



WIND BASED POWER GENERATION BY PANAMA WIND ENERGY PRIVATE LIMITED IN MAHARASHTRA, INDIA



Document Prepared By

LGAI Technological Center S.A. (Applus+ Certification)

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Summary:

Verification purpose: LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred as Applus+ Certification) has been appointed by “Panama Wind Energy Private Limited” to perform the 6th periodic verification of the “Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India”. The main purpose of this verification activity is to have an independent third party for the assessment of the project design, monitoring report to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements.

The project activity involves installations of 63 numbers of wind turbines of 1.6 MW capacity each (aggregating to 100.8 MW) in the state of Maharashtra. However, till now only 72 MW (45 WTGs) have been implemented in different phases and are in operation and 18 WTGs are yet to be implemented. Same are planned to be installed after signing of PPA with State Utility. The electricity generated from the WTGs is sold to state electricity board.

The project is registered with VCS with Project ID 1671¹. Start date of the project activity is the 22-February-2013. The monitoring period for this VCS verification is chosen from 01-January-2021 to 31-October-2021 (including both days) and the project activity achieved 66,398 tCO₂e emission reductions during this monitoring period.

The scope of the verification is the independent and objective review of the Monitoring Report (MR). The MR is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM validation and verification standard for project activities, Version 03.0, review against registered PD and Final Validation report and VCS program guideline version 4.0 and standard version 4.1.

¹ <https://registry.verra.org/app/projectDetail/VCS/1671>

A risk based approach has been followed to perform this verification activity. In the course of verification, 05 Corrective Action request (CAR) and 00 Clarification Requests (CLs) were raised and successfully closed. One (01) FAR was raised during this verification. The review of the monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

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 MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VERs. The 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 monitoring report combined.

The only purpose of the verification is its usage during the 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 verification opinion, which will go beyond that purpose.

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for document verifications. The entire documents checked/WTGs verification conducted to arrive at positive verification conclusions.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred as Applus+ Certification) has been appointed by “Panama Wind Energy Private Limited” to perform the 6th periodic verification of the “Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India” under VCS standard version 4.1 and guideline version 4.0. The objective of this verification activity is to have an independent third party for the assessment of the project design, Monitoring Report and Final Verification report 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 12.3.0”
- the project's monitoring plan is assessed against “ACM0002 - Version 12.3.0”
- 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 4.0
- CDM validation and verification standard for project activities, Version 03.0
- VCS standard v4.1
- VCS program guideline v4.0

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 verified emission reductions (VERs).

1.2 Scope and Criteria

The scope is defined as an independent and objective review of the Monitoring report (MR) prepared as per the registered PD and registered approved methodology ACM0002 - Version 12.3.0. The 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 version 4.1 and guideline version 4.0, including the approved baseline and monitoring methodology ACM0002 - Version 12.3.0. The verification was based on the requirements in the CDM validation and verification standard for project activities, Version 03.0 and VCS program guideline version 4.0 and standard version 4.1

The 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 Monitoring report. In line with Guidelines for Application of materiality in verifications, the verification team has conducted a complete verification of all the information presented in the monitoring report and data monitored as presented in the emission reduction calculation spread sheet. It follows the paper trail back to the raw data such as meter reading records and invoices. There are no material errors, overestimation of ER, omission or misstatement. The verification team has reviewed all the documents like commissioning certificates, technical specification, O&M practices, JMR, invoices, training records, grievance registers etc.

1.3 Level of Assurance

Applus+ Certification has planned and performed the verification by obtaining evidence and other information and explanations that assessment team considers necessary to give reasonable assurance that reported estimated GHG emission reductions are fairly stated. No sampling procedure applied for site visit or document verifications. The entire documents checked/Power plant verification conducted to arrive at positive verification conclusions.

In our opinion, the estimated GHG emissions reductions were calculated correctly on the basis of the approved baseline and monitoring methodology "ACM0002 - Version 12.3.0 and the VCS standard v04.1.

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 (wind energy). Panama Wind Energy Private Limited is the promoter and project proponent of the project activity. The project activity involves installations of 63 numbers of wind turbines of 1.6 MW capacity each (aggregating to 100.8 MW) in the state of Maharashtra. However, till now only 72 MW (45 WTGs) have been implemented in different phases and are in operation and 18 WTGs are yet to be implemented. The electricity generated from the WTGs is sold to state electricity board.

The project is registered with VCS with Project ID 1671. Start date of the project activity is the 22/02/2013. The monitoring period of this VCS verification covered from 01-January-2021 to 31-October-2021 (inclusive of both dates) and the project activity is achieved 66,398 tCO₂e emission reductions during this monitoring period.

The timeline for Commission of the project activity is also checked by the assessment team. Assessment team checked the Commissioning the WTGs via the commissioning Certificates and found correct. The project is implemented as per the description in the

registered PD. No event observed during the current monitoring period which can alter or deviate from the methodology requirement. The details are as below:

WTG ID	Date of commissioning
Location No. - 9,10,11,12,13	22/02/2013
Location No. - 8	22/04/2013
Location No. - 31	13/06/2013
Location No. - 45,47,48	13/06/2013
Location No. - 16,20,38,43	22/04/2013
Location No. - 4, 49	01/01/2014
Location No. - 42	07/07/2013
Location No. - 50,51	13/02/2014
Location No. - 5,6	02/07/2013
Location No. - 7	02/07/2013
Location No. - 14,17,26	10/05/2013
Location No. - 41,46	28/05/2013
Location No. - 22,23,34	28/05/2013
Location No. - 18,37,55,63	28/05/2013
Location No. - 40	13/02/2014
Location No. - 52,56,62	01/01/2014
Location No. - 61	07/07/2013
Location No. - 32	26/10/2013
Location No. - 15,19,25,27,28	06/03/2013

Assessment team checked the Commission of WTG with the commissioning Certificate and found correct. The project is implemented as per the description in the registered PD except, for non-commissioning of 18 WTGs are yet to be commissioned. Further, during project review, VVB team observed that one WTG (ID - 49) is not operational since year 2014 due to technical issue. However, as this technical issue could be resolved and make WTG - 49 may operational in future. thus, Verification team accepted the same and confirmed that there is no such events during the current monitoring period which can alter or deviate from the methodology requirement.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification Process: The project assessment is based on the “CDM validation and verification standard for project activities, Version 03.0 and “VCS standard version 4.1 and program guideline version 4.0” 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: -

1. A desk review of the Monitoring report against the registered PD and final validation report;
2. Follow-up interviews with project participant;
3. The resolution of outstanding issues and the issuance of the final verification report and opinion.

The prepared verification report and other supporting documents then undergo an internal quality control at the HQ (Accredited office) before being submitted to the VCS executive board.

In order to ensure transparency, assumptions must be clear and stated explicitly and background material must also be referenced. 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 the identified criteria.

Appointment of the assessment team

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

The composition of audit team shall be approved by the 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 presented 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 the assessment team.

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

The detail regarding the assessment team is provided below in this report as Appendix 3

Document review

The Monitoring report version 01 submitted by the PP was reviewed against the approved methodology, registered PD, final validation report 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 Applus+ Certification. Audit team performed interviews, via video/telephone conferences with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report.

Resolution of Clarification and Corrective Action Request

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues which need to be clarified for Applus+ Certification positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the Appendix 2.

The final MR Version 04 submitted by PP serves as the basis for the final assessment presented. Additional changes to the project during the 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 verification of the final documentation including the 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 PP the positive verification opinion and relevant documents are submitted to the VCS board through the VCS web-platform.

2.2 Document Review

The details of the document observed during the verification process are listed below in Appendix 1 of this report

2.3 Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Sintre	Mr. Ashok	PP representative	08-December-2021	Project Implementation, JMR & invoicing procedure, grievance mechanism Management practices, data storage, QA/QC	Dr. Atul Takarkhede (Team Leader)
2.	Jadhav	Mr. Ajay	Site Incharge		Project Implementation, JMR & invoicing procedure, calibration, grievance mechanism Management practices, data storage, QA/QC	
3.	Patil	Mr. Kunal	Local villager		Local stakeholders consultation, grievances etc.	
4.	Savlikar	Mr. Jagannath	Local villager		Local stakeholders consultation, grievances etc.	
5.	Meshram	Mr. Shyamrao	Teacher		Local stakeholders consultation, grievances etc.	
6.	Kumar	Mr. Prakash	EKI Energy Services Limited		GHG calculations, MR and ER preparation	

As referred above, the objective of the interview was to verify the following issues:

- Confirm the implementation and operation of the project in line with VCS PD: Except; out of the proposed 63 WTGs only 45 WTGs has been commissioned and further 18 WTGs referring to the project is still under the implementation stage. Same was confirmed during site visit and from Commissioning certificates, technical specifications of the WTGs, PPA, interviews with PP/Site in charge and JMR as well as invoices raised by PP towards state utility. Further, plant was under technical shutdown for the month of September & October 2021.
- Review the data flow for generating, aggregating and reporting the monitoring parameters: JMR procedures are followed at the project site in line with the state utility practice and are in line with the registered PD. JMR procedure is confirmed during the interviews with PP and assessment team also checked entire monthly JMRs issued by the state utility for the project activity with the values provided in the ER sheet for the calculations of the emission reductions;

- Confirm the correct implementation of procedures for operations and data collection: during interviews with PP, it was confirmed that implementation of procedures for operations and data collection is in line with registered PD. Service provider is responsible for the operations, maintenance as well as maintaining other technical data of the project activity. Performance and operation data of each WTG is controlled and maintained by service provider through the dedicated software and made available to the PP as & when required;
- Check the monitoring equipment against the requirements of the PD and the approved Methodology, including Calibration, maintenance, etc.: monitoring meters are cross checked with the previous verification reports, interviews with PP, Calibration is checked with the Calibration certificates issued by State Utility authorized third parties;
- Review the calculations and assumptions used to obtain the GHG data and ER: calculation procedures and monthly generation data is checked with JMR and crosschecked with invoices;
- Identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters: during interviews with PP, it was confirmed that quality control and quality assurance procedures are in place. Metering arrangements & JMR procedure is defined and controlled by state utility and PP do not have control on it. Assessment team checked all the monthly JMR values as well as crosschecked with the invoices and found that emission reductions are calculated conservatively.

Thus, to verify the implementation of project activity, onsite operation & maintenance, monitoring & management practices; assessment team has conducted site visit with site-in-charge, O&M team and also had a detail discussion with the PP representative and reviewed third party statutory documents i.e. Commissioning certificates, Power Purchase Agreement, Complete set of JMRs covering monitoring period, Invoice (for cross check of Net electricity supplied to the grid as per revised PD), breakdown log, O&M schedule, complaint/feedback register and other relevant records.

After physically interviews with concerned onsite persons, local stakeholders & document reviews submitted by PP; assessment team concluded that the project activity is implemented and operated in-line with the registered PD except 18 WTGs implementation. There is no change in the project design or operation and monitoring practices at site which can alter the applicability of meth or additionality of the project activity. In addition to the interviews with PP, assessment team have checked the Commissioning certificate, PPA and JMRs and found that the project activity is implemented as per the PD, and Monitoring report submitted by the PP for current monitoring period. From review of JMR and invoices assessment team therefore of the opinion that project is implemented as described in the registered PD and there is no change in monitoring practices as well as all monitoring parameters as envisaged in the PD. All the monitored values are supported by the evidences i.e., JMRs and found that information provided in the MR is in line with the submitted evidences. Assessment team reviewed all the Calibration certificates and found that monitoring meters are calibrated periodically

2.4 Site Inspections

Duration of Site visit: 08-December-2021				
No.	Activity performed on-site	Site location	Date	Team member
1.	The verification team conducted site visit to confirm the information and to resolve issues identified in the document review. This involved: 1) An assessment of the implementation and operation of the CDM project activity as per the registered PDD. 2) A review of information flows for generating, aggregating and reporting of the monitoring parameters. 3) interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the Monitoring Plan. 4) A cross-check between information provided in the MR and data from other sources. 5) A check of the monitoring equipment including Calibration performance, and observations of monitoring practices against the requirements of the PDD and the applied Methodology. 6) A review of calculations and assumptions made in determining the GHG data and ERs. An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters	Satara District, Maharashtra, India	08 - December -2021	Dr. Atul Takarkhede (Team Leader)

2.5 Resolution of Findings

The objective of this phase of the Verification was to resolve the requests for corrective actions and clarification and any other outstanding issues from validation which need to be clarified for Applus+ Certification's positive conclusion on the Monitoring report. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+

Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR submitted by PP serves as the basis for the final assessment presented. Additional changes to the project during the 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	00	00
Description of project activity	00	02	01
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
Project boundary	00	00	00
Establishment and description of baseline scenario	00	00	00
Demonstration of additionality	00	00	00
Emission reductions	00	01	00
Calibration details	00	01	00
Monitoring plan	00	00	00
No Net harm assessment	00	00	00
Local stakeholder consultation	00	01	00
Others (please specify)	00	00	00
Total	00	05	01

The list of findings and the resolution is presented in Appendix 2 of this report.

2.5.1 Forward Action Requests

This is 6th periodic VCS verification of the project activity and one FAR open from 2nd CDM verification² & previous VCS verifications. Please refer Appendix 2 of this report for details. However, same is open for subsequent verification.

2.6 Eligibility for Validation Activities

This section is not applicable for present verification, as Applus+ Certification holds the accreditation for Validation of projects for this Sectoral Scope.

² <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/iProcess/Applus1461150700.65/view>

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is registered with CDM with reference number UN8524³. The same is confirmed by checking the UNFCCC web site. The project activity is not availing any other form of credits & also REC India benefits and the same can be confirmed from publicly available link of REC generators.

Web-link:

https://www.recregistryindia.nic.in/index.php/general/publics/registered_regens

Further, the project proponent has provided undertaking for not availing other forms of environmental credit including REC for the same crediting period under consideration.

3.2 Methodology Deviations

PP has not requested any methodological deviation. Thus, this section is not applicable for present verification.

3.3 Project Description Deviations

PP has not requested any project description deviation. Thus, this section is not applicable for present verification.

3.4 Grouped Project

The project is not a grouped project. Thus, this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity, "Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India" was registered as a CDM project on 05-December-2012 (UNFCCC Ref No.8524) applying the methodology ACM0002 - Version 12.3.0. The WTGs of the project activity are owned by the Project Proponent, i.e., Panama Wind Energy

³ <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/view>

Private Limited, which was verified from commissioning certificate and the PPA for the project activity.

Project location is confirmed by the assessment team during the site visit. Assessment team also checked with the GPS meter regarding the latitude and longitude of the project site and confirm that the details as mentioned in the registered PD are correct.

The detail is as below:

Sr. No	Location No	Latitude	Longitude	Date of Commissioning
1.	Location No 4	N17 18 18.2	E73 47 19.8	01/01/2014
2.	Location No 5	N17 19 52.2	E73 48 58.8	02/07/2013
3.	Location No 6	N17 19 37.4	E73 48 50.2	02/07/2013
4.	Location No 7	N17 18 56.2	E73 49 19.9	02/07/2013
5.	Location No 8	N17 18 43.3	E73 46 48.0	22/04/2013
6.	Location No 9	N17 18 49.6	E73 46 37.0	22/02/2013
7.	Location No 10	N17 18 56.3	E73 46 42.8	22/02/2013
8.	Location No 11	N17 19 02.3	E73 46 49.5	22/02/2013
9.	Location No 12	N17 19 09.8	E73 46 53.0	22/02/2013
10.	Location No 13	N17 19 16.1	E73 46 59.4	22/02/2013
11.	Location No 14	N17 19 22.5	E73 47 05.5	10/05/2013
12.	Location No 15	N17 19 28.6	E73 47 12.8	06/03/2013
13.	Location No 16	N17 19 34.8	E73 47 19.5	22/04/2013
14.	Location No 17	N17 19 39.8	E73 47 28.0	10/05/2013
15.	Location No 18	N17 19 00.7	E73 49 33.5	28/05/2013
16.	Location No 19	N17 19 30.8	E73 47 35.6	06/03/2013
17.	Location No 20	N17 19 36.6	E73 47 45.0	22/04/2013
18.	Location No 22	N17 18 26.1	E73 47 14.7	28/05/2013
19.	Location No 23	N17 18 27.7	E73 47 27.0	28/05/2013
20.	Location No 25	N17 18 45.3	E73 47 00.6	06/03/2013
21.	Location No 26	N17 18 53.0	E73 47 04.7	10/05/2013
22.	Location No 27	N17 18 59.8	E73 47 10.7	06/03/2013
23.	Location No 28	N17 19 06.7	E73 47 18.1	06/03/2013
24.	Location No 31	N17 18 56.4	E73 50 01.9	13/06/2013
25.	Location No 32	N17 18 33.6	E73 48 31.8	26/10/2013
26.	Location No 34	N17 18 10.1	E73 47 24.3	28/05/2013
27.	Location No 37	N17 18 41.0	E73 48 37.3	28/05/2013
28.	Location No 38	N17 19 44.8	E73 47 37.7	22/04/2013
29.	Location No 40	N17 19 39.7	E73 48 33.6	13/02/2014
30.	Location No 41	N17 19 44.9	E73 48 56.0	28/05/2013
31.	Location No 42	N17 19 31.8	E73 49 09.3	07/07/2013
32.	Location No 43	N17 18 54.7	E73 47 25.7	22/04/2013
33.	Location No 45	N17 19 08.6	E73 48 40.5	13/06/2013
34.	Location No 46	N17 19 16.4	E73 48 43.0	28/05/2013
35.	Location No 47	N17 19 19.9	E73 48 52.8	13/06/2013
36.	Location No 48	N17 19 27.6	E73 48 59.3	13/06/2013
37.	Location No 49	N17 18 50.6	E73 47 56.6	01/01/2014
38.	Location No 50	N17 18 20.0	E73 48 54.6	13/02/2014
39.	Location No 51	N17 18 25.2	E73 48 47.2	13/02/2014
40.	Location No 52	N17 18 31.6	E73 48 53.1	01/01/2014
41.	Location No 55	N17 18 57.1	E73 49 02.3	28/05/2013
42.	Location No 56	N17 19 04.4	E73 49 07.2	01/01/2014
43.	Location No 61	N17 18 48.5	E73 49 22.2	07/07/2013
44.	Location No 62	N17 18 49.0	E73 49 40.0	01/01/2014
45.	Location No 63	N17 18 52.9	E73 49 51.8	28/05/2013
46.	Location No 1	N17 17 42.4	E73 46 33.3	
47.	Location No 2	N17 17 51.2	E73 46 32.5	

Sr. No	Location No	Latitude	Longitude	Date of Commissioning
48.	Location No 3	N17 17 59.8	E73 46 32.3	Yet to Commission
49.	Location No 21	N17 18 19.7	E73 47 02.1	
50.	Location No 24	N17 18 36.8	E73 46 59.5	
51.	Location No 29	N17 19 08.7	E73 47 31.3	
52.	Location No 30	N17 19 09.1	E73 47 48.7	
53.	Location No 33	N17 19 18.1	E73 47 27.0	
54.	Location No 35	N17 18 59.5	E73 47 54.8	
55.	Location No 36	N17 19 06.7	E73 48 09.0	
56.	Location No 44	N17 19 00.2	E73 48 37.4	
57.	Location No 53	N17 18 40.9	E73 48 53.1	
58.	Location No 54	N17 18 48.5	E73 48 57.0	
59.	Location No 59	N17 18 32.6	E73 49 17.6	
60.	Location No 60	N17 18 40.6	E73 49 20.4	
61.	Location No 39	N17 19 50.4	E73 48 40.3	
62.	Location No 57	N17 19 12.7	E73 49 08.7	
63.	Location No 58	N17 19 22.7	E73 49 15.5	

The project activity involves an installation of 63 Wind Turbine Generators (WTGs) of total generating capacity of 100.8 MW (63×1.6 MW) of GE make. But till date only 45 WTGs (72 MW) have only been commissioned. Remaining are planned to be installed after signing of PPA with State Utility. WTG (WTG 49) is not operational since 2014 due to technical issues. The WTG units are installed in Satara district in the state of Maharashtra and the electricity generated is exported to NEWNE grid of India. Verification team confirmed from the registered PD and on-site visit that the location of the project activity including the coordinates is same as mentioned in the registered CDM PDD. Actual operation days (243 days) less than the monitoring period (304 days) due to plant was shut down in September and October 2021 due to force majeure, same is verified during site visit and details are mentioned in revised MR and ER sheet.

The project boundary includes the electricity generation equipment at the project site, sub-station and the NEWNE grid.

Assessment team also checked the technical details of the WTGs installed onsite. The same is checked during the onsite visit from the number plates, module capacity etc. also cross checked from the technical details from Manufacture.

The project activity involves WTG supplied by GE. The WTGs are GE XLE 1.6 MW machines. The WTGs implemented in this project have been supplied by GE as complete unit without any technology transfer.

The technical details of the WTG are as follows:

Rotor:	
Diameters	82.5 m
Number of Blades	3
Swept area	5346m ²
Rotor speed range	9-18 rpm
Rotational direction	Clockwise looking downwind
Maximum tip speed	77.2 m/s

Orientation	Upwind
Speed regulation	Pitch control
Aerodynamic brakes	Full feathering
Pitch System:	
Principle	Independent blade pitch control
Actuation	Individual electric drive
Yaw System:	
Yaw rate	0.5 degree/s

Assessment team checked the commissioning certificate and confirmed that the dates of Commission for the plants are correct.

The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period except installation of remaining WTGs. The project design as mentioned in the registered PD is implemented and thus the same is acceptable to the assessment team. All required monitoring equipment's and procedures as mentioned in the registered PD are available and implemented in an appropriate manner.

The organisational role and responsibility as mentioned in the registered PD is followed onsite. All the monitoring equipment was calibrated once in three year and thus complied with registered monitoring plan. All the emergency preparedness as mentioned in the registered PD is followed onsite and no discrepancies were found regarding the same.

The project activity fulfilled the contribution of sustainable development to the host country by implementing environmental friendly technology and creating employment opportunities to the local community. Same is confirmed during site visit.

The ex-ante fixed grid emission factor of 0.9486 tCO₂/MWh has been used for the baseline emission calculation which is line with the registered CDM PDD.

By comparing the actual ER claimed in this monitoring period with the estimate in the registered VCS PD (88,579 tCO₂e for the monitoring period estimated⁴ for 45 WTGs), the actual emission reductions (66,398 tCO₂e for the monitoring period considering actual operational days of 243) are lower than by 25.04% what is stated in the registered VCS PD which surely will not lead to the overestimation of VERs.

All required equipments and procedures are available and implemented in an appropriate manner.

It was observed that the monitoring plan was implemented as per the requirement of the registered PD, FVR and approved methodology ACM0002 - Version 12.3.0. The

⁴ As per the VCS PD estimated ER for 63 WTGs (100.8 MW capacity) are 186,270 tCO₂e.

organisational role and responsibility as mentioned in the registered PD is followed onsite. All the monitoring equipment was calibrated as per the specified interval in the registered PD. All the emergency preparedness as mentioned in the registered PD is followed onsite and no discrepancies were found regarding the same.

Start date of the project activity is 22-February-2013. The Project has applied for the CDM under the Kyoto protocol and registered with CDM having UNFCCC ref number as UN8524⁵. CERs for the period 05-December-2012 to 01-May-2015 & 02-May-2015 to 01-April-2016 are already issued as per UNFCCC website. The project activity will avail GHG emissions reductions for only one program i.e. VCS⁶ and there will not be any double accounting for the same.

It was also observed during the verification process that project is not rejected by any other GHG program around the world. Declarations dated 10-January-2022 in that effect is also provided by PP.

It was also observed during the verification process is that project is not rejected by any other GHG program around the world. The project is registered by VCS board and the registered PD and registered FVR is used to assess the present periodic verification. The following web sites were checked to confirm the same:

1. www.v-c-s.org

Assessment team hereby also confirms from the declaration made by PP the projects are not registered under the any other scheme except CDM, Other environmental or GHG credits & REC mechanism of India and the same is cross-checked at <https://recregistryindia.nic.in>. Moreover as per state tariff policy the project is not eligible to receive REC benefits as it is selling power to State electricity grid.

The assessment team observed that the project is in line with the registered PD non-implementation of 18 WTGs,

Sustainable development indicators

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment, Forests & Climate Change (MoEFCC), has mentioned four indicators for the sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM/VCS) projects from India. Thus the project's contribution towards sustainable development has been addressed based on the following sustainable development aspects:

Social well-being

The project activity provided / provides job opportunity to local people during commissioning and maintenance of the wind power plant. Frequency of visiting villages

⁵ <https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/view>

⁶ <https://registry.verra.org/app/projectDetail/VCS/1671>

and nearby areas by skilled, technical and industrialist increase due to installation /site visit/operation and maintenance work related to wind plant. This directly and indirectly positively effects the economy of villages and nearby area.

Environmental well-being

Wind power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus, the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

Economic well-being

The VCS project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

Technological well-being

The project activity is step forward in harnessing the untapped wind energy and further diffusion of the wind technology in the region. The project activity leads to the promotion and demonstrates the success of wind projects in the region which further motivate more investors to invest in wind power projects. Hence, the project activity leads to technological well-being.

CAR 01 & CAR 02 was raised during the verification process and closed successfully. Please refer Appendix 2 of this report for the detail closure of the CAR.

4.2 Safeguards

4.2.1 No Net Harm

No potential environment or socio-economic matter was found during the documents review of VCS PD and grievance register etc. The project is renewable energy project and thus no negative impact observed due to project activity.

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. The report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013⁷. This report clearly mentioned that solar/Wind power project activity operations do not result in direct air pollution, noise pollution. Moreover, also as per the Central Pollution Control Board of India notification⁸ solar/wind project falls under White Category and are practically non-polluting.

⁷ <https://smartnet.niua.org/sites/default/files/resources/report-on-developmental-impacts-of-RE.pdf>

⁸ http://envfor.nic.in/sites/default/files/Latest_118_Final_Directions.pdf

4.2.2 Local Stakeholder Consultation

Local stakeholder consultation has been conducted at the time of project registration. For on-going stakeholder's communication, PP have maintained feedback/complaint register at the site office. All the stakeholders are happy with the implementation and operation of the project activity and no negative comments envisaged for the project activity. Complaint/suggestion/feedback register is maintained at site as a part of ongoing communication with stakeholders in line with clause 3.16.17 of VCS Standard, ver. 4.1 and appropriate actions taken time to time by PP.

Assessment team checked the grievance register provided by PP and found that local stakeholders can anytime lodge their grievances if any in the register over the operational life time of the project. However, during current monitoring period no grievance was received.

CAR 03 was raised during the verification process and closed successfully. Please refer Appendix 2 of this report for the detail closure of the CAR.

4.3 AFOLU-Specific Safeguards

This section is not applicable as this project activity is a non-AFOLU project activity.

4.4 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 VCS PD. 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 VCS PD.
Findings	CAR 04 was raised during the verification process and closed successfully. Please refer Appendix 2 of this report for the detail closure of the CAR.
Conclusion	Baseline Emissions: The baseline Emissions for a given year is calculated by multiplying the energy baseline with the grid emission factor. The grid in this case would be the 'Indian Grid' Formula Used:- $BE_y = EF_{CO_2, grid, y} \times EG_{BL, y}$ Where, $EG_{BL, y}$ = Net electricity supplied to the NEWNE regional grid $EF_{CO_2, grid, y}$ = Baseline emission factor Ex-ante Parameter: $EF_{grid, CM, y}$ = Parameter is fixed ex-ante for the entire crediting period and as per the validated VCS PD same is fixed 0.9486 tCO₂/MWh. Verification

team found same was used in the ER calculations.

$EF_{CO2,grid,y}$, $EF_{grid,BM,y}$, $EF_{grid,OM,y}$ were mentioned as ex-ante fixed parameter. Assessment team checked the values, source of data, choice of data, purpose of the data mentioned in the MR from the registered PD and confirms that the similar approach was considered for the current monitoring period also.

Ex-post parameters:

As per the registered monitoring plan and requirement of the registered methodology following parameters needs to be monitored:

$EG_{PJ,y}$ = The verification team has checked the entire monthly JMR reports for net electricity generated & supplied to the grid and crosschecked same with the invoices raised by PP towards State Utilities for the monitoring period. All values are found correct. All the parameters are monitored and recorded as per the monitoring plan in the registered VCS PD. The verification team has crosschecked the revised emission reduction sheet and monitoring report data with the JMR sheet and invoice and found all the values are matching. During the current monitoring period, the project activity supplied 69,995.84 MWh electricity to the grid.

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$ = 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)

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

$$\begin{aligned} EG_{BL,y} &= \text{Net electricity supplied to the NEWNE regional grid (MWh)} \\ &= 69,995.84 \text{ MWh} \end{aligned}$$

$$\begin{aligned} BE_y &= 69,995.84 \times 0.9486 \\ &= 66,398 \text{ tCO}_2\text{e (round down values)} \end{aligned}$$

PE_y = As per ACM0002 - Version 12.3.0, all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected. As the project activity involved wind project emissions (PE_y) are taken as zero.

Leakage: As per applied methodology ACM0002 - Version 12.3.0 and VCS PD Leakage emissions are not considered for the project activity.

$$\begin{aligned} \text{Hence, } ER_y &= BE_y - PE_y - L_y \\ &= 66,398 - 0 - 0 \\ &= 66,398 \text{ tCO}_2\text{e (rounddown values)} \end{aligned}$$

Assessment team confirmed that the GHG emission reductions and removals have been quantified correctly in line with the registered VCS PD.

Verification team also confirms that the monitoring has been carried out in accordance with the monitoring plan contained in the registered VCS PD.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the Calibration details of the monitoring meters with the calibration certificates.
Findings	CAR 05 was raised during the verification process and closed successfully. Please refer Appendix 2 of this report for the detail closure of the CAR.
Conclusion	The metering arrangement is tri-vector bi-directional energy meters of Elster Make; accuracy class 0.2s (main and check) at the State Electricity Board (SEB) substation. For measuring the energy delivered by the project activity, one set of main meters (part of interconnection facilities) and check meters is provided at each of the 4 feeders by the project proponent and respective electricity distribution company (MSDCL). These meters record several parameters including electricity exported & imported. These electricity meters are being used by state electricity board for JMR (Joint Meter Reading) electricity generation statements. During commissioning of the WTGs monitoring meters of accuracy class i.e. 0.2s were installed. The meters are monitored continuously & cumulative readings are taken at the end of the month by joint meter reading procedure. These are sealed by State Utilities to avoid malfunctioning with meter readings. Calibration frequency of the monitoring meters is once in three years. However, Meters are usually calibrated yearly by the meter testing division of the state utility in the presence of O&M Contractor / investor's representatives and State Utilities officials to ensure the working of meter within permissible limits, however, calibration frequency and schedule is under the complete discretion of State Utility and PP do not have control on it. The calculation of net electricity supplied to grid is under purview of state electricity board and PP does not have control on it. Calibration details of the monitoring meters checked with calibration certificates submitted by PP and found that calibration frequency of once in 3 years is complied. Please refer Appendix 5 for details. The break down log is checked and there is no major breakdown during the monitoring period except WTG 49. No unforced error observed. No sampling procedure applied for monitoring of the data parameter and entire documents were checked by the assessment team to arrive at positive verification conclusions. The monitoring plan is followed at the project site. Thus, assessment team concluded that the evidences are sufficient in quantity, and appropriate for the quality, to determine the GHG reductions and removals.

4.6 Non-Permanence Risk Analysis

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
NA	NA	NA	NA	NA

5 VERIFICATION CONCLUSION

Applus+ Certification has been engaged by Panama Wind Energy Private Limited to perform the 6th periodical verification of the “Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India”.

The management of Panama Wind Energy Private Limited is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s Monitoring Plan in the registered PD and the applied methodology ACM0002 – Version 12.3.0.

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. Further, the verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. No sampling procedure applied for document verifications. The entire documents checked/Power plant verification conducted to arrive at positive verification conclusions. The verification team 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.
- A Reasonable Level of assurance was achieved as planned, during verification process.
- Verification period: 01-January-2021 to 31-October-2021 (inclusive of both days)

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

Year	Baseline emissions or removals (tCO ₂ e) ⁹	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
01-January-2021 to 31-October-2021	66,398	0	0	66,398
Total	66,398	0	0	66,398

⁹Rounddown values

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (VERIFICATION)

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificates of the WTGs implemented in the project site.	NA	Project participant
2.	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
3.	NA	Technical specifications of wind turbine generators from manufacturers	Manufacturer technical specifications	Project participant
4.	NA	Power Purchase agreement for the project activity	NA	Project participant
5.	NA	Registered CDM PDD (Revised for post registration changes)	version 2 dated 14-August-2015	UNFCCC
6.	NA	Final CDM Validation report	version 2.5 dated 29-November-2012	UNFCCC
7.	NA	CDM 1 st Verification MR	Version 01 dated 28-August-2015	UNFCCC
8.	NA	CDM 1 st Verification FVR	Version 01 dated 07-September-2015	UNFCCC
9.	NA	CDM 2 nd Verification MR	Version 02 dated 02/06/2016	UNFCCC
10.	NA	CDM 2 nd Verification FVR	Version 01 dated 15-June-2016	UNFCCC
11.	NA	VCS PD	Version 03 dated 05-April-2017	Project participant
12.	NA	Final VCS GAP Validation & 1 st Verification report	version 02 dated 05-April-2017	Project participant
13.	NA	Final Monitoring report for 1 st verification	Version 02 Dated 23-March-2017	Project participant
14.	NA	Final Monitoring report for 2 nd verification	Version 03 Dated 30-April-2018	Project participant
15.	NA	Final Monitoring report for 3 rd verification	Version 02 Dated 07-May-2019	Project participant

No.	Author	Title	References to the document	Provider
16.	NA	Final Monitoring report for 4 th verification	Version 02 Dated 31-March-2020	Project participant
17.	NA	Final Monitoring report for 5 th verification	Version 02 Dated 08-February-2021	Project participant
18.	NA	Previous verification documents https://registry.terra.org/app/projectDetail/VCS/1671	-	Project participant
19.	NA	The operational lifetime of the project activity from the manufacturer=(Technical specifications)	Manufacturer technical specifications	Project participant
20.	NA	Ministry of Environment and forest: www.envfor.nic.in UNFCCC www.cdm.unfccc.int CEA: Central electricity authority www.cea.nic.in VCS: Verified Carbon Standard www.v-c-s.org	Reference link is provided.	Independent Search
21.	NA	Tools/ guidelines used in the project activity - CDM Methodology ACM0002 – Version 12.3.0 - 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 - Glossary of CDM terms version 07 - VCS standard Version 4.1 - VCS Program Guide 4.0 - VCS verification report template version 4.0	UNFCCC CDM web site	UNFCCC
22.	NA	JMR/Credit notes records for the complete monitoring period	JMR records	Project participant
23.	NA	Draft MR version 1 Revised MR version 2 Revised MR version 3 (revised for VCS Review_R1) Final MR version 4 (revised for VCS Review_R2)	13-Decemer-2020 10-January-2022 05-May-2022 05-August-2022	Project participant
24.	NA	Emission Calculation sheet version 01 Emission Calculation sheet version 02	13-Decemer-2020 10-January-2022	Project participant
25.	NA	Invoices for the complete monitoring period	Invoice	Project participant
26.	NA	Break down details of the complete monitoring period	Log sheet	Project participant
27.	NA	Self-Declaration from PP for not participating/	10-January-2022	Project

No.	Author	Title	References to the document	Provider
		claiming other emission reduction programme		participant

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

Project Implementation Status

CAR ID	01	Section no.	4.1	Date: 06-January-2022
Description of CAR				
PP is requested to reframe the language of section 1.11 of monitoring report as the project activity is already implemented and contributing towards emission reduction.				
Project participant response				Date: 10-January-2022
<i>Language in section 1.11 is being revised.</i>				
Documentation provided by project participant				
MR V2				
DOE assessment				Date: 17-January-2022
PP have submitted the revised MR with the corrections in the Section 1.11 & same are found correct. Thus CAR is closed.				

CAR ID	02	Section no.	4.1	Date: 06-January-2022
Description of CAR				
PP is requested to submit an undertaking for no double accounting for current monitoring period and for project activity is participated in other GHG program other than VCS.				
Project participant response				Date: 10-January-2022
Double counting declaration is being submitted.				
Documentation provided by project participant				
Double counting declaration.				
DOE assessment				Date: 17-January-2022

PP has also submitted Declaration dated 10-January-2022 regarding avoidance of double counting of emission reductions in the other GHG trading programmes and REC mechanism of India. CAR closed.

CAR ID	03	Section no.	4.2.2	Date: 06-January-2022
Description of CAR				
In section 2.2 of MR, PP has mentioned about ongoing local stakeholder consultation mechanism practise onsite. However, to verify the same, PP is requested to submit records of ongoing local stakeholder consultation including grievance register etc.				
Project participant response				Date: 10-January-2022
<i>Onsite Grievance is being submitted.</i>				
Documentation provided by project participant				
<i>Grievance register</i>				
DOE assessment				Date: 17-January-2022
PP has kept grievance registered at project site for ongoing communication with Local Stakeholder and also provided the copy of grievance registered to assessment. Assessment team checked the grievance registered and confirms that during current monitoring period no grievances were received. Thus, CAR closed.				

Accuracy of GHG Emission Reduction and Removal Calculation

CAR ID	04	Section no.	4.4	Date: 06-January-2022
Description of CAR				
In ER sheet, Electricity generation data for month of September and October 2021 is missing for all WTGs. Thus, Corrective action sought.				
Project participant response				Date: 10-January-2022
Plant was shut down in September and October 2021 due to force majeure.				
Documentation provided by project participant				
NA				
DOE assessment				Date: 17-January-2022
PP have submitted JMRs & found that there is no generation for the month of September and October 2021 due to force majeure. Same found correct. CAR thus closed.				

Quality of Evidence to Determine GHG Emission Reductions and Removals

CAR ID	05	Section no.	4.5	Date: 06-January-2022
Description of CAR				
PP has mentioned detailed information of metering equipment like serial number, make, calibration date and validity of calibration and calibration frequency in appendix 1 of MR. However, copy of calibration certificates issued during the period 2021 is missing. Thus, CAR is raised till submission of same.				
Project participant response				Date: 10-January-2022
Calibration certificate is being provided.				
Documentation provided by project participant				
Calibration certificate.				
DOE assessment				Date: 17-January-2022
PP have submitted the calibration certificates for all feeders and found correct. No delay in calibration observed. CAR thus closed.				

FAR ID	01	Section no.	4.1	Date: 17-January-2022
Description of FAR				
FAR open from 2 nd CDM verification & Previous VCS verifications: During this verification it was observed that out of the proposed 63 WTGs only 45 WTGs have been commissioned and further 18 WTGs referring to the project are still under the implementation stage. FAR is open. PP requested to provide status of forest clearance required for installation of remaining WTGs.				
Project participant response				Date: 10-January-2022
The location which doesn't have commissioned status during the last verification, they are still under the implementation stage and no any further clearances received.				
Documentation provided by project participant				
NA				
DOE assessment				Date: 17-January-2022
The verification team confirms that the reason mentioned is acceptable. However, the FAR is still open for subsequent verifications to check the implementation of the remaining WTGs.				

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) / Technical Expert (TE)	EI	Shen	Simon	Applus+ Certification
2.	Approver	IR	Calle de Miguel	Agustín	Applus+ Certification

Short CVs of the Team:

- Dr. Atul Takarkhede is Ph.D. (Environmental Sciences) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical papers related to environmental sciences. He counts with more than 11 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, functional area expert in Water Pollution & Solid & Hazardous Waste management among others. Furthermore, he counts with solid experience on CDM-VCS-GS consultancy and auditing. Currently he is associated with True Quality Certifications Private Limited and empanelled with Applus+ Certification to carry out GHG audits in the aforementioned schemes.
- Mr. Simon Shen (Master's Degree in Thermal Energy Engineering, Bachelor's Degree in Environmental Engineering) is an Auditor appointed by Applus+ LGAI for the GHG project

assessment, auditing and technical review. He has more than 6 years of work experience in CDM/GS4GG/VCS project assessment and review with Applus+, apart from the years of experience working as GHG Auditor and ISO 9001/14001 in TUV SUD for 3.5 years before he joined Applus+. Mr. Simon Shen has extensive experience also as former Applus+ Shanghai CDM Technical Manager.

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
CM	Combined Margin
CMS	Central Monitoring system
CO ₂	Carbon dioxide
CO ₂ e	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)
GWP	Global Warming potential
MSEDCL	Maharashtra State Electricity Distribution Company Limited
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS OF THE METERS

Calibration Details of the WTGs installed in the project activity is provided below:

Details	Calibration details of the_meters at Feeder No. 1			
Type of meter	Main Meter		Check Meter	
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 1 - 7304			
WTG Connected	Location no: 4, 8-13, 49			
Accuracy class	0.2 s		0.2 s	
Meter Make	Elster		Elster	
Meter Sr. No.	16595568		13813597	
Calibration Details	Year 2018	Year 2021	Year 2018	Year 2021
Date of calibration	06-June-2018	31-March-2021	06-June-2018	31-March-2021
Calibration delay ¹⁰	No delay		No delay	

Details	Calibration details of the_meters at Feeder No. 2			
Type of meter	Main Meter		Check Meter	
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 2 - 7305			
WTG Connected	Location no: 14-17, 19-20, 22-23, 25-28, 34,38,43			
Accuracy class	0.2 s		0.2 s	
Meter Make	Elster		Elster	
Meter Sr. No.	16595569		13813601	
Calibration Details	Year 2018	Year 2021	Year 2018	Year 2021
Date of calibration	06-June-2018	31-March-2021	06-June-2018	31-March-2021
Calibration delay	No delay		No delay	

Details	Calibration details of the_meters at Feeder No. 3	
Type of meter	Main Meter	Check Meter
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 3 – 7308	
WTG Connected	Location no: 5-6, 32, 40-42, 45-48	
Accuracy class	0.2 s	0.2 s
Meter Make	Elster	Elster
Meter Sr. No.	13813599	13132610

¹⁰ As per the registered PDD meters are calibrated at least once in three years.

Calibration Details	Year 2018	Year 2021	Year 2018	Year 2021
Date of calibration	06-June-2018	31-March-2021	06-June-2018	31-March-2021
Calibration delay	No delay		No delay	

Details	Calibration details of the_meters at Feeder No. 4			
Type of meter	Main Meter		Check Meter	
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 4 - 7309			
WTG Connected	Location no: 7,18,31,37,50-52,55-56,61-63			
Accuracy class	0.2 s		0.2 s	
Meter Make	Elster		Elster	
Meter Sr. No.	13132640		13813602	
Calibration Details	Year 2018	Year 2021	Year 2018	Year 2021
Date of calibration	06-June-2018	31-March-2021	06-June-2018	31-March-2021
Calibration delay	No delay		No delay	