



Verified Carbon Standard

JOINT VALIDATION & VERIFICATION REPORT FOR “GRID CONNECTED WIND POWER PROJECT IN TAMIL NADU”



Document Prepared by LGAI Technological Center, S.A. (Applus+)

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Summary:

LGAI Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been contracted CLP Wind Farms (India) Private Limited to conduct the validation of the renewal of the crediting period (RCP) and verification of the project “ Grid Connected Wind Power Project in Tamil Nadu ” (VCS ID- 909), regarding the relevant requirements of VCS programme guidelines and standard (VCS standard version 4.2, VCS and VCS program guide version 4.1). Relevant requirements of the UNFCCC for CDM project activities, as well as criteria for consistent project operations, monitoring and reporting has been applied for validation and verification.

The monitoring period covers under this verification are from 01/01/2021 to 31/12/2021(both days included).

The verification includes confirming the implementation of the monitoring plan of the validated VCS joint PD and MR and the application of the monitoring methodology as per “ACM0002- Grid-connected electricity generation from renewable sources’ version 20.”

The purpose of this project activity is to generate electricity using renewable sources (wind) and supplying the same to the integrated Indian Grid. Thus, the project aims to displace electricity produced by fossil fuel power plants harnessing wind energy. The energy produced is supplied to the Indian grid. Therefore, the project reduces greenhouse gas emissions and thereby contributes to sustainable development.

The project activity involves the installation of 15 WTGs of capacity 1.65 MW each at Theni district of Tamil Nadu state in India, reaching a total installed capacity of 24.75 MW. These WTGs are of Vestas make (model V-82) and supplying the electricity to the Southern grid (now part of integrated Indian grid).

The first WTG was commissioned on 02/07/2010 and remaining 14 WTGs on 29/07/2010, since then project is operational with some planned/unplanned shutdowns. The commissioning dates of the project activity have been verified through the commissioning certificates.

Project activity was operational during the first crediting period from 02/07/2010 to 01/07/2020. The operation of the project will remain the same for the second crediting period from 02/07/2020 to 01/07/2030.

A risk-based approach has been followed to perform this combined validation & verification. During validation & verification, 03 Corrective Action request (CARs) and 01 Clarification request (CLs) were raised and successfully closed.

The review of the joint project description & monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, have provided Applus+ Certification with sufficient evidence to validate the fulfillment of the stated criteria.

The assessment team can conclude that:

- i. A reasonable level of assurance has been applied.
- ii. All data and information used for ex-ante calculation of emission reductions is correctly applied.
- iii. The project is in line with all relevant host country legislation.
- iv. The project additionality is not required to be reassessed; however, it is sufficiently justified in the joint VCS PD&MR.
- v. The monitoring plan is in accordance with the approved methodology, transparent and adequate.
- vi. Project deviations have sufficiently been addressed and justified.

- vii. The calculation of the baseline emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 561,320 tCO₂e are most likely to be achieved within the 10-year renewable crediting period.
- viii. The conclusions of this validation report show that the project, as it was described in the updated project documentation, is in line with all criteria applicable for the validation against the VCS standard Version 4.2 without any qualifications or limitations.

Validation & Verification Conclusion:

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

Applus+ Certification confirms that the project is implemented in accordance with the validated VCS joint PD & MR. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the projects GHG emissions, and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information seen and evaluated we confirm that the implementation of the project has resulted in 45,378 tCO₂e during period 01/01/2021 to 31/12/2021.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center, S.A has been contracted by CLP Wind Farms (India) Private Limited (project proponent), to undertake the combined validation of renewable crediting period and verification of the renewable energy project titled “Grid Connected Wind Power Project in Tamil Nadu ” The verifiers have reviewed the GHG data collected to date for the monitoring period from 01/01/2021 to 31/12/2021 (both days included) covered in this verification.

The purpose of this validation and verification is to have an independent third-party assessment of whether the project activity conforms to the qualification criteria set out in the VCS standard Version 4.2 /17/ to attain real, measurable, additional, and permanent emission reductions. The validation/verification statement/opinion is a written assurance that:

- The project complies with all the applicable VCS requirements and could generate the emission reductions stated over the project’s crediting period.
- The project complies with all the relevant legal and regulatory requirements, including the host country legislation. Particularly, the validity of project's baseline and regulatory surplus are validated to confirm the compliance as outlined under paragraph 3.8.9 of VCS standard 4.2, for the renewal crediting period.
- The validation followed the requirements of the current version of the VCS Standard Version 4.2 and VCS program guide 4.1 to ensure the quality and consistency of the validation work and the report.
- The project has resulted in emission reductions as declared by the organisation or GHG project’s GHG assertion.
- The data reported is accurate, complete, consistent, transparent, and free of material error or omission..

1.2 Scope and Criteria

For validation:

The validation assessment was carried out in accordance with the requirements of VCS standard version 4.2 and included an assessment but not limited to, of the following:

Demonstration of the regulatory surplus, in reference to the additionality of the project, in accordance with the clause 3.8.9 VCS standard version 4.2.

Validity of the original baseline scenario reviewing the following criteria:

- Evaluation of the impact of new relevant national and/or sectoral policies and circumstances on the validity of the baseline scenario.
- Assessment of the GHG emissions associated with original baseline scenario using the latest version of the CDM Tool to assess the validity of the original/ current baseline.
- If the original baseline scenario is no longer valid, whether current baseline scenario is established in accordance with the VCS rules.
- The project description, containing updated information with respect to the baseline, the estimated GHG emission reductions or removals and the monitoring plan, submitted for validation is based upon the latest approved version of the methodology or its replacement.

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

For Verification:

The scope of the verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from the project activity. The verification of this project was based on the validated registered VCS PD, VCS joint PD& MR and supporting documents submitted by the project proponent to the verification team. The documents were reviewed against the following guidance and protocols:

- VCS Standard: Version 4.2 /17/
- Approved consolidated baseline methodology ACM0002., version 20 “Grid-connected electricity generation from renewable sources”/10/
- Final validated joint VCS Project Description & monitoring report/04/
- VCS Program Guide, Version 4.1 /18/
- ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions, 2006

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

1.3 Level of Assurance

The level of assurance of the joint validation and verification report falls under reasonable assurance. Reasonable assurance is a high level of assurance regarding material misstatements, but not an absolute one.

Reasonable assurance includes the understanding that there is a remote likelihood that material misstatements will not be prevented or detected on a timely basis. To achieve reasonable assurance, the auditor needs to obtain sufficient appropriate audit evidence to reduce audit risk to an acceptably low level. This means that there is some uncertainty arising from the use of sampling, since it is possible that a material misstatement will be missed.

The evidence used to achieve a reasonable level of assurance is specified in section 2.3 and 2.4 of this report.

1.4 Summary Description of the Project

The project activity involves electricity generation by wind electric convertors and being supplied to Indian grid. The project being a renewable energy generation activity, it leads to removal of fossil fuel dominated electricity generation. The project activity results in reductions of greenhouse gas (GHG) emissions that are real, measurable, and verifiable and plays beneficial role in the mitigation of climate change.

This project falls in the category of renewable energy generation, which replaces electricity generation from the fossil fuel dominated grid. The project activity consists of 15 WTGs (1650 kW capacity each), making the total installed capacity to be 24.75 MW at the Jangalpatti, Poomalaikundu, & Seepalakottai villages in Theni & Uttamaplayam taluka of Theni district of Tamil Nadu state in India.

The electricity generated from these windmills is being supplied to the state grid electricity system as per the PPA signed with state electricity authority/13/. The equivalent amount of electricity would have been generated through fossil fuel fired power plants connected to the Grid resulting in higher GHG emissions in absence of the project activity. Hence generation of power through the project activity contributes to GHG emission reductions. The project activity is already commissioned, and it is found to be running satisfactorily.

The WTGs have been commissioned between 02/07/2010 and 29/07/2010. The same has been verified through the commissioning certificates/12.

2 VALIDATION AND VERIFICATION PROCESS

2.1 Method and Criteria

For Validation:

The assessment team has assessed and determined whether the proposed implementation and operation of the project activity, and the steps taken to report emission reductions comply with the criteria and relevant guidance provided by the VCS Board.

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

- The desk review of documents and evidence submitted by the project proponent in context of the reference VCS rules and guidelines,
- Undertaking virtual interview or interactions with the representative of the project proponent,
- Reporting audit findings with respect to clarifications and non-conformities and the closure of the findings, as appropriate and preparing a draft validation report
- Resolution of outstanding issues and the issuance of final verification report and opinion

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

For Verification:

The verification approach consists of two phases.

In the first phase, Applus+Certification completed a strategic review and risk assessment of the project's activities and processes to gain a full understanding of:

- i) Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant.
- ii) Protocols used to estimate or measure GHG emissions from these sources;
- iii) Collection and handling of data;
- iv) Controls on the collection and handling of data;
- v) Means of verifying reported data; and
- vi) Compilation of the Monitoring Report.

In the second phase using the Verification checklist, Applus+Certification verified the implementation of the monitoring plan and the data presented in the Joint PD-MR/04/ for the period in question. This involved virtual interviews of project proponent representative's and a desk review of the Joint PD-Monitoring Report. This verification report describes the findings of this assessment.

The project activity does not fall under category "grouped projects", hence any sampling methods not to be employed by the validation/verification body for the verification of GHG emission reductions or removals generated by the project.

2.2 Document Review

The registered VCS PD (version 03, dated 28/06/2012), VCS Validation report version 02, dated 30/06/2012, joint VCS PD&MR and additional supporting documents related to the project performance submitted by the client were reviewed. A complete list of all documents reviewed is mentioned in Appendix 1 of this report.

2.3 Interviews

Due to the current situation with the global COVID-19 pandemic scenario physical site inspection is not done for the RCP validation & verification. Although domestic travel has resumed in India, it is still not recommended until necessary and considering health and safety a top priority, physical site visit for verification audit is not conducted. Furthermore, as per the Section 4.1.2 of the VCS Standard, v4.2, it is not mandatory to conduct the on-site visit by VVB for validation/verification. However, the representatives of the PP were interviewed through the video conferencing (via Microsoft Teams app) on 17/06/2022 i.e., personnel responsible for monitoring of the project activity, data collection and management, and QA/QC procedure. The details of the people interviewed are mentioned in the table below:

Name	Organization	Topic covered
Mr. Ilavarasan arunachalam	CLP Wind Farms (India) Private Limited (Asset Manager)	Project implementation, start date as per the VCS requirements. Electricity Generation Records (monthly energy statements, Invoices) Reliability & accuracy of readings considered for emission reduction calculations, Calibration procedure QA/QC procedures, data management, internal audits to maintain data quality & reliability, maintenance Practices.
Mr. Kishlay Parashar	CLP Wind Farms (India) Private Limited (Senior Manager)	Consideration of monitoring period, monitoring methodology, project documentation and emission reduction calculations.
Mr. Navneet Kumar	CLP Wind Farms (India) Private Limited (Manager, corporate office)	Eligibility for renewal crediting period Monitoring and measuring system

Name	Organization	Topic covered
		Collection of measurements Observations of established practices Data Verification of monitoring parameters

2.4 Site Inspections

As discussed in the above section, physical site inspection is not done for the current verification. However, to achieve a reasonable level of assurance, the assessment team has followed the alternative means to substantiate the verification criteria as described in the below table:

Assessment Criteria	Means of verification/source documents	Assessment remark
Description of project activity	Commissioning certificates /12/ PPA signed with TNEB/13/ VCS validation report /02/. Virtual meeting with site personnel on 17/06/2022 Previous verification records /02/	The information's with reference to project capacity, technology, plant equipment's and commissioning dates as provided in section 1.1 of MR are found consistent with the documents.
Validity of baseline scenario	Sectoral and national policies /26/ & /27/	The project is following laws and regulations and baseline remain unchanged
Compliance of the project implementation with the registered project design document	Monthly Joint Meter Reading (JMRs)/Energy generation statements issued by state utility (TNEB/TANGEDCO) /09/ Geographical co-ordinates (Location of WTGs) verified through Google Map ¹ VCS validation report /02/.	JMRs issued by TNEB/TANGEDCO indicate the following information:

¹ <https://www.gps-coordinates.net/>

Assessment Criteria	Means of verification/source documents	Assessment remark
	<p>PPA signed with TNEB/13/ Virtual meeting with site personnel on 25/12/2021 Photograph of all the WTGs, energy meters installed at site and screen shots of online monitoring system /19/ Previous verification records /02/</p>	<p>Identification of the substation to which the project is connected, Serial numbers of energy meters used for measurement, Capacity of project and name of project participant. Location of each WTG is verified through Google Map. Grid connectivity of the project is confirmed through the PPAs. All the information's regarding the project implementation as discuss above are further verified through latest VCS verification report and found consistent.</p>
<p>Compliance of the registered monitoring plan with applied methodologies and standardized baselines</p>	<p>Virtual meeting with site personnel on 17/06/2022 PPA signed with TNEB/13/ Monthly Joint Meter Reading (JMRs)/Energy generation statements issued by state utility (TNEB/TANGEDCO) Invoices raised by project developer to state utility/08/ ISO Certifications /20/ Photograph of all the WTGs, energy meters installed at site and screen shots of online monitoring system /19/ Previous verification records /02/</p>	<p>The organizational structure, responsibilities and competencies of the personnel confirmed through virtual interview. Frequency of monitoring of parameters listed under approved monitoring plan is verified through JMRs /Invoices. The methods used for measuring, recording, storing, aggregating, and reporting the data on monitored parameters are verified though PPA and interactions with site personnel. Procedure for data uncertainty, emergency</p>

Assessment Criteria	Means of verification/source documents	Assessment remark
		preparedness, roles and responsibility, operational and management structure are mentioned in the MR is confirmed through policy documents and found satisfactory.
Compliance with the calibration frequency requirements for measuring instruments	Calibration certificates of instruments/07/ Monthly Joint Meter Reading (JMRs)/Energy generation statements issued by state utility (TNEB/TANGEDCO) /09/ PPA signed with TNEB/13/ Central Electricity Authority (Installation and Operation of Meters) Regulations/16/	Calibration frequency and energy meter specifications (Sr.No, make accuracy class) is verified through calibration certificates and further verified through monthly JMRs and found consistent. Responsibility of calibration and maintenance of energy meters is solely under control of TANGEDCO/TNEB; this is verified through the PPA.
Assessment of data and calculation of emission reductions or net removals	Monthly Joint Meter Reading (JMRs)/Energy generation statements issued by state utility (TNEB/TANGEDCO) /09/ Invoices raised by project developer to state utility/08/ CEA CO ₂ Baseline Database for the Indian Power Sector /11/ Previous verification records /02/	Monthly values of monitoring parameters used in ER calculation are verified through JMRs/Share certificates and cross verified with the invoices raised by the PP to state utility. Methods, formulae, and emission factor for calculating baseline emissions have been followed are in accordance with the applied methodology and as described in the approved VCS verification report.

It is noteworthy that no sampling plan for verification is applied as 100% data is verified for the current monitoring period. Most of the reference document referred by the assessment team (above table) are either issued /endorsed by state utility (TNEB), an external government agency, hence is deemed authentic.

The project is also registered under CDM with UNFCCC ref.No -7415 . The assessment team has also used documents such as approved CDM verification records & CDM RCP validation report available publicly at UNFCCC project webpage to verify the project implementation. Furthermore, the project activity is already registered under VCS (ID 909) and verified under VCS previously (during first crediting period).

The project is currently undergoing first verification under second crediting period, hence based on the information's available through approved documents (VCS verifications), it can be confirmed that project is implemented and being operated as described in the joint VCS PD&MR/04/.

The assessment team has verified sufficient appropriate audit evidence, to reduce audit risk to an acceptably low level as requisite to achieve reasonable level of assurance for the current validation and verification.

2.5 Resolution of Findings

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

CAR (Corrective Action Request) is raised if one of the following occurs:

- (a) Non-compliance with the monitoring plan, the methodology or the standardized baseline are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- (b) Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- (c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- (d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

Clarification request (CL) is raised if;

Information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met. All CARs and CLs raised by the Applus+Certification during verification shall be resolved prior to submitting a request for registration.

FAR (Forward Action Request) is raised during verification if:

A Forward Action Request (FAR) will be issued when certain issues related to project implementation should be reviewed during the first verification.

All the findings that are raised and communicated to project participant during the validation are included under Appendix 3. The section also includes the response, if provided, by the project participants and an assessment by the validation team if it was closed out or otherwise.

2.5.1 Forward Action Requests

The project activity is undergoing RCP validation and verification under VCS; there were no FARs raised during the validation/02/ or previous VCS verification/02/. No forward action request has been raised during this validation and verification.

3 VALIDATION FINDINGS

3.1 Project Details

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

As per the project type defined by the UNFCCC and VCS standard version 4.2 Guidelines, the project activity falls under type-I (Renewable energy projects) and the list of Sectoral the sectoral scope 1 - Energy Industries (renewable/ non-renewable sources).

The project activity consists of 15 WTGs of 1.65 MW capacity each, making the total installed capacity to be 24.75 MW. The WTGs are of Model V-82) supplied by Vestas Wind Technology India Pvt.Ltd.

The proposed project activity is a green field project which results in an estimated GHG emission reduction of 56,132 tCO₂ annually and a total of 561,320 tCO₂e over 10 years of the crediting period.

The technology employed by project activity involves, generation of electrical energy using wind power. The technology used in the project does not generate any GHG emissions, hence considered as an environment friendly. The project activity is a Greenfield project and there was no electricity generation at the project site prior to the implementation of project activity. The WTGs under the project activity is having an average lifetime of 20 years. The equipment's are based on manufacturer's specifications and as per industry standards.

Technical specifications of WTGs will be as follows:

Technical Description	Specification
Rotor Diameter	82 m
Hub Height	78 m

Technical Description	Specification
Power regulation	Active-Stall®
Air Brake	Full blade pitch by three separate hydraulic pitch cylinders.
Nominal Revolutions	14.4 rpm
Rated voltage	690V
Generator	
Type of generator	Asynchronous water cooled
Rated power output	1650 kW
Rotor	
No of blades	3
Swept area	5,281 m ²
Control	
Type	Microprocessor-based monitoring of all turbine functions with the option of remote monitoring. Output regulation and optimization via Active-Stall
Operational Data	
Cut- in wind speed	3.5 m/s
Nominal wind speed	13 m/s
Cut-out wind speed (10 minutes)	20 m/s
Gearbox	
Type	Planetary/helical stages

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

Project design, including eligibility criteria for grouped projects:

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

Project proponent and other entities involved in the project:

CLP Wind Farms (India) Private Limited is the project proponent and no other entity involved in the project activity. The assessment has verified this through the VCS project view page/14/, registered VCS PD/01/ and found to be consistent with the updated joint VCS PD&MR/04/, hence accepted.

Ownership:

CLP Wind Farms (India) Private Limited is the project owner and the project proponent. In addition, the validation team reviewed the PPA/13/, commissioning certificates/12/ and latest JMRs/09/ issued by the state utility and it can be confirmed that there is no change with reference to the ownership of project since initial registration under VCS.

Project start date:

Start date of project activity is 02/07/2010, which was the date on which project has begun generating emission reductions. Same as mentioned in the registered VCS PD.

Project crediting period:

As per the registered VCS PD/01/, crediting period was considered from 02/07/2010 to 01/07/2020 which can be renewed twice for the duration of ten year each. However as per the registered VCS PD, the project technical life is approximately 20 years, hence only once the crediting period can be renewed.

The first crediting period considered was 02/07/2010 to 01/07/2020 and the second crediting period is from 02/07/2020 to 01/07/2030. The commissioning date of the last WTG is 29/07/2010 and therefore the end date of operations of the project activity is 29/07/2030 which is after the end date of the 2nd crediting period.

Project scale and estimated GHG emission reductions or removals:

The estimated annual emission reductions for the project activity are 56,132 tCO₂e which is less than 300,000 tCO₂e. Hence the category is applicable under “Project”.

Project location:

The wind power project is in Theni district of Tamil Nadu state, India. The assessment team has checked the Geo-coordinates of the commissioned WTGs through Google Maps (<https://www.gps-coordinates.net/>) and found consistent with the same mentioned in the VCS PDD.

Conditions prior to project initiation:

The project activity is set up to produce clean power from the wind energy converters (WEC's) which can be also named as Wind Turbine Generator (WTG). The project activity involves supply, erection, commissioning and operation of 15 machines of rated capacity 1.65 MW. The project is Greenfield project. There was no project installed prior to commissioning of this project.

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

The project is a voluntary initiative by the project proponent and has not been implemented to meet any local / national laws or regulatory compliances/29/. The project activity is following current laws and regulations and there are no legal and/or regulatory requirements that prevent the project implementation. Also, the validation team has confirmed that there is no such compliance requirement with an emission trading program or any binding limits on GHG emissions for the project activity in India (host country) as it is a non-annex 1 country. The project has obtained valid consents for the installation and operation from the state nodal agencies and follows local laws and regulations.

Participation under other GHG programs:

- Projects registered (or seeking registration) under other GHG program(s)

The project has been registered under Clean Development Mechanism (CDM) with reference number 7415 and the crediting period (renewable) is from 04/10/2012 to 03/10/2019. The crediting period under CDM is renewed and second crediting period is from 04/10/2019 to 03/10/2026.

The project got successful issuance of CERs² under CDM and VCS as well, records for the same as under the below table:

Monitoring period	GHG program	Credit Issued (tCO2)
11/06/2012 to 03/10/2012	VCS	44,303
04/10/2012 to 10/05/2015	CDM	190,493
11/05/2015 to 10/02/2016	CDM	62,357
11/02/2016 to 10/07/2017	CDM	164,494
11/07/2017 to 03/10/2019	CDM	233,674
04/10/2019 to 31/12/2020	CDM	88,221

² <https://cdm.unfccc.int/Projects/DB/RWTUV1348481875.12/view>

The project proponent has considered the current monitoring period from 01/01/2021 as the credits already claimed till 31/12/2020 under CDM, hence any chance of double counting are ruled out.

- Rejection by other GHG programs

The project has not been rejected by other GHG programs.

Other forms of credit:

- Emissions trading programs and other binding limits

The project is not participating in other emission trading programs. The letter of undertaking/15/ has been furnished by project participant confirming that 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.

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

The project is registered under the VCS (ID 909) and CDM as well. It is to be noted that there is no double counting of credits despite of the credits claimed under CDM and VCS.

Additional information relevant to the project, including:

- 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.

- Sustainable development contributions

The project activity is complying with indicators for sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India as discussed under section 1.17 of the joint VCS PD& MR.

Conclusion:

In view of the assessment of joint VCS PD&MR/04/ and supporting documents as listed in Appendix 1 of this report, the validation team can confirm that the description contained in the joint VCS PD&MR of the project activity provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation. Consequently, Applus+Certification confirms that the project description of the project contained in the joint VCS PD&MR /04/ is complete and accurate. The joint VCS PD&MR complies with the relevant forms and guidance for completing the joint VCS PD&MR.

3.2 Participation under Other GHG Programs

The project activity is already registered under VCS and currently undergoing validation of renewal crediting period & verification. The relevant information's are already validated under section 3.1 above.

3.3 Safeguards

3.3.1 No Net Harm

There is no negative impact to any socio-economic conditions of the region due to the project activity. As per the notifications issued by Ministry of Environment and Forest dated 01/12/2009, Environmental Impact Assessment for the wind projects is not required to be done.

This project activity will not involve any negative environmental or socio-economic impacts, as the WTGs are installed for generation of power using wind which is a clean source of energy. Hence no mitigation measures are required.

3.3.2 Local Stakeholder Consultation

The project activity undergoing validation of renewal crediting period and verification, local stakeholder consultation was appropriately conducted prior to initial validation under VCS to inform the design of the project and maximize participation from stakeholders during the validation. As per the registered VCS PD, the local stakeholder's consultation was carried out at project site on the 18/02/2010. The stakeholders were invited the through public notices well in advance of the date of the meeting. The meeting was well attended, by various stakeholders, including representatives from Gram Panchayat, villagers, and representatives of equipment suppliers. The registered VCS PD mentions the summary of the comments received and a note on how due account was taken of the concerns raised during the public consultation. The general attitude of the residents, who were likely to be affected by the project, was positive towards the project and no adverse comment was received from the local stakeholders.

The project proponent has implemented mechanism for ongoing communication with local stakeholders to allow stakeholders to raise concerns about potential negative impacts during implementation and operation of the project activity. The project proponent has placed a grievance register and a grievance box at site office/21/, where the local villagers can register their concerns.

3.3.3 Environmental Impact

The project proponent has mentioned in the registered PD/01/, joint VCS PD&MR/04/ that the present project activity does not require EIA to be carried out because as per the schedule 1 of

Ministry of Environment and Forest notification dated 14/09/2006/16/ <http://envfor.nic.in/legis/eia/so1533.pdf> and further notification number 3067 from MoEF dated 01/12/2009/16/ <http://moef.nic.in/downloads/rules-and-regulations/3067.pdf> , activities are required to undertake environmental impact assessment studies. The proposed project activity does not fall under the listed categories and hence not required an EIA to be done.

3.3.4 Public Comments

The project activity undergoing validation of renewal crediting period and verification; hence this section is not applicable.

3.3.5 AFOLU-Specific Safeguards

For non-AFOLU projects, this section is not required.

3.4 Application of Methodology

3.4.1 Title and Reference

The project activity was registered under VCS using “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, ACM0002, version 13. Following the guidelines as outlined under clause 3.8.9 (d) of the VCS standard v 4.2, the PP updated the applied methodology from ACM0002 version 13 to ACM0002 v.20, for the renewal of the crediting period.

Since the new version of the methodology refers to the “Tool to calculate the emission factor for an electricity system”. Thus, the following methodological tool is being applied:

Tool to calculate the emission factor for an electricity system – Version 07.0.0, (EB100 annex 4)

(<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf>)

Tool to assess the validity of the original/ current baseline and to update the baseline at the renewal of a crediting period, Version 3.0.1

(<https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-11-v3.0.1.pdf>)

The assessment team has checked through the UNFCCC website it is confirmed that the selection of the applied methodology and methodological tool has been done correctly in line with the applicable requirements for the RCP under VCS standard v4.2.

3.4.2 Applicability

The project activity was initially registered applying the methodology ACM0002 version 13 as mentioned in the registered VCS PD/01/ and the version of the methodology is still applicable.

However, to comply with the guidelines as provided under clause 3.8.9 (d) of the VCS standard v 4.2, applicability of latest version of applied methodology (ACM0002 V 20) is demonstrated.

The latest version of the methodology is deemed fully applicable for the new crediting period and no request for deviation with regards to the applicability of the methodology is required. All applicability conditions are completely and correctly included in the joint VCS PD&MR and the same are demonstrated below:

Criteria-1:

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

Validation assessment:

- Project activity is Greenfield wind power project, supplying electricity to national grid. This is verified thorough the Power Purchase Agreement /13/ and commissioning certificates/12/. Thus, the criterion (a) is fulfilled by the proposed project activity.

Criteria-2:

The methodology is applicable under the following conditions:

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

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

Validation assessment:

Project activity is generation of electricity through wind energy which is renewable energy power plant. Hence the project activity satisfies the criterion (a).

Criteria-3 and Criteria-4: (Paragraph 5 and 6 of ACM0002 V 20.0)

Both the criteria are relevant to hydro power projects. Since the proposed project activity is wind power plant, hence not applicable.

Criteria-5:

The methodology is not applicable to:

- (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;
- (b) Biomass fired power plants/units.

Validation assessment:

The project activity involves generation of electricity using wind energy. Thus, the criterion is not applicable for the proposed project activity.

Criteria-6:

In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, because 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.”

Validation assessment:

The project activity does not involve any capacity additions, retrofits, or replacements of an existing facility because it is a Greenfield wind power generation project activity; same has been confirmed from the commissioning certificates/12/, VCS validation report and PPA /13/.

Thus, the criterion is not applicable for the proposed project activity.

Thus, it can be concluded that the applied methodology ACM0002, version 20.0 is applicable to the project activity.

Tool to calculate the emission factor for an electricity system:

The revised PDD refers and correctly applies the latest version of tool to calculate the emission factor for an electricity system, version 07.0 /10.1/. Also, the PP has referred the CEA Baseline CO2 Emission Database version 17, dated Oct 2021 /11/ which was the latest available database at the time of PDD submission for RCP validation of the project activity.

The locations of windmills are in the state of Tamil Nadu, in India. As per CEA Baseline CO2 Emission Database/11/, Tamil Nadu state comes under the Indian regional electricity grid in India, the geographic and system boundaries of which are clearly identified; information on the characteristics of the grid is available. Thus, the tool is applicable for the project activity.

Tool for the demonstration and assessment of additionality:

This tool is not required to be applied during validation of renewal crediting period.

Thus, all the applicability conditions of the applied methodology are confirmed in line with paragraphs 68 of VVS for PAs version 03.0. Based on the above discussion, the validation team confirms that the proposed project activity meets all the applicability conditions and all other stipulations of the selected methodology ACM0002 V.20.

3.4.3 Project Boundary

The project boundary is defined by the applied methodology, ACM0002, version 20:

“The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.”

The purpose of this project activity is to generate electricity using renewable sources (wind power) and export to the Indian grid, thereby displacing the grid generated electricity. The project boundary includes the wind power project, sub-stations, grid, and all power plants connected to grid, which has been illustrated in the Section 3.3 of the joint VCS PD& MR/04/ and provides clear understanding of the project boundary; thus, it is acceptable.

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

The assessment team can conclude that the project boundary and selected sources are applied as per the methodology and the applicable criteria as outlined under clause 3.11.1 of the VCS standard v4.2.

3.4.4 Baseline Scenario

The project activity involves the installation of a newly built and grid-connected renewable power plant that exports the generated electricity to the Indian grid system in India, hence, according to the applied methodology ACM0002, version 20.0, the baseline scenario is determined properly as: “The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid.”

The baseline scenario is correctly described under section 3.4 of the joint VCS PD & MR.

According to VCS Standard, v4.2, paragraph 3.8.9-2) “The validity of the original baseline scenario shall be demonstrated, or where invalid a new baseline scenario shall be determined, when renewing the project crediting period”.

According to VCS Standard, v4.2, paragraph 3.8.9, Clause (2-a) “The validity of the original baseline scenario shall be assessed. Such assessment shall include an evaluation of the impact of new relevant national and/or sectoral policies and circumstances on the validity of the baseline scenario”.

VVB assessment:

The project activity is in Tamil Nadu state, the relevant mandatory national/26/ & sectoral policies/ 27/ in the state are as following.

- (i) The Electricity Act, 2003
- (ii) National Electricity Policy,2005
- (iii) Tariff Policy, 2006
- (iv) TNERC tariff order Order on procurement of Wind Power and related issues, dated 07/10/2020
- (v) TNERC Regulations/Codes <http://www.tnerc.gov.in/regulat.htm>

The assessment team has reviewed the above national & sectoral policies and confirmed that the current baseline as described in the joint VCS PD&MR follows the relevant mandatory national & sectoral policies as listed above, there are no national or local laws or regulations that entail the installation of wind power project in Tamil Nadu.

Based on the experience, there are no relevant mandatory national and/or sectoral polices forbidding equivalent electricity generated by the project activity is supplied to the Indian grid which is current baseline of the project activity. Therefore, baseline scenario remains unchanged in the next crediting period and is following all the relevant mandatory national and/or sectoral policies.

According to VCS Standard, v4.2, paragraph 3.8.9, Clause (2-b) “Where it is determined that the original baseline scenario is still valid, the GHG emissions associated with the original baseline scenario shall be reassessed using the latest version of the CDM Tool to assess the validity of the original/ current baseline and to update the baseline at the renewal of a crediting period.”

VVB assessment:

The project proponent has included the assessment of the validity of the original baseline under section 3.4 of the joint VCS PD&MR, including the assessment of original baseline as per the “Tool to assess the validity of the original/ current baseline and to update the baseline at the renewal of a crediting period, Version 3.0.1”, which has been concluded to be still valid and applicable for the project.

The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to

update the baseline in case that the current baseline is not valid anymore for the next crediting period.

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

As verified above (Para 3.8.9 2-a), there are no national or local laws or regulations that entail the installation of wind power project in Tamil Nadu. Hence it can be concluded that current baseline follows relevant mandatory national and sectoral policies.

Step 1.2: Assess the impact of circumstances

The assessment team has confirmed that the baseline scenario as identified at the time of initial validation of the project activity was the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plants and by the addition of new generation sources into the grid.

Thus, assessment team has confirmed that the project activity was a voluntary investment which intends to replace equivalent amount of electricity at grid from renewable source. The investment does not lead to any continued baseline practice for the PP within their scope whereas the continued operation of the project activity would continue to replace equivalent amount of electricity at grid. Therefore, the same baseline as identified in the previous crediting period is still valid for the project.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

The lifetime of WTGs installed for the project activity is 20 years /01/; hence an investment is not the most likely scenario for the renewal crediting period under consideration.

Step 1.4: Assessment of the validity of the data and parameter

In accordance with the step 1.4 of the tool “Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity”.

The grid emission factor calculated ex-ante for the 1st crediting period needs to be updated, as per the valid and latest version of “Tool to calculate the emission factor for an electricity system” /10.1/, the most recent information available should be used to update the emission factor for the 2nd crediting period. The OM and BM was obtained from a publicly available source i.e. “CEA CO2 Baseline Database” Version 17 latest version published by Central Electricity Authority, Ministry of Power (Government of India) at the time of validation.

Considering the guidance provided under this step, calculation of emission factor and baseline emissions are updated for the next crediting period as per step 2.

Step 2: Update the current baseline and the data and parameters

“Update the current baseline emissions for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period”.

Step 2.1: Update the current baseline

As discussed above the baseline scenario of the project activity is still sustained in the second crediting period, hence reassessment of baseline scenario is not required. The baseline emission factor is calculated as per the latest version of CEA CO2 baseline database version 17 /11/ available at the time of initial PDD submission for renewal of crediting period.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents that would occur in the absence of the proposed project activity. The assessment team considers the baseline scenario is realistic and credible.

Step 2.2: Update the data and parameters

The emission factor has been calculated as per Methodological Tool 07: Tool to calculate the emission factor for an electricity system” v 07.0 as recommended by the applied methodology ACM0002 v 20.0.

“A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the ‘Tool to calculate the emission factor for an electricity system’.”

It is verified that the latest available version for “Tool to calculate the emission factor for an electricity system” is version 07.0 /10.1/ and the PP has correctly referred to the same in the section B.6.1 of the final joint VCS PD&MR /04/ to determine the baseline grid emission factor.

The PP has considered Option (a) of Para 17 to calculate the grid emission factor as per the Methodological Tool 07 “Tool to calculate the emission factor for an electricity system” version 07.0 since data is available from an official source.

In accordance with step 1 of Tool; the project participant has identified the electricity system is based on the option 1 (under the para 17 of the tool) which is unified Indian Grid system. Therefore, the Indian grid has been correctly identified for the calculation of electricity emission factor, as the project displaces electrical energy from Indian grid, as per the CEA database version 17/11/.

It is to be noted that CEA database version 17 was published in Oct 2021, and it was the most recent information available version at the time of first submission of the initial version of joint VCS PD&MR to VVB, hence referred for determination of emission factor for the second crediting period.

It can be confirmed that the determination of grid emission factor in compliance with the “Tool to calculate the emission factor for an electricity system” (version 07.0.0), which states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used”. Thus, the Project Participant has considered the national grid that is delineated by the Central Electricity Authority of India which was found to be correct and acceptable.

The values of OM and BM have been determined ex-ante as per the CEA CO₂ baseline database version 17 published on Oct 2021, which is published by the Ministry of Power, Government of India/11/. In step 2 of the Tool, the PP has considered option I “Only grid power plants are included in the calculation.”

Further under step 3, the PP has used the simple operating margin calculation method to determine the operating margin (OM). Validation Team has verified from the CEA CO₂ baseline database/11/ that the percentage of total grid generation by low-cost/ must-run plants (based on average of five most recent years) for the Indian grid is less than 50% of the total generation. Therefore, it is satisfied the condition stipulated under Para 40 (a) of Methodological Tool 07, Version 07, hence the simple OM method (Option a in paragraph 38) has been used as low cost/must run resources constitute less than 50% of total grid generation.

As per Tool para 40 -42; The PP has chosen ex-ante option (option a of Para 42 of Methodological Tool 07, version 07) for calculation of Simple OM emission factor using a 3-year generation-weighted average/10.1/, based on the most recent data available at the time of submission of the joint VCS PD&MR.

In step 4, the PP has calculated the simple operating margin as per Option B as stipulated under Para 47 (b) of Methodological Tool 07, version 07. The PP has considered an average of the latest available three years i.e., 2018-19, 2019-20 and 2020-21 for calculation of simple OM emission factor. The value for weighted average operating margin has been validated and used as 0.9522 tCO₂/MWh /11/.

In step 5; the Build margin for the Indian grid is considered as 0.8653 tCO₂/MWh as per “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4) para 72 (i.e., as per the provision of the section 6.5 of the tool) where the Option 1 is chosen by PP to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information/data from CEA CO₂ Baseline Database version 17, dated Oct 2021 and is fixed for the entire crediting period.

In step 6, the combined margin (CM) emission factor is calculated based on option (a) i.e., weighted average CM as accordance to Tool. The weighted average combined margin has been

calculated by the PP, considering the 75% weighted for operating margin and 25% for build margin; this is in accordance with the tool which states that for “Wind and solar power generation project activities: WOM = 0.75 and WBM = 0.25 (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods”.

The combined margin emission factor for the project activity arrives as 0.9305 tCO₂/MWh. The PP has provided the detailed calculation for the same in the ER calculation sheet. The baseline emission factor for the electricity system has been calculated on ex-ante basis and will remain fixed for the entire second crediting period.

In accordance with the Methodological tool 07: Tool to calculate the emission factor for an electricity system Version 07.0.0 /10.1/, “Regional or national average default values can be used for calculation of CO₂ Emission Factor if values are reliable and documented in regional or national energy statistics / energy balances”.

The Central Electricity Authority of India (CEA) is a statutory organisation and the sole authority for publication of such data in India and hence, accepted. The assessment team verified that the parameters are determined ex-ante:

Parameter	Value	Source	Means of Validation
EF _{grid,OM,y} Operating Margin of the Indian Grid	0.9522 tCO ₂ /MWh	Baseline Carbon Dioxide Emission Database Version 17 from the Central Electricity Authority (CEA), Ministry of Power Government of India /11/	Value is calculated using the data published in the CEA database version 17, dated Oct 2021/11/.
EF _{grid,BM,y} Build Margin of the Indian Grid	0.8653 tCO ₂ /MWh	Baseline Carbon Dioxide Emission Database Version 17 from the Central Electricity Authority (CEA), Ministry of Power, Government of India /11/.	Verified value against default value listed in CEA database version 17 dated Oct 2021/11/.
EF _{grid,CM,y} Combined margin CO ₂ emission factor for the project electricity system in year y	0.9305 tCO ₂ /MWh	Baseline Carbon Dioxide Emission Database Version 17 from the Central Electricity Authority (CEA), Ministry of Power, Government of India /11/.	Value is as the weighted average of Operating Margin and Build Margin Emission Factor in line with the paragraph 86(a) of “Tool to calculate the emission factor for an electricity system” version 07.0

The OM has been determined as the average of the previous 3 years' values (2018-19, 2019-20 and 2020-21) mentioned in the CEA database. The value of BM (for year 2020-21) has been sourced directly from the CEA database/11/. The combined margin emission factor has been arrived at by applying weights of 75% for OM and 25% from BM, as specified in the methodological tool 07, version 07.0.0, §§ 86 (b) for second crediting period for wind project.

The baseline emissions for the project activity have been calculated as per ACM0002 Version 20.0 §§39. The baseline emissions for the project activity have been calculated to be 56,132 tCO₂ per year.

The assessment team confirms that all data sources and assumptions are appropriate, and calculations are correct, applicable to the CDM project activity and will result in a conservative estimate of the emission reductions.

Conclusion:

- (a) The assessment team confirms that there have been no changes in the relevant national and/or sectoral regulations on installation of wind power project for exporting electricity to power grid since the previous crediting period.
- (b) On the other hand, the baseline scenario for the project remains the same as that in the registered PD as "Electricity delivered to state grid by the Project that would otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid".
- (c) The assessment of continued validity of the current baseline scenario and update of the baseline emissions are complied with Methodological Tool "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period version 03.0.1" as per VVS for PAs version 03.0.
- (d) In line with CDM-PS version 03.0/25/ §§283, the demonstration of the validity of the original baseline or its update does not require a reassessment of the baseline scenario, but rather an assessment of the GHG emission reductions that would have resulted from that scenario.

3.4.5 Additionality

In accordance with the paragraph 3.8.9 clause 1 of VCS standard v 4.2, "A full reassessment of additionality is not required when renewing the project crediting period. However, regulatory surplus shall be demonstrated in accordance with the requirements set out in the VCS Program rules and the project description shall be updated accordingly".

As per the above guidelines, the assessment team has reviewed the sectoral and national policies implemented for the wind power projects in host country India.

Latest regulatory requirements for the project activity were checked through the official website of the Ministry of New and Renewable Energy, a nodal ministry of Government of India for the matters relating to new and renewable energy/26/ and state policies/27/.

In view of the above assessment, it can be concluded that the proposed project is not mandated by any law, statute, or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute, or other regulatory framework and hence continued to be voluntary.

3.4.6 Quantification of GHG Emission Reductions and Removals

The calculation of the emissions reductions exactly follows the procedures described in the methodology ACM0002, version 20.0 /10/ and relevant tool, e.g., the “Tool to calculate the emission factor for an electricity system”/10.1/.

The assessment team has assessed the calculation of project emissions, baseline emissions, leakage emissions and emission reductions and the corresponding calculations have been carried out based on calculation spreadsheet. The consistency of the parameters and equations presented in the final joint VCS PD&MR, as well as calculation spreadsheet etc., has been compared with the information and requirements presented in the methodology and respective tools.

The assumptions and data used to determine the emission reductions are listed in the final joint VCS PD&MR and all the sources have been checked. Based on the information reviewed it is confirmed that the sources used are correctly quoted and interpreted in the final joint VCS PD&MR.

The values presented in the final joint VCS PD&MR are considered reasonable based on the documentation and references reviewed and the results of the virtual interviews. The estimation of the emission reductions is considered correct as the calculations have been reproduced by the assessment team with the attainment of the same results.

The algorithms for the determination of the baseline, project, and leakage are discussed in the following sections. The GHG emission reductions are calculated applying the updated version of methodology ACM0002 version 20.0

Baseline Emissions:

As per the paragraph 22 of the methodology ACM0002 V 20.0:

“If the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been

generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in “TOOL07: Tool to

calculate the emission factor for an electricity system”. The baseline emissions are to be calculated as follows:

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

Where:

BE_y = Baseline emissions in year y (t CO₂)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of “TOOL07: Tool to calculate the emission factor for an electricity system” (t CO₂/MWh)

$EG_{PJ,y}$ = $EG_{facility,y}$ (for Greenfield projects paragraph 41 ACM0002 v 20.0)

Where,

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

The baseline emissions equivalent to tCO₂ due to the project have been calculated as the product of the net electricity supplied to the grid and the grid emission factor as per the combined margin approach described in the ‘Tool to calculate the emission factor for an electricity system’ version 07.0. The power produced will be exported to the Indian grid. Hence, the grid emission factor and the corresponding baseline emissions have been calculated for the Indian grid.

Estimation of Project Emissions (PE_y):

As per the applied methodology, for most renewable 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, by using the following equation:

$$PE_y = PE_{EF,y} + PE_{GP,y} + PE_{HP,y}$$

Where,

PE_y = Project emissions in year y (tCO₂e)

$PE_{EF,y}$ = Project emissions from fossil fuel consumption in year y (tCO₂)

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO₂e)

$PE_{HP,y}$ = Project emissions from reservoirs of hydro power plants in year y (tCO₂e)

Since the project activity is a wind energy-based power generation, the project emissions are not applicable to the project activity. Hence, PE_y = 0

Calculation of leakage emissions:

As per paragraph 53 of the applied methodology, no leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g., extraction, processing, and transport). These emissions sources are neglected. Therefore, $LE_y = 0$.

Emission reductions:

As per the paragraph 54 of the applied methodology ACM0002 Version 20.0, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y,$$

where

ER_y = Emission reductions in year y (tCO₂e)

BE_y = Baseline Emissions in year y (tCO₂e)

PE_y = Leakage emissions in year y (tCO₂e)

As discussed above $PE_y=0$ and $LE_y=0$, hence

$$ER_y = BE_y - 0 - 0$$

$$ER_y = BE_y$$

$$ER_y = EG_{\text{facility},y} \times EF_{\text{grid, CM},y}$$

The estimated value of $EG_{\text{facility},y}$ is determined as submission of the net electricity supplied to the grid through the WTGs:

$$EG_{\text{facility},y} = 60,325 \text{ MWh}$$

Hence baseline emission reductions as follows:

$$BE_y = 60,325 \text{ MWh} \times 0.9305 \text{ tCO}_2\text{e/MWh}$$

$$= 56,132 \text{ tCO}_2\text{e}$$

$ER_y = BE_y = 56,132 \text{ tCO}_2\text{e}$ per year for the selected 10 years crediting period.

Total emission reductions during the second crediting period are estimated to be 561,320 tCO₂.

Conclusion:

The assessment team has assessed the calculations of project emissions, baseline emissions, leakage emissions and emission reductions and corresponding calculations have been carried out based on calculation spreadsheets. The parameters and equations presented in the final joint VCS PD&MR, as well as other applicable documents, have been compared with the information and requirements presented in the methodology and respective tools. The

assessment team has compared all the formulae to ensure consistency between those presented in the calculation files and in the final joint VCS PD&MR, methodology, and tools. This is found to be correct.

In general, the assessment team can confirm the following:

- a) All assumptions and data used by the project participants are listed in the final joint VCS PD&MR and/or supporting documents, including their references and sources.
- b) All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the final joint VCS PD&MR.
- c) All values used in the final joint VCS PD&MR are considered reasonable in the context of the proposed project activity.
- d) The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, and leakage emissions.
- e) All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the final joint VCS PD&MR.

3.4.7 Methodology Deviations

No methodology deviations are identified.

3.4.8 Monitoring Plan

The assessment team reviewed the updated joint VCS PD&MR, checked whether the monitoring plan section in accordance with all relevant applicable requirements in the CDM PS for PAs and relevant VCS guidelines. Also verified whether the joint VCS PD&MR list all data and parameters to be monitored, as required by the applied methodology and whether the monitoring plan explained the operational and management structure, responsibilities and institutional arrangement for data collection/archiving, QA/QC procedures.

The project applies the approved consolidated monitoring methodology ACM0002 version 20.0 - "Grid-connected electricity generation from renewable sources".

The monitoring parameter relevant to this project activity described in the applied methodology is:

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

Monitoring arrangements & procedure:

During the virtual conversation with PPs representative and through the review of latest JMR & actual photographs of project site, it is verified that, the parameter ($EG_{\text{facility},y}$) is directly monitored through the dedicated meters (main and check) installed by the state utility (TNEB) at each WTG.

Joint Meter Reading is being taken jointly by the officials of state utility (TNEB) and project participant's representative and accordingly JMR Report is being prepared. The monitoring methodology applies consistently the choice of the option selected for monitoring of baseline emissions. The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period. The assessment team has also verified the actual photographs/video recording of monitoring equipment's (indicating technical specifications), video recording of online SCADA system and the VCS verification records/14/ and it is confirmed that registered monitoring plan as described in the revised joint VCS PD&MR was implemented and followed during previous crediting period/14/ and in accordance with the applied methodology.

All the relevant data records will be kept by the Project owner during the crediting period and electronically archived for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. Data management and quality control measures have been confirmed through desk review of the project documents/04/ and interview with the PPs representatives.

There are one set of meters (main & check meter) is installed nearby each WTG. All the meters are of accuracy class 0.2s and will be calibrated once in 5 years.

Implementation of the monitoring plan:

The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period. The assessment team has also verified the actual photographs/video recording of monitoring equipment's (indicating technical specifications), photographs of online SCADA system and the previous VCS verification records/14/ and it is confirmed that registered monitoring plan as described in the final joint VCS PD&MR was implemented and followed during previous crediting period/14/ and in accordance with the applied methodology.

All the relevant data records will be kept by the Project owner during the crediting period and electronically archived for two years after the end of the crediting period or the last issuance of VCUs for this project activity, whichever occurs later.

An organizational structure is provided in section 5.3 of the joint VCS PD&MR/04/. The functions such as data collection, aggregation, verification, calculation, archiving, as well as the maintenance of equipment's etc. have been defined. Quality assurance and quality control procedures for recording, maintaining and data archiving etc. will be ensured according to VCS rules.

The calibration of the meter will be implemented as per national standard. An emergency treatment process has been defined in joint VCS PD&MR when the meter gets malfunctioned. Data management and quality control system are quoted in joint VCS PD&MR. The procedures described in the joint VCS PD&MR have been recognized by the assessment team through document review and virtual interviews with the relevant personnel.

It is confirmed that remaining aspects of monitoring plan like monitoring procedure, metering system, calibration procedure, data recording, monitoring role and responsibility and QA/QC procedure as mentioned in the registered joint VCS PD&MR, will remain same during the 2nd crediting period.

In conclusion, based on local and sectoral expertise, documents review, the assessment team confirms that:

- (a) The monitoring plan of the joint VCS PD&MR is following the requirements of the methodology ACM0002 version 20.0.
- (b) Monitoring arrangements described in the monitoring plan of the joint VCS PD&MR are feasible within the project design.
- (c) The PP's ability to implement the monitoring plan can be guaranteed. The monitoring plan of the joint VCS PD&MR is complied with the registered PD.

3.5 Non-Permanence Risk Analysis

Not applicable, non-permanence risks were not identified.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity consists of 15 WTGs installed at G. Jangalpatti, Poomalaikundu, Govindanagram & Seepalakottai villages in Theni & Uttamaplayamtaluka Taluk of Theni district of Tamil Nadu state in India. The first WTG and last WTG under the project activity was commissioned on 02/07/2010 and 29/07/2010 respectively. The WTGs are Vestas make with an individual capacity of 1.65 MW, summing up to 24.75 MW of total installation capacity.

The project activity is reducing the GHG emissions generated by the current generation energy mix in India's Power Grid, which is dominated by fossil fuel-based grid connected power plants. The power generated through the proposed project activity being supplied to southern grid (now part of Indian grid) through contractual arrangement (PPA). The technical specification of the project activity equipment's has been checked through the photographs of all the equipment's/19/ installed at site and are found to be consistent with the mentioned under section 3.1 of MR. The status of the project activity is verified through the screen shots of SCADA system/19/, indicating the real-time generation data and hence it is confirmed that the project is fully functioning.

The monitoring plan of registered VCS PD/01/ includes the parameter "Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project

activity during the period y" ($EG_{\text{facility},y}$). This parameter is directly monitored through the dedicated meters (main and check) installed by the state utility (TNEB) at each WTG. All the meters installed at WTGs are of accuracy class 0.2s and in line with the applied methodology, parameter $EG_{\text{facility},y}$ is measured continuously and recorded monthly.

Monthly values of $EG_{\text{facility},y}$ obtained directly from the monthly JMRs issued by state utility/09/. The invoicing being done against electricity supplied by the project plant. The measurement results are cross checked with records of invoices, and it is in line with applied methodology. Thus, this parameter is considered in emission reduction calculations.

As verified through the calibration certificates/07/ and recent photographs of energy meters/19/ that the project WTGs are connected to eight separate feeders, there is one set of energy meters (main and check meter) installed at each feeder located at substation and are under control of state utility (TNEB), sealed in presence of both the state utility official & representative of PP. Also, the WTGs of other project developers (non-project activity) are also connected to these feeders, hence the electricity supplied to the grid by the individual project developer is calculated by the O&M contractor/DISCOM using apportioning procedure as described under section 4.3 of the monitoring report.

Post apportioning the state utility issues the JMRs/09/ to individual project developer, that indicates the value of electricity exported, imported and net electricity supplied to the grid in particular month.

Joint Meter Reading is being taken jointly by the officials of state utility and project participant's representative on monthly basis and accordingly monthly JMR is being prepared/13/. The monitoring methodology applies consistently the choice of the option selected for monitoring of baseline emissions. The monitoring plan provide procedures for the collection and archiving of all relevant data necessary for estimation or measuring the emission reductions within the project boundary during the crediting period. This is checked through discussion with consultant and the project participant during the virtual interview.

The VCS MR/04/ has been reviewed to check that the procedure for data uncertainty, emergency preparedness, roles and responsibility, operational and management structure are mentioned in the MR. The monitoring plan completely describes all measures to be implemented for monitoring all parameters required. The monitoring plan described the positioning of the equipment. Calibration frequency for Energy meters is once in 5 years. Also, CEA Notification/16/ No. 502/70/CEA/DP&D dated 17/03/2006 which is considered as national standard mentions that "All interface meters shall be tested at least once in five years." Hence calibration frequency once in 5 years considered for the project activity is found to be appropriate.

The information relating to the project implementation, provided in the Monitoring Report /04/ is consistent with that stated in the registered PD /01/. The data and variables provided in the monitoring report are the same as stated in the registered PD/01/. Total emission reductions

achieved under this monitoring period 01/01/2021 to 31/12/2021 (including both days) is 45,378 tCO_{2e}.

Project deviations considered during the monitoring period:

The following project deviations are identified during the current monitoring period:

Deviation #1: The registered VCS PDD mentions that the meters will be calibrated and tested once in a year. In the updated joint VCS PD&MR, the calibration frequency is changed as once in 5 years.

VVB assessment:

The national guidelines issued by the Central Electricity Authority, Ministry of Power, Government of India Notification No. 502/70/CEA/DP&D dated 17/03/2006/16/ which is considered as national standard, mentions that “All interface meters shall be tested at least once in five years.”

In accordance with section 4, clause (i) of the Power Purchase agreement (PPA) signed with state utility (TNEB), “*The metering arrangements with facilities to record export and import of energy shall be provided in accordance with the Central Electricity Authority (Installation and Operation of meters) Regulations 2006. The periodicity of testing, checking, calibration etc. will be governed by the regulations issued by Central Electricity Authority (CEA) in this regard*”.

Therefore, it can be confirmed that the calibration frequency of the meters is not in control of the PP and the revised calibration frequency of “once in 5 years” is in accordance with the national standards hence deemed appropriate, hence the project deviation is accepted.

Deviation #2: The registered VCS PD mentions that the energy meters of accuracy class 0.5s will be installed at 33 kV side. However, all the meters of accuracy 0.5s are replaced by the state utility with 0.2s accuracy class meters.

VVB assessment:

It is noted that all the existing old main meters of accuracy class 0.5s have been replaced with new ABT meters of accuracy class 0.2s in line with the notification issued by TANGEDCO (meter and protection division of state utility) dated 08/02/2016. As verified through the state utility notification, all the existing meters (TOD/0.5s class ABT meters) in WTG HT services had to be replaced with 0.2s class ABT meters. The assessment team has confirmed that the replacement of meters is completely under preview of state utility and PP has no control over the same.

Since the new meters are of higher accuracy (0.2s) as compared to old one (0.5s), hence the assessment team is of the opinion that the proposed changes is more conservative and same change would enhance the level of accuracy of the monitoring parameters compared with the

requirements contained in the registered monitoring plan. Thus, the deviation is acceptable to the assessment team.

Assessment team concludes the following:

- a) There are no material discrepancies between project implementation and the project description provided in the registered PD/01/.
- b) The monitoring plan is implemented completely and monitoring system (i.e., process and schedule for obtaining, recording, compiling, and analysing the monitored data and parameters) is appropriate.
- c) There are no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology/10/.
- d) The GHG emission reductions or removals generated by the project have not included in an emissions trading program or any other mechanism that includes GHG allowance trading/15/.
- e) The project has not received or sought any other form of environmental credit, or has become eligible to do so since validation or previous verification/15/.
- f) The project is registered under VCS and CDM as well.
- g) The project activity is complying with indicators for sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India as discussed under section 1.11 of MR.

In view of the information's as verified above the assessment team can conclude that the project has been implemented as described in the project description.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

The project monitoring has been carried in accordance with the final joint VCS PD&MR/04/. The monitoring plan laid in the joint VCS PD&MR is being followed at the site/19/. The assessment team has verified the information flow (from data generation, aggregation, to recording, calculation and reporting for these parameters including the values) as described in the joint VCS PD&MR /04/.

The emission reductions are purely based on the net electricity generated and exported from the machines. The electricity supplied to the grid by the project activity is directly sourced from JMR reports, this is found to be in line with the requirement provided in the joint VCS PD&MR. The formulas, summation and consistency of the data and parameters are correctly applied in ER spreadsheet.

PP has provided all the sufficient data for current monitoring period. The values of the net electricity supplied to the grid used in deriving the GHG emission reduction could be very well

correlated between the data sets and ER spreadsheet/05/ provided by PP. The net electricity supplied to the grid by the project activity is measured by state utility on monthly basis through dedicated metering system installed at site and recorded in the monthly JMRs provided to the project proponent. Verification team has verified the monthly values of the net electricity supplied to the grid as reported in the ER sheet with the source document (JMR) and no discrepancy is observed, hence it can be confirmed that no manual transposition errors between data sets have been occurred. The verification of each monitoring parameter has been discussed later in section 4.3.

The calculation method and formulae used in calculating baseline emission complies to the methodology used i.e., ACM0002 Version 20 /10/. Since project activity is a wind power project, leakage emission and project emission has been considered as zero.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

All the data recorded is following the registered VCS PD and Monitoring Report. The assessment team has checked the monthly JMRs for electricity generated and supplied by project activity/09/ for the current monitoring period to verify the values of monitoring parameter reported in ER calculation sheet and found to be consistent. Since the monthly JMRs prepared and issued by state utility, they are found to be reliable and authentic.

The CLP Wind Farms (India) Private Limited is responsible for the operations, maintenance and monitoring of the project activity, whose operation and maintenance activities are ISO 9001:2015 (Quality Management System) certified/20/. Hence it is confirmed that the management system of the VCS project is in place; with the responsibilities properly identified. The same was also verified during the virtual interview of site personnel. The monitoring of the project activity is found to be in accordance with the monitoring methodology described in ACM0002, Version 20 /10/. The monitoring mechanism is effective and reliable. During the remote audit, personnel involved at various levels of the operation of the project activity have been interviewed(virtually) to confirm that the plant personnel are conscious of the importance of the monitoring activities. The verification of the plant records and latest photographs are also substantiating consistency in recording and reporting of monitored data.

The screen shots of SCADA system/19/ confirms that the monitoring systems have been installed and are operational. The meters comply with appropriate quality standards applicable for the used technology. The accuracy class of the meters installed for the project activity was verified through the initial registered VCS PD/01/, joint VCS PD& MR /04/, and calibration certificates/07/, latest photographs of meters and cross-checked against the PPA/13/ signed for the project activity, found to be consistent.

The supporting records of monthly JMRs /09/ and invoices for the entire monitoring period were checked and found to be sufficient to enable verification of emission reductions.

The following parameter has been verified for current monitoring period:

Parameter:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y, $EG_{\text{facility},y}$ (MWh):	
Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The main meter and check meters, located near the turbine, continuously monitors export, import and net export of energy from each turbine. The readings at the Metering Point are undertaken every month jointly by the representatives of the State Grid/ TNEB and CLP/Vestas representative.
	Is measuring and reporting frequency in accordance with the monitoring plan and monitoring methodology? (Yes / No)	Yes. In line with the approved monitoring plan, this parameter is recorded on monthly basis in the monthly JMRs issued by state utility.
	Monitoring equipment	A set of bidirectional (main and check) energy meters are installed near each WTG to account the electricity supplied to the grid.
	Is accuracy of the monitoring equipment as stated in the monitoring plan? If the monitoring plan does not specify the accuracy of the monitoring equipment, does the accuracy of the monitoring equipment comply with local/national standards, or as per the manufacturer's specification?	The energy meters are two-way tri-vector meters of accuracy class 0.2s. Accuracy of the monitoring equipment's is higher than accuracy mentioned in the monitoring plan as outlined in the joint VCS PD&MR.
Is the accuracy valid for the entire measuring range or do different accuracy levels	Yes. The accuracy of monitoring equipment is valid for the entire range.	

	apply to different measuring ranges?	Calibration of energy meters is valid for the current monitoring period.
	Calibration frequency /interval:	Calibration frequency of the meters is once in 5 years /01/.
	Is the calibration interval in line with the monitoring plan and/or methodology? If the monitoring plan does not specify the frequency of calibration, is the selected frequency in accordance with the local/national standards, or as per the manufacturer's specifications?	Yes. The calibration frequency is in line with the monitoring plan as outlined in the joint VCS PD& MR/04/.
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Yes, the calibration is conducted by state utility (TNEB) which is a NABL Accredited entity/07/.
	How were the values in the monitoring report verified?	Cumulative value of $EG_{\text{facility},y}$ for entire monitoring period is reported in the monitoring report/04/, however monthly values are reported in the ER calculation sheet/06/. The monthly values were verified from the JMRs issued by state utility and found to be consistent. Value of this parameter for the current monitoring period was verified as 48,767.56 MWh.
	If applicable, has the reported data been cross-checked with other available data?	Monthly reported values of $EG_{\text{facility},y}$ for the current monitoring period were further cross-checked with the monthly invoices raised by the PP /08/ and found to be consistent.
	Does the data management ensure correct transfer of	Yes, the adequate QA/QC procedures were implemented by all the

	<p>data and reporting of emission reductions and are necessary QA/QC processes in place?</p>	<p>stakeholders, namely, the Grid Authority (TNEB), the PP and the Vestas (O&M Contractor). The data transfer process for the said parameter is as follows:</p> <p>The Joint meter reading at all the metering points at DISCOM substation is taken by the representatives of TNEB in the presence of PPs representative officials in the form of JMRs.</p> <p>Based on this monthly recording, the state electricity board issues the 'joint meter reading' (JMR) termed as Statement of Energy every month.</p> <p>The verification team cross-checked all the Energy statements issued by TANGEDCO, invoices raised by Project Participant for corresponding months and confirms that the generated electricity has been sold to the grid and not used for any other purpose throughout the current monitoring period.</p>
	<p>In case project participants have temporarily not monitored the parameter, has either i) a deviation been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?</p>	<p>No such issues.</p>
<p>Findings</p>	<p>CL #1, CAR #1, CAR #2, and CAR #3 were raised and resolved.</p>	
<p>Conclusion</p>	<p>The parameter has been monitored appropriately, in accordance with the registered monitoring plan (as per measurement methods and procedures to be applied) and applied methodology. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.</p>	

Parameters fixed ex ante:

$EF_{grid,OM,y}$; tCO_{2e}/MWh : it is the operating margin emission factor of integrated Indian grid and considered fixed for the second crediting period. Value of this parameter reported in the ER sheet as 0.9522 tCO_{2e}/MWh which is consistent with the joint VCS PD&MR /04/.

$EF_{grid,BM,y}$; tCO_{2e}/MWh : it is build margin emission factor of integrated Indian grid and considered fixed for the second crediting period. Value of this parameter reported in the ER sheet as 0.8653 tCO_{2e}/MWh which is consistent with the joint VCS PD&MR /04/.

$EF_{grid,CM,y}$; tCO_{2e}/MWh : it is the combined margin emission factor of integrated Indian grid and considered fixed for the second crediting period. Value of this parameter reported in the ER sheet as 0.9305 tCO_{2e}/MWh is consistent with the joint VCS PD&MR /04/.

Calibration of meters:

During the verification assessment of the project activity, accuracy of all the metering have been checked and found appropriate. The installation and working conditions of the meters were checked through calibration certificates, latest photographs and were found to be satisfactory. Details of meters are provided in below table:

HTSC no-	Meter Sr.No	Calibration date	Validity date of calibration	Accuracy class and make
WEG T110	Main meter: 624921	05/04/2017	04/04/2022	0.2s & HPL Electric
	Check meter: 3033736	08/12/2017	07/12/2022	0.2s & HPL
WEG T123	Main meter: 4322551	29/05/2017	28/05/2022	0.2s & Genus
	Check meter: 3033730	08/12/2017	07/12/2022	0.2s & HPL
WEG T124	Main meter: 4322546	27/05/2017	26/05/2022	0.2s & Genus
	Check meter: 3033750	08/12/2017	07/12/2022	0.2s & HPL
WEG T125	Main meter: HT 2180087	21/05/2020	20/05/2025	0.2s & EDMI
	Check meter : 3033745	08/12/2017	07/12/2022	0.2s & HPL
WEG T126	Main meter: HT 2180279	20/01/2020	19/01/2025	0.2s & EDMI
	Check meter: 3033747	08/12/2017	07/12/2022	0.2s & HPL
WEG T127	Main meter: 625156	03/04/2017	02/04/2022	0.2s & HPL Electric

	Check meter : 3033728	08/12/2017	07/12/2022	0.2s & HPL
WEG T128	Main meter: 4321966	30/05/2017	29/05/2022	0.2s & Genus
	Check meter : 3033714	08/12/2017	07/12/2022	0.2s & HPL
WEG T129	Main meter: HT 2180305	29/10/2018	28/10/2023	0.2s & EDM I
	Check meter: 3033713	08/12/2017	07/12/2022	0.2s & HPL
WEG T130	Main meter: 625093	05/04/2017	04/04/2022	0.2s & HPL Electric
	Check meter: 3033739	08/12/2017	07/12/2022	0.2s & HPL
WEG T131	Main: HT 02120480	08/09/2017	07/09/2022	0.2s & Wallaby
	Check meter : 3033726	08/12/2017	07/12/2022	0.2s & HPL
WEG T132	Main meter: 625097	04/04/2017	03/04/2022	0.2s & HPL Electric
	Check meter : 3033729	08/12/2017	07/12/2022	0.2s & HPL
WEG T133	Main meter: 624927	11/04/2017	10/04/2022	0.2s & HPL Electric
	Check meter: 3033741	08/12/2017	07/12/2022	0.2s & HPL
WEG T134	Main meter: 624929	11/04/2017	10/04/2022	0.2s & HPL Electric
	Check meter: 3033721	08/12/2017	07/12/2022	0.2s & HPL
WEG T135	Main meter: 625096	04/04/2017	03/04/2022	0.2s & HPL Electric
	Check meter new: 3033711	08/12/2017	07/12/2022	0.2s & HPL
WEG T136	Main meter: 625094	04/04/2017	03/04/2022	0.2s & HPL Electric
	Check meter: 3033715	08/12/2017	07/12/2022	0.2s & HPL

It is evident from the above table that calibration for all the meters installed at the site has been conducted as per the calibration frequency mentioned in the joint VCS PD&MR and no delay in calibration of energy meters is identified.

During the virtual meeting, the assessment team has interacted with site personnel & verified the latest photographs of energy meters/19/ and observed that meter's details provided in the joint VCS PD&MR are consistent with the same mentioned in the calibration certificates. It is to be noted that the PP receives payment, for the electricity supplied to the grid, from the state utility (which is a Government Organization and a 3rd party with respect to this VCS project). This electricity supplied to the grid is obtained using directly measured values at the energy meters. Hence the state utility (TNEB/TANGEDCO) ensures that the energy meters are in proper working condition since it must make payments based on these meter readings.

Meters used to measure the parameters are of accuracy class 0.2s as verified through calibration certificates/07/ and through the latest photographs of meters indicating the technical specification. The CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006 and its amendments Notified on 26/06/2010 No. 502/6/2009/DP&D/D-I /16/ which is considered as national standard, mentions that for voltage of 650 V up to 33 KV, 0.5s accuracy class or above is recommended. Hence, the accuracy classes of 0.2s for the energy meters installed at the project activity site are found to be appropriate.

The details of monitoring equipment are involved in the project activity and their calibration details/07/ are mentioned in the table under Appendix-1 of the joint VCS PD&MR /04/.

The CEA Notification No. 502/70/CEA/DP&D dated 17/03/2006/16/ which is considered as national standard mentions that "All interface meters shall be tested at least once in five years." Hence, the stipulated calibration frequency once in 5 years is appropriate.

GHG Calculations:

In accordance with the applied methodology ACM0002 V20, the emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (tCO₂e/yr)

BE_y = Baseline emissions in year y (tCO₂/yr)

PE_y = Project emissions in year y (tCO₂e/yr)

The formula provided for the calculation of baseline emissions is:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where:

BE_y : Baseline emissions in year y (tCO₂e/yr)

$EG_{PJ, y}$: Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)

For renewable energy projects $EG_{PJ, y} = EG_{facility, y}$

$EF_{grid, CM, y}$: Combined margin CO₂ 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” (tCO₂e/MWh)

Baseline Emissions:

The net electricity supplied to the grid by the project activity during the current monitoring period

$$EG_{PJ, y} = 48,767.56 \text{ MWh}$$

$$\text{Thus, } BE_y = 48,767.56 \text{ MWh} * 0.9305 \text{ tCO}_2/\text{MWh}$$

$$= 45,378 \text{ tCO}_2$$

As per the applied methodology, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

As per paragraph 36 of the applied methodology ACM0002 v 20.0 “For most renewable energy power generation project activities, $PE_y = 0$, hence

$$ER_y = 45,378 - 0$$

$$ER_y = 45,378 \text{ tCO}_2$$

The verification team confirms that appropriate methods and formulae for calculating baseline emissions have been followed. The assumptions, emission factors and default values that were applied in the calculations are justified. The actual emission reduction achieved during the current monitoring period are 19.16 % lower than the estimated amount of emission reductions as determined in the updated joint VCS PD&MR, which is due to the low PLF achieved by the project activity during the monitoring period.

It is to be noted that PLF is completely governed by the availability of wind, which is natural phenomenon and same is beyond the control of PP, hence the assessment team has concluded the decrease in emission reduction of the project activity is justified and acceptable. All the data were made available and have monitored as per required monitoring frequency. The means of verification for the values of parameters, used for baseline emission calculation, is described above.

In view of the above discussion the assessment team able to confirm that evidence used to determine the GHG reductions and removals are sufficient and appropriate with respect to quality and quantity.

5 VALIDATION AND VERIFICATION CONCLUSION

LGAI Technological Center, S.A. (Applus+Certification), contracted by CLP Wind Farms (India) Private Limited, to perform the combined validation of renewal crediting period and verification of the project: “Grid Connected Wind Power Project in Tamil Nadu” regarding VCS standard Version 4.2 requirements and the information provided by the project proponent related to the project design, operation, monitoring and reporting. The monitoring period considered for current verification is from 01/01/2021 to 31/12/2021 in the VCS joint project description & Monitoring Report Version 1.3 dated 22/08/2022 are eligible for issuance as Verified Carbon Units.

A risk-based approach has been followed to perform this validation and verification. During the joint validation & verification 03 Corrective Action Requests (CARs), 01 Clarification requests (CLs) were raised and successfully closed.

No limitations or doubts were identified related to the validation and verification.

Validation conclusion:

The purpose of this project activity is to generate electricity using renewable sources (wind) and supplying to the Indian grid, thereby displacing the grid generated electricity.

The project activity has applied the baseline and monitoring methodology, ACM0002 V 20: *Grid-connected electricity generation from renewable sources*, which is an approved methodology under the CDM programme and is acceptable under VCS standard Version 4.2. The baseline has been determined in accordance with the stated approved baseline methodology.

As summary the validation team able to conclude that:

The project is in line with all relevant host country criteria (India) and all relevant VCS version 4 program guidelines requirements.

A reasonable level of assurance has been applied.

The project additionality is not required to be reassessed; however, it is sufficiently justified in the joint VCS PD&MR.

The monitoring plan is transparent and adequate and in line with applied monitoring methodology of ACM0002, version 20.

The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions of 561,320 tCO₂e/year are most likely to be achieved within the 10-year renewable crediting period.

The conclusions of this report show that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation as outlined under VCS version 4, without any qualifications or limitations.

Verification conclusion:

This engagement covers the verification of emission reductions from anthropogenic sources of greenhouse gases included within the project boundary of the project “Grid Connected Wind Power Project in Tamil Nadu” (VCS ID -909), as well as an additional confirmation of the compliance of the joint VCS PD&MR with the requirements of VCS Standard version 4.2.

Applus+Certification is an entity accredited by the United Nations Framework Convention on Climate Change (UNFCCC) to undertake certification and verification services in the sectoral scope in which the Project is undertaken.

The VCS joint project description & Monitoring Report, together with other information examined, was prepared as per the VCS joint project description & Monitoring Report Template, Version 4.0.

The information in the VCS joint project description & Monitoring Report together with other information examined by the assessment team, including all the information necessary to determine that the emission reductions achieved have been determined correctly.

In view of the information provided in the VCS joint project description & Monitoring Report and other relevant information, it can be concluded that the project meets all the requirements of the VCS Standard Version 4.2. Also, based on our examination of the VCS joint project description & Monitoring Report and other relevant information, the emission reductions during the monitoring period from 01/01/2021 to 31/12/2021 (both the days included) are verified as 45,378 tCO₂e.

The management of CLP Wind Farms (India) Private Limited is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions. Applus+Certification is responsible for verification and confirming emission estimates for the project, as described in the VCS joint project description & Monitoring Report.

The certification approach followed by Applus+Certification draws on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. Our examination includes an assessment of evidence, through desk review, and where necessary, virtual interviews, stakeholder discussions, relevant to certifying the rightfulness of the amounts and disclosures in relation to the Project’s GHG emission reductions.

We planned and performed our work to obtain the information and explanations that we considered necessary to provide sufficient evidence for us to give reasonable assurance that the

amount of GHG emission reductions for the given period, prepared based on the VCS Joint project description & Monitoring Report, are fairly stated.

Based on process and procedures conducted, in our opinion, CLP Wind Farms (India) Private *Limited assertion* on GHG emission reductions for the “Grid Connected Wind Power Project in Tamil Nadu ” (VCS ID-909) project during the reporting period 01/01/2021 to 31/12/2021 is materially correct and is a fair representation of the GHG data and information and the emission reductions are fairly stated. The GHG emission reductions were calculated correctly based on monitoring methodology ACM0002- version 20.

The verification team also confirms that the project is implemented as described in the validated VCS joint PD & MR. Therefore, Applus+ Certification can certify that the project is in full compliance with the VCS Standard Version 4.2, and the quantity of the reported emission reductions during below reporting period are completely, comparably, accurately, and correctly reported.

Verification period: From [1st January 2021] to [31st December 2021]

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

Year	Baseline emissions or removals (tCO2e)	Project emissions or removals (tCO2e)	Leakage emissions (tCO2e)	Net GHG emission reductions or removals (tCO2e)
2021(01/01/2021 to 31/12/2021)	45,378	0	0	45,378
Total	45,378	0	0	45,378

APPENDIX 1: DOCUMENT REFERENCES

S.No	Title of Document	Version	Date
1.	Registered VCS PD	03	28/06/2012
2.	VCS Validation Report (Report No: URS/12/VCS/03)	02	30/06/2012
	VCS Verification report (Ref.No- CCMS003761) for previous monitoring period (from 11/06/2012 to 03/10/2012)	02	03/05/2014
3.	Joint VCS PD&MR	01	27/05/2022
4.	Joint VCS PD&MR (Final)	1.3	22/08/2022
5.	ER spread sheet (For validation)	01	27/05/2022
		02	11/06/2022
	ER spread sheet (For verification)	01	27/05/2022
		02	11/06/2022
6.	Project UNFCCC web page: https://cdm.unfccc.int/Projects/DB/RWTUV1348485861.38/view	-	-
7	Certificates of Calibration for all the meters belongs to project activity	-	-
8.	Invoice issued by PP to the state utility	For the period 01/01/2021 to 31/12/2021	-
9.	Monthly JMRs issued by the state utility	For the period 01/01/2021 to 31/12/2021	-
10.	Applied Methodology, ACM0002, "Grid-connected electricity generation from renewable sources"	Version 20.0	Dated 28/11/2019

S.No	Title of Document	Version	Date
10.1	Tool to calculate the emission factor for an electricity system	Version 07.0.0	-
11.	CEA Database	version 17	-
12.	Commissioning certificate issued for all the WTGs pertaining to the project activity	-	-
13.	Power purchase Agreement between CLP Wind Farms (India) Private Limited & Tamil Nadu Electricity Board		02/07/2010
14.	VCS webpage for the project, VCS ID 909; https://registry.verra.org/app/projectDetail/VCS/909	-	Last accessed on 18/06/2022
15.	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period	-	Dated 04/06/2022
16.	Central Electricity Authority (Installation and Operation of Meters) Regulations Notified on 17/03/2006 <u>No. 502/70/CEA/DP&D</u> Amendments Notified on 26/06/2010 <u>No. 502/6/2009/DP&D/D-I</u>	-	-
17.	VCS Standard	Version 4.2	20/01/2022
18.	VCS Program Guide	Version 4.1	20/01/2022
19.	Latest photographs of SCADA system, WTGs, transformers, and energy meters installed at site	-	-
20.	<ul style="list-style-type: none"> ISO 9001:2015 certification for Scope of Design, Development and Operation of wind power plant Quality policy implemented at site	-	-
21.	Grievance register/suggestion box placed at site office	-	-

S.No	Title of Document	Version	Date
22.	Clean Development Mechanism Validation and Verification Standard for Project Activity (CDM-VVS for PA)	version 03.0 as per EB 111, Annex 2	Dated 09/09/2021
23.	CDM Project Standard for Project Activity (CDM-PS for PA)	version 02.0 as per EB 111, Annex 1	Dated 09/09/2021
24	CDM Project Cycle Procedure for Project Activity (CDM-PCP for PA)	version 02.0 as per EB 111, Annex 10	Dated 09/09/2021
25	Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period,	version 03.0.1, EB 66, Annex 47	Dated 02/02/2012
26	The Electricity Act, 2003 (http://www.cercind.gov.in/Act-with-amendment.pdf) National Electricity Policy, 2005 (https://powermin.nic.in/en/content/national-electricity-policy) Tariff Policy, 2006 http://www.orierc.org/documents/National%20Electricity%20Tariff%20Policy.pdf		Dated 26/05/2003 Dated 12/02/2005 January 2006
27.	TNERC Regulations. Codes http://www.tnerc.gov.in/regulat.htm	-	-

APPENDIX 2: COMPETENCY STATEMENT

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	Qualification	Coverage of scope	Coverage of technical Area	Financial aspect	Host country Experience	Attendance to the On-Site Assessment
Ravi Kant Soni	Lead Auditor (LA)	Yes (1)	Yes (1.2)	N/A	Yes	NA
Ravi Kant Soni	Technical Expert (TE)	Yes (1)	Yes (1.2)	N/A	Yes	NA
Simon Shen	Technical Reviewer (TR)	Yes (1)	Yes (1.2)	N/A	N/A	N/A

Ravi Kant Soni is a certified lead auditor for Lead Auditor ISO 14001:2004&Lead Auditor ISO 14064:2006 GHG Inventory and verification. He has more than 10 years of work experience across Climate Change, Environmental Management & Monitoring, Health & Safety Management, and Statutory Compliance. He was involved in more than 100 CDM validation and verifications activities and Gold Standard, VER projects as a team leader/technical reviewer / validator / verifier covering the sectoral scope 1 technical area 1.2. He has done Mater in Technology (Energy Management) from a premier institute, School of Energy & Environmental Studies, DAVV, Indore (M.P.), India and Bachelor of Engineering (Mechanical Engineering) from M.I.T.S Gwalior Jiwaji University Gwalior, India.

Simon Shen (master’s degree in Thermal Energy Engineering, bachelor’s degree in environmental engineering) is a Lead Auditor appointed by Applus+ Certification 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+ Certification, he had been worked for TÜV SÜD as a GHG Validator/Verifier and ISO 9001/14001 Lead Auditor for 5.5 years.

APPENDIX 3: ABBREVIATIONS

Abbreviations	Full texts
ABT	Availability Based Tariff
BEF	Baseline Emission Factor
BM	Build Margin
CAR	Corrective Action Request
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
CL	Clarification Request
CMS	Central Monitoring System
CMP	Conference of Parties Serving as Meeting of Parties
CO ₂	Carbon dioxide
DISCOM	Distribution Company
EB	Executive Board
FAR	Forward Action Request
GHG	Green House Gas
ISO	International Standards Organization
JMR	Joint Meter Reading
kW	Kilowatt
kWh	Kilowatt hour
MFR	Multi-Function Relay
MR	Monitoring Report
MWh	Megawatt-hour
PD	Project Description
PLF	Plant Load Factor
PP	Project Proponent
QA/QC	Quality Assurance and Quality Control
TNEB	Tamil Nadu Electricity Board
TANGEDCO	Tamil Nadu Generation and Distribution Corporation Limited
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Voluntary Carbon Standard
VCSA	Voluntary Carbon Standard Association
VCS PD	VCS Project Description
VCUs	Voluntary Carbon Units
WEG	Wind Energy Generator

Abbreviations	Full texts
WTG	Wind Turbine Generator

APPENDIX 4: FINDINGS OVERVIEW

Table 1. Remaining FAR from validation and/or previous verification

FAR ID	NA	Section no.	XX	Date :DD/MM/YYYY
Description of FAR				
Not applicable				
Project participant response				Date : DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				Date: DD/MM/YYYY

Table 1. CL from this verification

CL ID	01	Section no.	3.3.1	Date : 02/06/2022
Description of CL				
Please submit the documents pertaining to the ownership of the project activity. Section 2.1 MR: Please describe how the negative environmental and socio-economic impacts are accessed.				
Project participant response				Date : 04/06/2022
PP has submitted ownership documents (PPA & commissioning) pertaining to project activity. PP has revised section 2.1 of MR highlighting assessment of negative environmental and socio-economic impacts.				
Documentation provided by project participant				
<i>MR version 1.1</i> <i>PPA and commissioning certificates</i>				
DOE assessment				Date: 10/06/2022
The PP has submitted the PPA signed with the state utility and commissioning certificates for the project activity, found to be sufficient to verify the ownership. The has described the environmental and socio-economic impacts of project activity in the Joint VCS PD&MR, found to be appropriate. CL #1 is closed.				

Table 2. CAR from this verification

CAR ID	01	Section no.	3.4.4	Date : 02/06/2022
Description of CAR				
Please clarify why the impact of new relevant sectoral policies and circumstances on the validity of the baseline scenario is not discussed in the MR.				
Project participant response				Date : 04/06/2022
PP has revised MR and provided the impact of new relevant sectoral policies and circumstances on the validity of the baseline scenario.				
Documentation provided by project participant				
<i>MR Version 1.1</i>				
DOE assessment				Date: 10/06/2022

The PP has appropriately described the impact of new relevant sectoral policies and circumstances on the validity of the baseline scenario in the revised joint VCS PD&MR.
CAR #1 is closed.

CAR ID	02	Section no.	3.1	Date : 02/06/2022
Description of CAR				
Please clarify why the details of the GHG credits issued under CDM is not provided under section 1.15.1 of the MR.				
Please submit the declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions.				
Project participant response				Date : 04/06/2022
PP has revised section 1.15.1 of the MR and provided details of the GHG credits issued under CDM.				
PP has submitted the declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions.				
Documentation provided by project participant				
MR Version 1.1 VERRA declaration				
DOE assessment				Date : 10/06/2022
The PP has provided the details of CERs issued under CDM during each monitoring period in the revised joint VCS PD&MR, found to be satisfactory.				
The PP has submitted the declaration confirming that the GHG Emission reductions or removals generated by the project activity will not be used for compliance with an emission trading program or to meet binding limits on GHG Emissions, found to be appropriate, hence accepted.				
Please address the following issues:				
<ul style="list-style-type: none"> i. Capacity of the project activity as mentioned in the joint VCS PD&MR is not consistent with the registered VCS PD. ii. Second crediting period for the project activity starts from 02/07/2020, however the monitoring period is considered from 01/01/2021. Kindly clarify the reason. iii. As per the registered VCS PD calibration frequency of meters is once 3 years, however the joint VCS PD&MR mentions the same as once in 5 years. 				
CAR #2 is open				
Project participant response				Date : 11/06/2022
<ul style="list-style-type: none"> i. PP has revised capacity of project as mentioned in Joint PD and MR document as per registered VCS PD. ii. All the 15 WTGs of this project activity are part of registered CDM Project "Grid Connected Wind Power Project in Tamil Nadu, CDM Ref No 7415" which has total 30 WTGs (49.5 MW). The CDM verification of this project is completed till 31 Dec 2020. Hence PP has considered monitoring period start date from 01/01/2021 under second crediting period. iii. During registration, calibration frequency has been considered once in three years. However, in actual practice, state utility conducted the accuracy check of all interface meters once in five years. These meters also tested whenever the energy and other quantities recorded by the meter are abnormal or inconsistent with electrically adjacent meters. Same is in line with para 18.1.b of the notification dated 17/03/2006 published by Central Electricity Board, Govt. of India (www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf). Testing and calibration has been done by state utility which is beyond the control of Project Participant. 				
Documentation provided by project participant				

VCS Joint PD and MR version 1.2	
ER Sheet Theni-I Version 1.1	
ER Sheet Estimated Theni-I version 1.1	
DOE assessment	Date: 17/06/2022
<p>I. The PP has corrected the capacity of project in the joint VCS PD&MR, also updated the ER sheet accordingly.</p> <p>II. The project proponent has considered the current monitoring period from 01/01/2021 as the credits already claimed till 31/12/2020 under CDM, hence any chance of double counting is ruled out.</p> <p>III. The PP has revised the calibration frequency as once in 5 years as the calibration is not under control of the PP and this instance is considered as project deviation during the current monitoring period. Since the calibration of meters is not under control of the project proponent and the updated calibration frequency is in line with the national standard, hence project deviation is justified and accepted</p>	
CAR #2 is closed.	

CAR ID	03	Section no.	4.1	Date : 02/06/2022
Description of CAR				
Please submit the calibration certificates for all the energy meters. It is observed that the meters at existing energy meters at some locations were replaced with new meters. The PP is requested to provide the meter replacement certificates.				
Project participant response				Date : 04/06/2022
PP has submitted calibration certificates for all the energy meters. PP has provided meter replacement certificates for meter locations which were replaced with new meters.				
Documentation provided by project participant				
Calibration certificates Meter replacement certificates				
DOE assessment				Date: 10/06/2022
The PP has submitted the calibration certificates of all the energy meters and found to be valid for the current monitoring period, hence accepted. The main meters located at HTSC no- WEG T125, WEG T126 were replaced with new meters due to the connectivity issue / erroneous display. The new main meters (location - WEG T125, WEG T126) installed at respective location are of the same accuracy class (0.2s) as the existing one, this is verified through the replacement certificates issued by the state utility. CAR #3 is closed.				

Table 3. FAR from this validation

FAR ID	XX	Section No.	XX	Date :
Description of FAR				
NA				
Project participant response				Date : DD/MM/YYYY
NA				
Documentation provided by project participant				
NA				
DOE assessment				Date: DD/MM/YYYY
NA				