”	78° 03’ 27.53”
63.	OTA046	8° 54’ 14.91”	78° 02’ 32.54”
64.	OTA050	8° 54’ 32.46”	78° 02’ 14.19”
65.	OTA052	8° 55’ 14.21”	78° 01’ 57.60”
66.	OTA053	8° 55’ 47.24”	78° 02’ 33.20”
67.	OTA055	8° 56’ 34.17”	78° 02’ 17.36”
68.	OTA064	8° 55’ 09.64”	78° 02’ 52.09”
69.	OTA069	8° 53’ 51.50”	78° 02’ 00.65”
70.	OTA075	8° 54’ 55.49”	78° 00’ 45.44”
71.	OTA092	8° 54’ 02.36”	78° 00’ 23.15”
72.	OTA093	8° 53’ 36.66”	78° 00’ 37.42”
73.	OTA095	8° 51’ 49.15”	78° 00’ 13.41”
74.	OTA099	8° 52’ 20.10”	78° 00’ 08.64”
75.	OTA100	8° 53’ 03.66”	78° 00’ 10.09”
76.	OTA106	8° 54’ 52.06”	78° 00’ 08.03”
77.	OTE011	8° 50’ 48.54”	78° 03’ 02.78”
78.	OTE019	8° 52’ 06.30”	78° 02’ 46.39”
79.	OTE021	8° 51’ 38.16”	78° 03’ 09.61”
80.	OTE037	8° 52’ 49.71”	78° 03’ 30.01”
81.	OTE041	8° 53’ 08.90”	78° 03’ 34.65”
82.	OTE047	8° 51’ 16.05”	78° 04’ 41.90”
83.	OTE059	8° 51’ 36.88”	78° 04’ 47.09”
84.	OTE061	8° 52’ 37.51”	78° 04’ 43.93”
85.	OTE064	8° 53’ 20.02”	78° 04’ 16.09”
86.	OTE075	8° 53’ 58.22”	78° 04’ 39.40”
87.	OTE076	8° 53’ 42.89”	78° 04’ 57.93”
88.	OTE077	8° 53’ 02.86”	78° 05’ 15.45”
89.	OTE081	8° 52’ 36.62”	78° 05’ 41.10”
90.	OTE082	8° 52’ 04.65”	78° 05’ 50.25”
91.	OTE099	8° 55’ 20.34”	78° 04’ 52.06”
92.	OTE101	8° 55’ 58.58”	78° 06’ 55.86”
93.	OTE102	8° 53’ 51.10”	78° 06’ 31.79”
94.	OTE103	8° 53’ 25.35”	78° 06’ 53.58”
95.	OTE112	8° 53’ 07.12”	78° 07’ 33.62”
96.	OTE113	8° 53’ 25.30”	78° 07’ 42.18”
97.	OTE115	8° 54’ 25.20”	78° 06’ 55.30”
98.	OTE118	8° 54’ 49.74”	78° 06’ 15.24”
99.	OTE120	8° 55’ 33.93”	78° 06’ 22.32”

SL. No	Turbine ID	Latitude N	Longitude E
100.	OTE121	8° 55’ 52.05”	78° 06’ 19.17”
101.	OTE135	8° 57’ 25.98”	78° 06’ 40.50”
102.	QTE136	8° 57’ 11.87”	78° 06’ 53.50”
103.	OTE137	8° 56’ 49.55”	78° 06’ 52.20”
104.	OTE138	8° 56’ 01.68”	78° 07’ 18.22”
105.	OTE140	8° 55’ 31.48”	78° 07’ 28.73”
106.	OTE141	8° 55’ 10.22”	78° 07’ 16.50”
107.	OTE142	8° 55’ 05.97”	78° 07’ 56.01”
108.	OTE151	8° 56’ 43.08”	78° 09’ 03.09”
109.	OTE153	8° 55’ 58.45”	78° 08’ 19.87”
110.	OTE155	8° 56’ 37.34”	78° 07’ 24.13”
111.	OTE157	8° 57’ 08.58”	78° 07’ 56.23”
112.	OTE158	8° 57’ 44.31”	78° 07’ 12.67”
113.	OTE163	8° 57’ 15.35”	78° 08’ 29.93”
114.	OTE164	8° 57’ 02.20”	78° 08’ 49.79”
115.	OTE165	8° 56’ 21.97”	78° 08’ 58.28”
116.	OTE166	8° 55’ 28.72”	78° 09’ 30.72”
117.	OTE172	8° 56’ 26.94”	78° 09’ 32.13”
118.	OTE173	8° 56’ 36.76”	78° 08’ 31.97”
119.	OTE174	8° 56’ 42.84”	78° 09’ 47.84”

During the Current Monitoring Period from 08/10/2018 to 30/11/2019 (First and last date included) the project activity contributed to the GHG reductions 706,167 tCO_2e.

Project Technology Details –

The project activity involves the installation of Wind projects. The project activity involves installation of 119 WTGs with total capacity of 249.9 MW in the states of Tamil Nadu, India.

The technical specifications are mentioned in section 1.4 of this report and same was checked during site visit.
Assessment team checked onsite and confirms that the details of the project proponent areas below:

Organization name	**Green Infra Renewable Energy Limited**
Contact person	Mayank Tyagi
Title	Manager, Power Sales
Address	5th floor, Tower C, Building No. 8, DLF Cybercity, Gurgaon – 122002 Haryana, India
Telephone	+91 124 3896972
Email	mayank.tyagi@sembcorp.com

Assessment team checked onsite and confirms that the details of the other entity involved is as below:

Organization name	NA
Role in the project	NA
Contact person	NA
Title	NA
Address	NA
Telephone	NA
Email	NA

Project Start Date

08/10/2018 which is the date of commissioning of the Project. Assessment team checked the commission details from the commissioning certificate provided by the Government agencies.

Project crediting period Date

Assessment team confirms that the crediting period dates for the project is as below:

Crediting Period Start date: 08/10/2018

Crediting Period End date: 07/10/2028

The project activity adopts renewable crediting period of 10 years period which can be renewed for maximum 2 times.

Project Scale and Estimated GHG Emission Reductions or Removals

Assessment team confirms that the project is a Project that involves setting up of 249.9 MW wind Project activity project.

Project Scale	
Project	
Large project	✓

As the estimated annual average GHG emission reductions or removal per year is 707,515 tCO_2e which are higher than 300,000 tonnes of CO_2e per year, thus the project falls in the category of Large Project.

Year	**Estimated GHG emission reductions or removals (tCO_2e)**
Year 1	707,515
Year 2	707,515
Year 3	707,515
Year 4	707,515
Year 5	707,515
Year 6	707,515
Year 7	707,515
Year 8	707,515
Year 9	707,515
Year 10	707,515
Total estimated ERs	7,075,150
Total number of crediting years	10
Average annual ERs	707,515

The above estimated emission reduction is confirmed by assessment team via emission reduction calculation spreadsheet. The calculation is conservative and this acceptable to the assessment team.

Conditions prior to project initiation

Assessment team during the desk review and onsite visit confirms that the project is a wind power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction. The baseline as described in section 3.3.4 of this report will continue to be the baseline in the absence of project activity.

Project compliance with applicable laws, statutes and other regulatory frameworks

Assessment team confirms that the Project has received necessary approvals for development and commissioning for the proposed Wind project from the state Nodal agencies and is in compliance to the local laws and regulations. Assessment team checked the Commissioning certificates, PPA with state board, Installation report for Wind power plant in the name of PP issued by state nodal agency to confirm the project capacity and its relevant statutory requirements as per the host country regulations.

Assessment team noted that the project fulfils the norms put down by Central Pollution Control Board norms. As per Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India), final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (29/02/2016).

Being a renewable power project, it falls under the category of White and thus these projects do not need clearance for Consent to operate and only needs to inform the relative State Pollution Control Board. The same is done for the project and thus it can be confirmed that it follows the local laws of the host country.

The relevant national laws and regulations pertaining to generation of energy in India are:

- Electricity Act 2003
- National Electricity Policy 2005
- Tariff Policy 2006

The Project activity conforms to all the applicable laws and regulations in India:

- Power generation using renewable energy is not a legal requirement or a mandatory option.
- There are state and sectoral policies, framed primarily to encourage Wind power projects. These policies have also been drafted realizing the extent of risks involved in the projects and to attract private investments.
- The Indian Electricity Act, 2003 (May 2007 Amendment) does not influence the choice of fuel used for power generation.
- There is no legal requirement on the choice of a particular technology for power generation.

Thus, assessment team confirms that the project activity follows the National and local law and regulation of the host country.

Project Ownership

Green Infra Renewable Energy Limited is the parent company and also project proponent (PP) of project activity and they have the legal right to control and operate the project activities.

The project ownership has been checked by the Assessment Team and demonstrated through below supporting documents:

1. Commissioning certificates – The letter from respective State Nodal Agency to the PP for commissioning of generation facility indicates that PP have the legal right to control and operate the project activities.

2. Contract with EPC contractor – The purchase order on the name of PP indicates that PP has the legal right to control and operate the project activities.

Assessment team confirms that, the project ownership relies on **Green Infra Renewable Energy Limited** based on the above documentation.

Emissions trading programs and other binding limits

Assessment team confirms that the Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits. Audit team checked the REC Mechanism database of India and found that the project activity is not accredited[6] / registered[7] under REC mechanism. Further, Declaration in effect of the same has been submitted by project proponent to audit team and found to be correct. Thus, it is concluded that the project activity not involved on other Emissions trading programs and other binding limits.

Additional Information Relevant to the Project

Eligibility Criteria for grouped projects

This is not a grouped project activity. Thus, this section is not applicable for this project.

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. The details are presented transparently to the assessment team for analysis which lead to positive conclusion for this validation and verification.

Sustainable Development

Contribution to sustainable development:

[6] https://recregistryindia.nic.in/index.php/publics/accredited_regens
[7] https://recregistryindia.nic.in/index.php/publics/registered_regens

Ministry of Environment and Forests, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. Assessment team found that the project contributes to sustainable development using the following ways.

Social well-being: The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation.

Economic well-being: The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state.

Technological well-being: The successful operation of project activity would lead to promotion of Wind based power generation and would encourage other entrepreneurs to participate in similar projects.

Environmental well-being: Wind being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the Project activity also helps in avoiding significant amount of GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.

Project undergone continuous operation and only scheduled maintenance as per the manufacturer specification is considered. No unforeseen incident observed for the present monitoring period.

3.2 Participation under Other GHG Programs

The project has neither been registered nor seeking registration under any other GHG programs. The project is seeking registration only in VCS program. Audit team checked the REC Mechanism database of India and found that the project activity is not accredited / registered under REC mechanism. Further, declaration for the same is checked and found correct by the assessment team. Also assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

1. https://www.recregistryindia.nic.in/
2. http://cdm.unfccc.int/
3. http://www.goldstandard.org/

Rejection by other GHG programs

The Project is not rejected by other GHG programs. A declaration for the same is checked and found correct by the assessment team. Also assessment team checked the following registries to confirm the same. The details of the registries checked are as follows:

1. https://www.recregistryindia.nic.in/
2. http://cdm.unfccc.int/
3. http://www.goldstandard.org/
4. www.v-c-s.org

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

Renewable energy certificates are available for trading in the host country However, the same is not availed by the project participant. The undertaking regarding the same is submitted by PP which is acceptable to the assessment team and assessment team also checked the REC web site (https://recregistryindia.nic.in/) and found the declaration to be correct.

3.3 Application of Methodology

3.3.1 Title and Reference

Assessment team checked that following methodology and tools are applicable for the project activity. The details are as below:

Title: Grid-connected electricity generation from renewable sources - ACM0002- Version 19.0

Reference: The project activity meets the eligibility criteria of Large scale project as it is more than 15 MW

Methodology : Grid-connected electricity generation from renewable sources

Type I : Energy industries (renewable / non-renewable sources)

Category: Approved Consolidated Methodology

Tools referred with above methodology and applicable for project activity are:

- Tool to calculate the emission factor for an electricity system[8] - Version 07.0 (EB 100, Annex 04)
- Methodological Tool- Tool for the demonstration and assessment of additionality[9] - Version 07.0.0 (EB 70, Annex 08)

3.3.2 Applicability

The applied baseline methodology is justified as it has been demonstrated that the proposed project activity is:

Applicability Criterion	Justification	Assessment
This methodology is applicable to grid-connected renewable power generation project activities that: • install a Greenfield power plant; • involve a capacity addition to (an) existing plant(s); • involve a retrofit of (an) existing operating plants/units; • involve a rehabilitation of (an) existing plant(s)/unit(s) or • involve a replacement of (an) existing plant(s)/unit(s).	The project activity is a Wind Power Project which falls under applicability criteria option 1 (a) i.e., "Install a Greenfield power plant".	The project activity meets the given applicability criterion.

[8] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf
[9] http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf

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;	The project activity is a WInd Power Project	The project activity meets the given applicability criterion.
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;	The proposed project activity does not involve any capacity additions, retrofits or replacements and therefore this condition is not applicable.	Condition not applicable
In case of hydro power plants, one of the following conditions shall apply: • The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or • 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/m^2; or • The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m^2.	The project activity is a Wind Power Project	Condition not applicable
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/m^2, all of the following conditions shall	The project activity is a Wind Power Project	Condition not applicable

apply: • The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m^2; • Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; • Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be; ✓ Lower than or equal to 15 MW; and ✓ Less than 10 per cent of the total installed capacity of integrated hydro power project.		
In the case of integrated hydro power projects, project proponent shall: • Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or • Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.	The project activity is a Wind Power Project	Condition not applicable
Methodology is not applicable to the following • Project activities that involve switching from fossil fuels to renewable energy sources at the site	The proposed project activity is the installation of a new grid connected wind renewable energy power project and does not involve switching from fossil	Condition not applicable

of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; • Biomass fired power plants/units	fuel to renewable energy and hence this criterion is not relevant to the project activity.	
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".	The proposed project activity is a new grid connected wind renewable energy power plant.	Condition not applicable

Applicability 9: Please refer below

Applicability conditions of "Tool to calculate the emission factor for an electricity system"

Applicability Criterion	**Justification**	**Assessment**
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The project is a grid connected Greenfield wind power project and thus the tool is applicable.	The project activity meets the given applicability criterion.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 2: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or	Steps involved in calculation of Emission Factor is included in section **Error! Reference source not found.** of the Joint PD MR as per the requirement of the tool	The project activity meets the given applicability criterion.

Applicability Criterion	Justification	Assessment
the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.		
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	Project is located in non-Annex I country and hence the tool is applicable	The project activity meets the given applicability criterion.
Under this tool, the value applied to the CO_2 emission factor of biofuels is zero.	The project is a wind project and there is no involvement of biofuels.	Condition not applicable

LGAI Technological Center S.A. (Applus+ Certification) confirms that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i.e. ACM0002- Version 19.0 is applicable to the project activity.

The project activity qualifies as Type I during every year of the crediting period in accordance with applicable provisions for project activity eligibility as discussed above. Also, the total installed capacity of project activity is more than 15 MW which is applicable as per large scale project activities methodology ACM0002- Version 19.0. The project capacity will be always remain the same and hence the project activity will always be large scale project activities throughout the crediting period and thereafter.

3.3.3 Project Boundary

Project boundary has been ascertained and confirmed during the site visit using ACM0002- Version 19.0 – “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”.

Hence the project boundary includes the renewable energy power generation, sub-stations, grid and all power plants connected to grid. The proposed project activity will evacuate power to the grid. The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the VCS project power plant is connected to”.

The calculation of net electricity supplied to grid is under purview of state electricity board and project activity Owner or project activity Implementer does not have any control on it. Thus, for project activity, net electricity supplied to grid is the monitoring parameter which is used for ER calculations.

It is to be noted that metering arrangement is under control of state electricity board and PP does not have any control on it.

The sources and GHG gases involved for proposed Project activity are as below

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation.	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other emissions are emitted from the project
Project	Greenfield Wind Power Project Activity.	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O
		Other	No	Project activity does not emit other forms of GHG emissions

3.3.4 Baseline Scenario

Assessment team confirms that being a grid connected Wind energy generation project, PP developed the project based on the Methodology ACM0002- Version 19.0. As per methodology *if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:*

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".

As per CDM Validation and Verification Standard for project activities version 02, "where the baseline scenario is not prescribed in the approved methodology, the DOE shall assess the list of identified credible alternatives to the project activity in the JOINT VCS PD & MR selected to determine the most realistic baseline scenario." Thus, JOINT VCS PD & MR should mention the credible alternatives to the project activity in order to determine the most realistic baseline scenario. As the selected large-scale methodology clearly mention the baseline scenario and the same has been opted in this project, therefore, no further analysis on baseline is required.

Validation Team, therefore, concludes that the JOINT VCS PD & MR conforms to the guidance given by EB via CDM Validation and Verification Standard for project activities version 02 and VCS via VCS standard version 3.7.

The project activity involves setting up wind projects to harness the power of wind energy to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

In the absence of the project activity, the equivalent amount of power would have been drawn from the Indian grid. Hence, the baseline for the project activity is the equivalent amount of power from the Indian grid.

The combined margin ($EF_{grid, CM, y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM). Calculations for this combined margin must be based on data from an official source (where available) and made publicly available. The

Central electricity authority (CEA) database version 14 is the latest available data at the time of JOINT VCS PD & MR submission to DOE for validation, hence same is considered for emission factor calculations.

The combined margin of the Indian grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	0.9368 tCO_2/MWh	Combined margin CO_2 emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO_2 Emission Database, Version 14.0, December 2018 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9610 tCO_2/MWh	Operating margin CO_2 emission factor for the project electricity system in year y	Calculated as the last 3-year (2015-16, 2016-17 & 2017-18) generation-weighted average, sourced from Baseline CO_2 Emission Database, Version 14.0, December 2018 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	0.8644 tCO_2/MWh	Build margin CO_2 emission factor for the project electricity system in year y	Baseline CO_2 Emission Database, Version 14.0, December 2018 published by Central Electricity Authority (CEA), Government of India

Moreover, Annex 3 of the EB 22 states that national and/or sectoral policies and circumstances have to be accounted for when considering the baseline scenario. Paragraph 7(a) states that, only those national and/or sectoral policies or regulations under paragraph 6(a), i.e., type E+ policy that increase GHG emissions, that have been implemented before adoption of the Kyoto Protocol by the COP (decision 1/CP.3, 11/12/1997), shall be taken into account when developing a baseline scenario. The Electricity Act of 2003 promoted cogeneration and generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity (Refer Section 86(1) of Electricity Act 2003). Therefore, it could be seen that the provincial and sectoral policies are E- i.e., policies that decrease GHG emissions and are after November 2001.Hence the baseline scenario of electricity generation by grid connected fossil fuel dominated power plants is in accordance with Annex 3 of EB 22.

Assessment team thus confirmed that baseline is selected as per the applied methodology and combined margin is calculated as per the tool and thus acceptable to the assessment team.

3.3.5 Additionality

During conceptualization of the project activity, board of directors of the project proponents considered the VCS revenue to improve the project financials. During the board meeting for board of Directors decided that they would consider VCS revenue for their project activity. In continuation to the board decision, PP issued the respective purchase order for the supply of wind plant.

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

The proposed project activity is not the first-of-its-kind. Hence not applicable.

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

Alternative 1: The proposed project activity without VCS benefit;

Alternative 2: Continuation of the current situation, i.e., electricity will continue to be generated by the existing generation mix operating in the grid.

Having regard to the fact that the project activity under consideration is a wind power project, validation team is convinced that there are no other realistic and credible alternatives. Both the alternatives are in compliance with all applicable legal and regulatory requirements as;

- the implementation of project activity is a voluntary initiative and is not mandatory or a legal requirement;
- the applicable environmental regulations do not restrict the use of wind energy; and
- There is no legal requirement on the choice of a particular technology.

Assessment team noted that the project fulfils the norms put down by Central Pollution Control Board. As per Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India), final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (29/02/2016).

The newly introduced White category of industries pertains to those industrial sectors which are practically non-polluting such as Biscuit trays etc. from rolled PVC sheet (using automatic vacuum forming machines), Cotton and woollen hosiers making (Dry process only without any dying/washing operation), Electric lamp (bulb) and CFL manufacturing by assembling only, Scientific and mathematical instrument manufacturing, Solar power generation through photovoltaic cell, wind power and mini hydel power (less than 25 MW).

There shall be no necessity of obtaining the "Consent to Establish/Operate'' for White category of industries. Intimation to concerned SPCB / PCC is sufficient.
Being a renewable power project it falls under the category of White and thus these projects do not need clearance for Consent to operate and only needs to inform the relative State pollution control board. The same is done for the project and thus it can be confirmed that it follows the local laws of the host country.

Due to above categorization of white category and being the renewable in nature, the project activity does not emit any emissions. Thus, there are no any other surplus regulatory requirement for the project activity. This is found to be accepted by assessment team.

However, of the two alternatives identified, alternative (i) cannot be considered realistic as further analysis in the following paragraph reveals that it is not economically feasible option. Hence, alternative (ii) alone could be justified as realistic, credible and plausible alternative to the PP.

Validation team is, therefore, convinced that the project developer has taken into consideration all realistic and credible alternatives (having regard to the governing methodologies) including the project being undertaken as a non-VCS activity and continuation of current scenario. The identification of alternatives is in conformity with the guidance given by the tool.

Outcome of Sub-step 1a: All the realistic alternatives for the project activity have been enlisted above.

Sub-step 1b: Consistency with mandatory laws and regulations:

The alternative(s) shall be in compliance with all applicable legal and regulatory requirements, even if these laws and regulations have objectives other than GHG reductions, e.g. to mitigate local air pollution. (This sub-step does not consider national and local policies that do not have legally-binding status.)
Both the alternatives are in compliance with all applicable legal and regulatory requirements as;

- The implementation of project activity is a voluntary initiative and is not mandatory or a legal requirement;
- The applicable environmental regulations do not restrict the use of wind energy; and
- There is no legal requirement on the choice of a particular technology.

Moreover, Outcome of Sub-step 1b: Hence, both the alternatives enlisted above are found to comply with the mandatory laws and regulations taking into account the enforcement of the legislations in the region or country and EB decisions on national and/or sectoral policies and regulations. However, Alternative 2 has been selected as the appropriate baseline alternative for this project activity.

Step 2: Investment analysis

Determine whether the proposed project activity is economically or financially less attractive than at least one other alternative, identified in step 1, without the revenue from the sale of emission reductions credits. To conduct the investment analysis, use the following sub-steps:

Sub-step 2a: Determine appropriate analysis method and Sub-step 2b (Option III): Apply benchmark analysis

a) Suitability of investment analysis, financial indicator and benchmark:

Project developer had demonstrated that the financial returns of the proposed VCS project activity would be insufficient to justify the required capital investment as per CDM Validation and Verification Standard for project activities version 02.0. In the Initial Joint VCS PD & MR version 01. PP has adopted a conservative approach to identify the benchmark for the project activity. The project is earning revenue from the installation of the project activity. Thus, simple cost analysis (Option I) is not appropriate. Also in the absence of the project activity grid electricity would have been the obvious choice for the Project which requires no investment. Hence investment comparison analysis (Option II) is also not appropriate for the project activity. Therefore, benchmark analysis (Option III) is used for the project activity as per project type and decision-making context. Therefore, the Expected return on equity is considered appropriate benchmark. Accordingly, the post-tax Equity IRR has been considered as the relevant financial indicator for the project activity which is acceptable to the assessment team. Moreover, the financial indicator selected by the PP is correct based on the fact that tool do not restrict the PP to either use project IRR or Equity IRR. This is under the prerogative of the PP to select appropriate indicator based on his preferences to know the IRR based on his equity investment or debt investment. The same is thus acceptable to the assessment team. Assessment team however checked the Equity IRR calculation and found that input assumptions used for the calculation of Equity IRR are applicable at the time of investment decision of the project and thus is in accordance with the relevant guideline of the tool.

As per Methodological tool “Investment Analysis” Version 09, “In situations where an investment analysis is carried out in nominal terms and the available IRR benchmarks are in real terms, project participants shall convert the real term values of benchmarks to nominal values by adding the inflation rate. The inflation rate shall be obtained from the inflation forecast of the central bank of the host country for the duration of the crediting period. If this information is not available, the target inflation rate of the central

bank shall be used. If this information is also not available, then the average forecasted inflation rate for the host country published by the IMF (International Monetary Fund World Economic Outlook) or the World Bank for the next five years after the start of the project activity shall be used".

The investment analysis has been carried out in Nominal terms. Accordingly, default value has been adjusted by adding suitable forecasted inflation rate taken from RBI (Central Bank, India). PROJECT OWNERS have calculated Benchmark based on WPI mean inflation rate. As per appendix A of Methodological tool "Investment Analysis" Version 09, the inflation forecast should be for the duration of the crediting period. However, since RBI provides forecast inflation only for 5 & 10 years, the project investor has calculated benchmark using 10 years durations and the same is considered as Benchmark for the project activity.

At the time of decision made of project activity, Version 07 of methodological tool "Investment Analysis" (version 7 & 8) were the latest available tools to the PP. However, the request for registration for Version 7 could be submitted till 31/10/2017 and for version 8 the registration request could be submitted till 28/11/2018. Hence, PP has used Methodological Tool for Investment Analysis version 09 (EB 101, Annex 11). Upon comparison of the detail of version 07.0, 08.0 and version 09.0 of the methodological tools it was observed that, there is no major difference in the versions except for the change of default value for benchmark calculation. The default value as mentioned in version 07 was 11.06% for the group 1 projects in India, in the version 08 it was 10.73% for group 1 project in India and Value as mentioned in version 09 is 9.79% for group 1 project in India which is clearly more conservative than version 07 & 08 values. Hence, version 09 is used which is appropriate and more conservative for benchmark calculation and PP has considered the same tool for default value of return on equity for the project activity.

As Methodological tool "Investment Analysis" Version 09 the cost of equity is determined by selecting the values provided in the Appendix, i.e. Default values for cost of equity (expected return on equity) is presented below:

Appendix A in Methodological tool "Investment Analysis" Version 09 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = 9.79%

Whereas, appendix in EB 101, Annex 11 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = 9.79%

The Required return on equity (benchmark) was computed in the following manner:

Nominal Benchmark[10] = {(1+Real Benchmark)*(1+Inflation rate)} -1

Where:

- Default value for Real Benchmark =9.79% (as per Appendix of Methodological tool "Investment Analysis" Version 09)

- Inflation Rate forecast by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India & in case where RBI Inflation forecast was not available, average Inflation rate forecast for India has been sourced from IMF web site.

Benchmark estimation:

[10]As per Fisher Equation, https://en.wikipedia.org/wiki/Fisher_equation

Appendix in Methodological tool "Investment Analysis" Version 09 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = **9.79%**

Since RBI publishes the inflation forecast for 5 years and 10 years, PP has considered the maximum 10 year inflation considering the renewable crediting period of total 30 years.

Benchmark Calculations	Value	Sources Link	Document Date	Decision making Date
Default Value for India as per UNFCCC guidelines	**9.79%**	EB 101 Annex 11	29/11/2018	25/05/2017
Inflation forecast (WPI Mean) as per RBI for 10yrs	**4.00%**	https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=17458	06/04/2017	
Benchmark (with 10yrs Forecast)	**14.18%**	Calculated		

Thus, benchmark of **14.18 %** has been selected for this project activity.

b) Parameters and assumptions used:

The input assumptions and IRR calculations has been validated by DOE and the same has been mentioned in confidential version of the report. Please refer the confidential version of report for same.

The IRR is well within benchmark, thus project activity is additional.

Common Practice analysis:

The common practice analysis is proved by following points as per the requirement of Methodological tool "Common Practice", version 03.1 EB 84, Annex 7[11]:

1. Applicable Geographical Area (Para 9): The Tamil Nadu state has been considered as the applicable geographical area for this project. PP had considered these states as geo-graphical area due to regulatory regime since applicable power tariff structure for renewable energy projects is unique for all 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/40*/).

Furthermore, 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

[11] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf

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 01/04/2006.

- As mandated under section 86(1)(e) of the Electricity Act (2003), by 26/06/2012 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 polices 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.

Therefore 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, the specific geographical area i.e. states of the project activities for the common practice analysis of the proposed project activity is considered and thus the same is acceptable to the assessment team.

2. Measure (Para 10): The project activity reduces greenhouse gas emissions by generating electricity using renewable energy source- wind. Therefore, the project activity falls under the following measure:

(b) Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies.

3. Output (Para 11): The project activity produces electricity. Therefore, electricity is considered as output of the project activity.

4. Different Technologies (Para 12): The project activity uses wind energy for producing electricity and hence as per Para 12(a), the technologies which use energy source/ fuel other than wind will be considered as the different technologies for the project activity.

For the concerned project activity, Common Practice Analysis has been carried out for 249.9 MW capacity wind Power Projects in these states which is developed by **Green Infra Renewable Energy Limited**.

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB 84, Annex 7:

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

Range	Capacity	Unit
+50%	374.85	MW
Capacity of the proposed project activity	249.9	MW
-50%	124.95	MW

Step (2): Identify similar projects (both CDM and non-CDM) which fulfil 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.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

a) As the projects are located in these states of India, therefore, projects in the geographical area of these states has been chosen for analysis. The project activity involves generation of electricity from wind energy. The project activity is located in these states in India and the policy applicable for the wind projects is regulated by respective state policy. The policies/tariff for each state is regulated by State Electricity Regulatory Commissions of respective states and they differ for respective states. The project implemented in these states is claimed as different since the policies and regulations differ in each state. Each state has different policies regarding renewable energy, hence these states are considered as geographical region for common practise analysis.

b) The project activity is a green-field wind power project and uses measure (b) "Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies". Therefore, projects applying same measure (b) are candidates for similar projects.

c) The energy source used by the project activity is wind energy. Hence, only wind energy projects have been considered for analysis.

d) The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.

e) The capacity range of the projects is within the applicable capacity range from 124.95 MW to 374.85 MW.

f) The start date of the concerned project activity is 08/10/2018. Therefore projects, which have started commercial operation before 08/10/2018, have been considered for analysis.

Numbers of Similar projects identified, which fulfil above-mentioned conditioned are

N_{wind}= 2

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}.

CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the power plants identified is provided to the DOE. After excluding the registered and under validation projects the total number of projects.

N_{all} = 2

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}.

As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis two criteria:

1. Size of Installation – Since project activity is large scale project, small and micro scale projects are considered as different technology project. Based on this criteria, there are no any different technology project out of similar identified projects.

2. Investment climate on the date of the investment decision – For proposed project activity, there are no any different technology project considered out of similar identified projects.

Hence, projects where either of the conditions is satisfied those projects are counted for calculating N_{diff} projects.

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.

Calculate $F=1-N_{diff}/N_{all}$

$F = 1-(0/2) = 1$

As per methodological tool "common practise" version 03.1, 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.

Thus, if both conditions are fulfilled, then project activity will be a common practise otherwise, the project activity is treated as not a common practise.

Outcome of Common Practise analysis:

As,

i. F = 1; is greater than 0.2

ii. $N_{all} - N_{diff} = 2$; is not greater than 3

Thus, the proposed project activity is not a "common practice" within a sector in the applicable geographical area.

The above discussions show that wind power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional and the assessment team considers the approach and calculations acceptable as per the requirements in the methodological tool

3.3.6 Quantification of GHG Emission Reductions and Removals

Assessment team checked the baseline, project and leakage calculation and confirm that the evaluation of baseline, project and leakage is as per the approved methodology and formula used to calculate the same is correct. The detail analysis is as below:

Baseline Emission:

As per the approved consolidated Methodology ACM0002 version 19.0:

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid- connected power plants. The baseline emissions are to be calculated as follows:

$$\mathbf{BE_y = EG_{PJ,y} \times EF_{grid,CM,y}}$$

Where:

BE_y = Baseline emissions in year y (t CO_2/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr)

Since Green Field project, $EG_{PJ,} = EG_{facility,y}$ (para 44, inline Methodology ACM0002 version 19.0)

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

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

The grid emission factor is calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values. The value of combined margin is sourced from Baseline CO_2 Emission Database, Version 14, December 2018 published by Central Electricity Authority (CEA), Government of India. CEA calculates the data based on Tool to Calculate the Emission Factor for an Electricity System", Ver. 7.0. No further assessment is required for grid emission calculation as the ex-ante value is sourced directly from the Govt. of India database.

Emission factor (EF_y):

$EF_y = EF_{grid,CM,y}$= 0.9368 t CO_2/MWh. This value is fixed ex-ante for the crediting period.

$EG_{PJ,y}$ is calculated based on capacity (Checked from the manufacturer specification), PLF= sourced from offer letter thus fulfilling the requirement of Para 3 (b), Annex 11 EB 48 and 8,760 (365*24) annual hours. Moreover, $EG_{PJ,y}$ is a monitoring parameter and the actual value will be obtained during the verification of the project activity.

BE_y= 755,247 x 0.9368 = 707,515 tCO_2

Project Emission:

As per the approved consolidated ACM0002 version 19.0: "For most renewable energy power generation project activities, PE_y = 0. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$\mathbf{PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}}$$

Where:

PE_y = Project emissions in year y (t CO_2e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year y (t CO_2/yr)

$PE_{GP,y}$ = Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO_2e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year y (t CO_2e/yr)

As the project activity is the installation of a new grid-connected Wind Power plant and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants, and from water reservoirs of hydro power plants. Therefore $PE_{FF,y}$, $PE_{GP,y}$, $PE_{HP,y}$ are equal to zero and thus, PE_y = 0.

Leakage Emission:

Leakage emission is not considered as per the requirement of ACM0002 version 19.0.

Net Emission reduction:

Reductions are calculated as follows:

$$\mathbf{ER_y = BE_y – PE_y}$$

Where:

ER_y	=	Emission reductions in year *y* (t CO_2e/yr)
BE_y	=	Baseline emissions in year *y* (t CO_2/yr)
PE_y	=	Project emissions in year *y* (t CO_2e/yr)

Therefore, Net GHG Emission Reductions and Removals are calculated as follows:

$$\mathbf{ER_y = BE_y – PE_y}$$

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
08/10/2018 to 07/10/2019	707,515	0	0	707,515
08/10/2019 to 07/10/2020	707,515	0	0	707,515
08/10/2020 to 07/10/2021	707,515	0	0	707,515
08/10/2021 to 07/10/2022	707,515	0	0	707,515
08/10/2022 to 07/10/2023	707,515	0	0	707,515

Year	Estimated baseline emissions or removals (tCO_2e)	Estimated project emissions or removals (tCO_2e)	Estimated leakage emissions (tCO_2e)	Estimated net GHG emission reductions or removals (tCO_2e)
08/10/2023 to 07/10/2024	707,515	0	0	707,515
08/10/2024 to 07/10/2025	707,515	0	0	707,515
08/10/2025 to 07/10/2026	707,515	0	0	707,515
08/10/2026 to 07/10/2027	707,515	0	0	707,515
08/10/2027 to 07/10/2028	707,515	0	0	707,515
Total	**7,075,150**	**0**	**0**	**7,075,150**

3.3.7 Methodology Deviations

Assessment team confirms that No methodology deviation is applicable for the present project activity.

3.3.8 Monitoring Plan

Assessment team checked the monitoring practice onsite and also checked the guideline of respective State electricity regulatory commission. The detail analysis is as below:

Parameters determined ex-ante:

Baseline emission factor of INDIAN Grid is established ex-ante based on Tool to calculate the grid emission factor, using a combined approach consisting 75 % operating margin and 25 % build margin. The emission coefficient from official data published in Central Electricity Authority (CEA) CO_2 Baseline database available to the project participant at the time of submission of joint VCS PD & MR for joint validation& Verification and global stakeholder's consultation process. CEA is an official source of Ministry of Power, Government of India have worked out baseline as CO_2 baseline database. The assumption were verified by the validation team and found to be correct.

Parameters determined ex-post:

The parameters monitored ex-post involves net electricity supplied to the grid (calculated from electricity exported and imported) to the INDIAN grid by the project activity.

As per the Joint VCS PD & MR Version 02, Joint Energy Meter Reading Report will be the source of data during verification. The DOE will use the same source for verification of emission reductions.

In accordance with the methodology requirement, net electricity supplied by the project activity is obtained from Joint Energy Meter Reading Report issued by State electricity authority which provide input values used for calculation of $EG_{PJ,} = EG_{facility,y}$ by the project activity and forms the basis for emission reduction calculation. Electricity export to the grid and import from the grid is metered by main and check tri-vector energy meters of 0.2s accuracy class. The main meter reading is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of state utility and O&M personnel.

In the event of failure of main meter, the check meter will be used in monitoring the electricity data. The agency is experienced in the monitoring system and is managing O&M of numerous other Wind farm projects. The validation team therefore is of the opinion that the project participant through the O&M agency is capable of implementing the monitoring plan in the context of the project activity.

Calibration of all the meters is done by state electricity board officials as per the industry standards. However, the calibration will be done once in a 5 year[12] for all the project activity. The energy meter recording the export and import from the grid at substation is under the control and supervision of state electricity board officials. Similarly, O&M contractor is responsible for monitoring of the generation data at CMS.

It is reported that the data will be kept for 2 years following the end of the crediting period or till the last issuance of VERs for the project activity whichever occurs later.

The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit.

3.4 Non-Permanence Risk Analysis

Not applicable for the present project activity.

4 SAFEGUARDS

4.1 No Net Harm

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation.

As project is a renewable energy project hence there is no negative environmental and socio impact effect and the same can be summarized in the below table:

S.No.	Indicator	Assessment team opinion
1	Air quality	The project generates clean energy which replaces the fossil fuel intensive electricity generation. Also report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013. This report clearly mentioned that Wind farms operations do not result in direct air pollution. Adequate measures were taken to mitigate the envisaged impacts like spraying water on the road side to reduce dust level, etc. This was confirmed by the local stakeholders. Therefore, it is validated that mitigation measures were robustly implemented on ground for air quality issues project will have a positive impact on air quality.

[12] http://powermin.nic.in/whats_new/pdf/Metering_Regulations.pdf, page 12

S.No.	Indicator	Assessment team opinion
2	Water quality and quantity	The project has no effect on water quality and quantity because it neither generates any waste not consume any water. It was validated during on-site assessment that there was no requirement of water for operations of Wind plant and the only usage of water was for drinking and sanitation purpose. The consumption of freshwater during construction was also pretty much limited as confirmed by the local stakeholders. Hence the parameter is indicated as neutral and the same is acceptable to the DOE
3	Soil condition	There are negligible impacts envisaged during operation of the project activity. For mitigating the impacts during construction, various mitigation measures were taken which is validated from the plant records of PP and the interview with local villagers. The top soil excavated during construction, was stockpiled and used for compaction. The roads were not paved and soling was done with excavated earth & rock material, so land disturbance could be minimized. It was also confirmed that, the vegetation done at site helps for soil erosion. The same is confirmed during the stakeholder meetings during onsite visit. Therefore, it can be concluded that the project has no effect on soil conditions during its operation because it has no waste coming out.
4	Biodiversity	During the validation site visit it was observed that the condition of ground vegetation will be gradually improved; No rare species has been found in the around area. The project site is not on the migration route of migratory bird. As Such Wind power plant does not have any obstruction in the path of migratory birds. With the implementation of Project, the greening water will be increased significantly; the biodiversity in the vicinity will be improved with the vegetation improvement. NO negative impact envisaged.
5	Employment Generation	The project activity employed local population as skilled workers as well as security guards which were envisaged during the validation site visit. The personnel employed by the project activity are also provided trainings and exposed to various awareness programs therefore a positive indicator has been accepted.
6	Livelihood of the poor	The project is associated with infrastructure development like roads in the nearby areas and promoting economic activities like grants to local school and communities temples etc. Positive impact envisaged.

4.2 Environmental Impact

The project activity is expected to have positive impacts and no significant adverse environmental impacts are foreseen. Since, the project activity is an electricity generation from renewable source (i.e. Wind energy) therefore no negative impacts are envisaged. There is no mandatory legal requirement for carrying out an environmental impact assessment in the host country. The Ministry of Environment,

Forests & Climate change (MoEFCC), Government of India (GoI) notification [13] dated 14/09/2006 regarding the requirement of Environment Impact Assessment (EIA) studies states that any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. The list includes thirty nine project activities that require EIA studies. The Wind power projects are not included in this list and thus an EIA study is not required.

4.3 Local Stakeholder Consultation

As per the VCS requirements, it is necessary to invite the relevant stakeholders, prior of the validation process. Moreover, the stakeholder meeting took place prior to the start date of the project activity which fulfill the requirement of project standard for project activities version 02. The DOE checked the relevance of the dates during the validation site visit. The detail of the invitation date and stakeholder meeting date is as below:

SPVs Name	Invitation Notice Date	LSHM Meeting Date
Project Site, Mela Thattaparai village, Green Infra Renewable Energy Limited	05/06/2017	20/06/2017

The local stakeholders' consultation meeting was attended by local persons including local villagers, local vendors and technology suppliers.

The stakeholders identified by the project participant were local villagers who are the major population of the particular area, local communities and gram panchayat (Village head), panel supplier, project proponent representatives, O&M Team and other people involved in the project. Validation team verified the list of participants who attended the stakeholder meeting and feedback questionnaire and confirms the stakeholders identified are relevant. Validation team verified the list of participants who attended the stakeholder meeting and feedback questionnaire and confirms the stakeholders identified are relevant. The validation team also verified the minutes of meeting to note that no negative comments were received and the same was cross checked with the information obtained during follow up interviews with the stakeholder's. Moreover, assessment team during the validation site visit also noted that a grievance register is also put onsite for the stakeholder to comment on any grievances during the operation lifetime of the project activity, the grievances from the stakeholder if found suitable will be addressed immediately by the top management and thus the approach is found appropriate for the project activity.

The interactions with some of the stakeholders during the site visit are presented below:

Name of the stakeholder	Shri. K Senthodoprandi (Agriculture)
DOE questions: Did the power project generated employment opportunities for locals youths, skilled or unskilled persons? Answer: Yes. Employment given to locals in O&M activities for technically educated youths and unskilled men & womens as labours in construction activity as well as vegetation removal etc. work.	

Name of the stakeholder	Shri. V Pooludaiyar (Agriculture)
DOE questions: Did the Wind power project have any adverse impact on the nearby areas? Answer: No. Wind power plants do have no adverse impact on surrounding area.	

[13] http://envfor.nic.in/legis/eia/so1533.pdf

Thus, Validation team is of the opinion that the stakeholder meeting was adequate and appropriate. Further, PP have maintained Complaint/Feedback register at the project site for the ongoing stakeholders communication.

4.4 Public Comments

Assessment team noted that this project was open for public comment from 10/07/2019 to 09/08/2019. No comments were received.

The detail were checked by the assessment team in the following web platform

https://www.vcsprojectdatabase.org/#/pipeline_details/PL1904

5 VERIFICATION FINDINGS

5.1 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the Joint VCS PD & MR. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the Joint VCS PD & MR.
Findings	CAR 08 was raised on this section and closed successfully. Please refer Appendix 2 for further details
Conclusion	The baseline Emissions for a given year is calculated by multiplying the energy baseline (EB) with the regional grid emission factor. The grid in this case would be the 'INDIAN Grid' **Formula Used:-** **$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$** Where: BE_y = Baseline emissions in year y (t CO_2/yr) $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr) Since Green Field project, $EG_{PJ,} = EG_{facility,y}$ (para 44, inline Methodology ACM0002 version 19.0) $EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr) $EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh) BE_y = 753,834.417 x 0.9368 = 706,167 tCO_2 (round down value)

	Project Emission: As the project activity is the installation of a new grid-connected Wind Power plant and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants, and from water reservoirs of hydro power plants. Therefore $PE_{FF,y,}$ $PE_{GP,y}$, $PE_{HP,y}$ are equal to zero and thus, $PE_y = 0$. **Leakage Emission:** Leakage emission is not considered as per the requirement of ACM0002 version 19.0. **Net Emission reduction:** *Reductions are calculated as follows:* $\mathbf{ER_y = BE_y - PE_y}$ $= 706,167 - 0 = 706,167\ tCO_2$ The verification team has checked the entire monthly Deviation Settlement Account statement report and invoices applicable for the monitoring period as per the project activity applied for verifications and found all the parameters are monitored and recorded as per the monitoring plan in the Joint VCS PD & MR. The verification team has crosschecked the emission reduction sheet and monitoring report data with the SETTLEMENT ACCOUNT STATEMENT REPORT and invoice bills and found all the values are matching.

5.2 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the break down log for the monitoring period. During the verification site visit the feeder wise location of the project is also checked. The Calibration details of the monitoring meters are also checked with calibration certificates.
Findings	CAR 09 was raised on this section and closed successfully. Please refer Appendix 2 for further details
Conclusion	The metering arrangement is tri-vector bi-directional energy meters (main and check) at the plant sites/State Electricity Board's (SEB) pooling substations. These meters record several parameters including electricity exported & imported. Moreover, the meters are located at the HT side of the transformer and are of accuracy class of 0.2s for each project activity applied for verification. These electricity meters are being used by state electricity board for SETTLEMENT ACCOUNT STATEMENT REPORT. The Net electricity supplied to the grid is then calculated from export and import values. The net electricity exported to the grid is also cross checked from the invoices raised to respective state electricity board which is in line with Methodology requirement. Hence assessment team confirmed that the value of net electricity exported to the grid as used in emission reduction calculation is correct. Electricity export to the grid and import from the grid is metered by main and check/Standby tri-vector energy meters. The main meter reading is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of state utility and O&M personnel or directly downloaded by concerning authority to generate Settlement Account Statement

	Report which was made available on CEA's website. In the event of failure of main meter, the check meter will be used in monitoring the electricity data. The agency is experienced in the monitoring system and is managing O&M of numerous other Wind farm projects. The validation team therefore is of the opinion that the project participant through the O&M agency is capable of implementing the monitoring plan in the context of the project activity. Calibration of all the meters is done by state electricity board officials as per the industry standards. However, the calibration is done once in a 5 year[14]. The details of Calibration of the meters are mentioned in Appendix 5 of this report. The energy meter recording the export and import from the grid at substation is under the control and supervision of state electricity board officials. Similarly O&M contractor is responsible for monitoring of the generation data at CMS. It is reported that the data will be kept for 2 years following the end of the crediting periodor till the last issuance of VERs for the project activity whichever occurs later. The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit. On-site visit and interview with O&M personnel also confirms that the operational and organizational chart as mentioned in Joint VCS PD & MR is as per the site practice and thus assessment team confirms that the details are correct. The break down log is checked and found that the plant undergone scheduled maintenance and break down. No unforced error observed.

[14] http://powermin.nic.in/whats_new/pdf/Metering_Regulations.pdf, page 12

6 VALIDATION AND VERIFICATION CONCLUSION

VALIDATION CONCLUSION:

Applus+ Certification has been engaged by **Green Infra Renewable Energy Limited** to perform the Joint validation and verification of the "Wind Power Project in Tamil Nadu by Green Infra Renewable Energy Limited"

The management of the project participant/owner is responsible for the preparation of the GHG emissions data and the reported/estimated GHG emissions reductions on the basis set out within the project's Monitoring Plan in the Joint VCS PD & MR and the approved methodology ACM0002- Version 19.0.

Our Validation approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board and VCS board. Our approach is risk-based, drawing on an understanding of the risks associated with estimated GHG emissions data and the controls in place to mitigate these. The validation can confirm that:

- The projects description compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7

- The project's baseline and additionality is assessed against "ACM0002- Version 19.0" for large scale project

- The project's monitoring plan is assessed against "ACM0002- Version 19.0" for large scale project

- A risk based approach has been followed to perform this validation activity. The review of the project description and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews with Project Owner have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence for positive validation opinion as per the requirement of VCS.

VERIFICATION CONCLUSION:

Our Verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in Monitoring Report is as per the PD
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;

- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.
- No limitation observed for the present verification

Verification period: 08/10/2018 to 30/11/2019 (first and last date included)

Verified GHG emission reductions and removals in the above verification period:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
08/10/2018 to 31/12/2018	86802	0	0	86,802
01/01/2019 to 30/11/2019	619365	0	0	619,365
Total	**706,167**	**0**	**0**	**706,167**

The estimated emission reduction to be achieved from the project activity for the current monitoring period is 812,188 tCO_2e[15] whereas, actual emission reductions achieved are 706,167 tCO_2e, which is approximately 13.05%[16] lower than the estimated emission reductions. The generation of electricity depends upon climatic conditions and monitoring period considered and not within the control of the project participant.

[15] Calculated based on the actual operational days of i.e. 419.

[16] This estimation is based on annual (365 days) estimation of ER as 707,515 tCO_2e and current monitoring period is for 419 days.

APPENDIX 1: DOCUMENTS REVIEWED DURING VALIDATION AND VERIFICATION

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificates	Commissioning certificates of 249.9 MW Wind Power project	Project participant
2.	NA	Contract of the PP with the DOE	Contract of the PP with the DOE	Project participant
3.	NA	Technical specifications	Technical specifications of WTGs from manufacturers	Project participant
4.	NA	Draft Joint VCS PD&MR Version 01 Revised Joint VCS PD&MR Version 02	20/06/2019 23/12/2019	Project participant
5.	NA	Emission Calculation sheet- version 01- Estimated ER Emission Calculation sheet- Version 02- Estimated ER	20/06/2019 23/12/2019	Project participant
6.	NA	Emission Calculation sheet- version 01– Actual ER Emission Calculation sheet- Version 02– Actual ER	20/06/2019 23/12/2019	Project participant
7.	NA	IRR calculation sheet Ver-01	23/12/2019	Project participant
8.	NA	The operational lifetime of the project activity from the manufacturer=(Technical specefications)	Manufacturer technical specifications	Project participant
9.	NA	Reference link is provided.	SERC order of the respective states RBI: Reserve Bank of India www.rbi.org.in Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in Income tax act 1961 http://law.incometaxindia.gov.in/DIT/ VCS: Verified Carbon Standard www.v-c-s.org	Independent Search
10.	NA	Tools/ guidelines used in the project activity	UNFCCC CDM web site • Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 • Tool to calculate the emission factor for an electricity system version 07	UNFCCC

No.	Author	Title	References to the document	Provider
			• UNFCCC Methodology: ACM0002 version 19.0 • Glossary of CDM terms version 07 • VCS joint validation and verification report template Version 3.1 • Tool for the demonstration and assessment of additionality version 06 & 07	
11.	NA	Calibration details of the project activity undergoing verifications	Please refer to Appendix 5	Project participant
12.	NA	DPR/Offer letters/PLF	DPR / Offer letters /PLF reports for Individual project owners	Project participant
13.	NA	Settlement Account Statement Reports + Invoices for the complete monitoring period	Settlement Account Statement Reports + Invoices for the respective states	Project participant
14.	NA	PPA Agreement	Power purchase Agreement between Project Proponent & State Utility	Project participant
15.	NA	Actual O&M agreement	O&M agreements for all sites	Project participant
16.	NA	VCS Declaration	Declaration from PP for Participation under Other GHG Programs	Project participant

APPENDIX 2: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS, FORWARD ACTION REQUESTS (CAR/CL/FAR)

During the document review it was observed that

1. JOINT PROJECT DESCRIPTION & MONITORING REPORT is not filled inline with the guidelines for completion of the same. Correction requested throughout the document.
2. PP requested to provide commissioning certificates and technical specifications along with lifetime for all WTGs involved in the project activity.
3. Project scale is not inline with the capacity of the project activity. PP requested to review the same.
4. PP requested to submit all relevant supporting documents like commissioning certificates, PPA, O&M agreements, JMRs & invoices, training records, LSC documents etc.

Project participant response	**Date:** 23/12/2019
1. The joint PD MR V2 is now inline with the guidelines. *2. Commissioning certificates along with technical specification is being provided.* *3. Project scale has been updated in joint PD MR V2.* *4. Project supporting documents is now being provided*	
Documentation provided by project participant	
PD MR V2, Commissioning certificates	
DOE assessment	**Date:** 23/12/2019
1. PP have submitted revised Joint VCS PD and MR and found to be filled inline with the guidelines for completion of the same. 2. Commissioning certificates and technical specifications along with lifetime for all WTGs involved in the project activity are now submitted by PP and found consistent with information in joint VCS PD and MR. 3. Project scale is now revised to Large Scale inline with the capacity of the project activity. 4. PP submitted supporting documents; commissioning certificates, PPA, O&M agreements, JMRs & invoices, training records, LSC documents. Thus, CAR closed.	

CAR ID	02	**Section no.**	3.1	**Date:** 18/11/2019
Description of CAR				
Exact village names & Geo-coordinates of the Power plant are missing in the JOINT PROJECT DESCRIPTION & MONITORING REPORT. PP requested to update the same.				
Project participant response				**Date:** 23/12/2019
Villages Names along with exact geo cordinates is being provided.				
Documentation provided by project participant				
KML files, Lat Long details				
DOE assessment				**Date:** 23/12/2019
PP have revised the location and coordinates of the each WTG and found correct. CAR closed.				

CAR ID	03	**Section no.**	3.2	**Date:** 18/11/2019
Description of CAR				
Declaration from PP regarding participation in other trading / GHG programs, rejection under other GHG program etc. is missing. PP requested to submit the same.				
Project participant response				**Date:** 23/12/2019
Declaration regarding non participating and doublé counting is being provided.				
Documentation provided by project participant				
Declaration				
DOE assessment				**Date:** 23/12/2019

PP have submitted declaration for no double counting and other GHG programme and found correct. CAR closed.

CAR ID	04	**Section no.**	3.3.5	**Date:** 18/11/2019
Description of CAR				
PP requested to submit all supporting documents for IRR calculations, IRR sheets. PP requested to update justification of additionality with latest versions of applicable tools.				
Project participant response				**Date:** 23/12/2019
Supporting docucments regarding IRR calculation is being provided. Latest applicable tool is now being referred in the joint PD MR V2				
Documentation provided by project participant				
Joint PD MR V2 and IRR sheet				
DOE assessment				**Date:** 23/12/2019
PP have submitted IRR sheet along with the all supporting documents used in additionality justification and additionality is justified appropriately. Thus, CAR closed.				

CAR ID	05	**Section no.**	3.3.6	**Date:** 18/11/2019
Description of CAR				
PP requested to submit Estimated ER and actual ER calculation sheets for the project activity. Corrections requested in the ER calculations and formulas used inline with latest version of applied methodology.				
Project participant response				**Date:** 23/12/2019
Updated ER and Actual ER Sheet has been provided.				
Documentation provided by project participant				
ER Sheet V2				
DOE assessment				**Date:** 23/12/2019
PP have submitted revised Estimated ER and actual ER calculation sheets for the project activity and electricity values were found correct inline with Deviation Settlement Account statement. CAR thus closed.				

CAR ID	06	**Section no.**	3.3.8	**Date:** 18/11/2019
Description of CAR				
Line diagram of metering arrangement is inadequate with respect to actual site meeting arrangements for each site separately. Also PP requested to submit all calibration certificates of the monitoring meters.				
Project participant response				**Date:** 23/12/2019
Line Diagram and calibration records is being provided.				
Documentation provided by project participant				
Line Diagram and Calibration Records				
DOE assessment				**Date:** 23/12/2019
PP have submitted SLD for the project activity and section 4.3 of joint VCS PD and MR accordingly and found correct. PP also submitted calibration records for the monitoring meters and found under calibration compliance for complete monitoring period. CAR closed.				

CAR ID	07	**Section no.**	4.3	**Date:** 18/11/2019
Description of CAR				
PP is requested to provide details of stakeholder consultation for the project activity along with supporting documentation. PP is also requested to update section for public comments during GSP of VCS.				
Project participant response				**Date:** 23/12/2019
Attendance Sheet, MoM and Notice regarding the local stakeholder consultation is being provided				
Documentation provided by project participant				
Notice, MoM and Attendance Sheet				
DOE assessment				**Date:** 23/12/2019
PP have submitted documents related to LSC and revised sections of joint VCS PD & MR accordingly. Also section for				

GSP is revised appropriately and found inline with VCS webpage. CAR thus closed.

CAR ID	08	**Section no.**	5.1	**Date:** 18/11/2019
Description of CAR				
PP is requested to revise section 6 of VCS PD & MR inline with applied methodology ACM0002 Version 19. ER achieved during this monitoring period are reserved till submission of all JMR for net electricity export and invoices for crosscheck of net export values.				
Project participant response				**Date:** 23/12/2019
VCS joint PD MR section has now being updated as per the methodology.				
Documentation provided by project participant				
VCS PD MR V2				
DOE assessment				**Date:** 23/12/2019
Revise section 6 of VCS PD & MR is now inline with applied methodology ACM0002 Version 19. Also PP have submitted JMR and invoices for the verification of assessment team and data found inline with JMR submitted. CAR thus closed.				

CAR ID	09	**Section no.**	5.2	**Date:** 18/12/2019
Description of CAR				
PP is requested to justify calibration compliance of the monitoring meters for complete monitoring period.				
Project participant response				**Date:** 23/12/2019
The energy meters are calibrated as per the compliance and the calibration reports justifying the complaince is being provided. The joint PD MR V2 section 5.2 is also updated				
Documentation provided by project participant				
Joint PD MR V2, Calibration Records				
DOE assessment				**Date:** 23/12/2019
PP have submitted copies of the calibration and found inline with the requirement. CAR thus closed.				

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Lead Auditor/ Technical Expert	OR	Takarkhede	Atul	TQC-Outsourced entity	Yes	Yes	Yes	Yes

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	EI	Shen	Simon	LGAI Technological Center S.A. (Applus+ Certification)
2.	Approver	IR	Sendin	Juan	LGAI Technological Center S.A. (Applus+ Certification)

Short CVs of the Team:

1. Dr. Atul Takarkhede counts with 9 years of experience in field of Environmental Auditing, consulting and accreditation. He is an Expert in ISO 9001-14001, CO2/GHG Reporting, Carbon Foot Print, Energy, Water and Waste Management Reporting for organizations environmental performance. His professional portfolio is mainly related with carrying out EIA, conducting QA/QC of EIA Reports; Conducting Environmental/water Audits; NABET requirements appliance. Furthermore, he counts with solid experience on CDM-VCS-GS consultancy and auditing. He has Ph.D. (Environmental Science) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical reports related to environmental science. Currently he is associated with True Quality Certifications Private Limited and is empanelled with APPLUS certification to carry out GHG audit.

2. Simon Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ LGAI for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years.

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CERC	Central Electricity Regularity Commission
CM	Combined Margin
CMS	Central Monitoring system
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
OM	Operating Margin
GWP	Global Warming potential
JMR	Joint Metering reading
RBI	Reserve Bank Of India
SEB	State Electricity Board
SERC	State Electricity Regularity Commission

APPENDIX 5: CALIBRATION DETAILS

Metering arrangement at 220/33KV Substation, Chandragin, Tamil Nadu

Meter Sl. No.	Make	Class	Calibration date	Due date for Calibration
NP3285A (Main Meter)	Secure	0.2 s	25/09/2018	24/09/2023
NP3286A (Check Meter)	Secure	0.2 s	25/09/2018	24/09/2023

Meters installed at all sites are of 0.2s accuracy class. Considering five years calibration frequency as per CEA notification and pre-calibrated meters installed at time of commissioning, there is no any delay in calibration applicable for the project activity during this monitoring period.