

VERIFICATION REPORT OF “GRID CONNECTED WIND ENERGY PROJECT IN TAMIL NADU”



Document Prepared By Earthood Services Private Limited

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Report Title	Verification Report of “Grid Connected Wind Energy Project in Tamil Nadu”
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Summary:

Earthood Services Private Limited (ESPL) has performed the verification of the project “Grid Connected Wind Energy Project in Tamil Nadu” VCS ID 911, against VCS Standard Version 3.7. The scope of verification includes confirming the implementation of the monitoring plan of the registered VCS PD (version 03) dated 21/06/2012 and the application of the monitoring methodology “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”, ACM0002, Version 13.0.0.

The verification is consisted of three phases: i) desk review of the project; ii) follow-up onsite visit and interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification report and opinion. The overall verification, from Contract Review to Verification Report & Opinion, was conducted following ESPL internal quality procedures.

During the verification process 03 CARs, 01 CL and 00 FARs were raised. All the findings have been closed satisfactorily and the same has been discussed in Appendix 4.

ESPL confirms that the monitoring system is in place and the emission reductions are calculated without material misstatements. The emission reductions from the project activity “Grid Connected Wind Energy Project in Tamil Nadu” in India during the period 10/10/2017 – 09/09/2018 (including both days) amount to 79,385 tonnes of CO₂e.

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1 INTRODUCTION

1.1 Objective

CLP Wind Farms (Theni – Project II) Private Limited has contracted Earthood Services Private Limited (ESPL) to perform VCS Verification of the ‘Grid Connected Wind Energy Project in Tamil Nadu’ in India (hereafter called project). This project has already been registered as a VCS project (VCS ID 911). The objective of this verification is a thorough and independent assessment of registered project activities against the applicable VCS requirement by the DOE. The verification process shall determine whether the proposed project activity complies with the requirements of latest VCS guidelines, applicability conditions of the selected methodology, relevant host country regulations and guidance issued by the VCS Board.

1.2 Scope and Criteria

The scope of verification is to assess the claims and assumptions made in the VCS monitoring report (MR) against the VCS criteria, including but not limited to, VCS standard, applied methodology and other relevant rules and requirements established for VCS project activities.

The Verification is not meant to provide any consulting towards the project participants. However, stated requests for clarification and/or correction actions request may have provided inputs for improvement of the project design.

1.3 Level of Assurance

The verification team verified the complete monitoring data for all the parameters of the monitoring plan and confirms that the reported emission reductions are free from any type of material errors. Therefore, ESPL confirms that the verification is conducted with reasonable level of assurance.

1.4 Summary Description of the Project

The project activity involves electricity generation by wind electric convertors and supplying the generated electricity to the Southern 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 also plays beneficial role in the mitigation of climate change.

The project activity consists of 30 WTGs (1650 kW capacity each), making the total installed capacity to be 49.5 MW at the G.Usulampatti, Mottanoothu, Kothapatti, Shanmuga Sundara Puram & Marikundu villages of Theni district in state of Tamil Nadu.

Location of the project was verified through Google Map (<https://www.gps-coordinates.net/>) and found consistent with the data provided in the registered PD /01/. The WTGs generate 3-phase power at 400 V ($\pm 12.5\%$) in the frequency range of 47.5 – 51.5 Hz. It is further stepped up to 33 kV for further distribution by the state utility. This information was verified during physical site visit and found to be in line with the details provided in the registered PD /01/.

The first 20 WTGs have been commissioned on 25/06/2010 and remaining 10 WTGs on 02/07/2010. The same was verified against the registered VCS PD/01/ and commissioning certificates/11/. The emission reductions from the project activity during the period 10/10/2017 – 09/09/2018 (including both days) amount to 79,385 tonnes of CO₂e.

2 VERIFICATIONPROCESS

The registered VCS project is undergoing fifth verification under VCS, the approach adopted to ensure the quality of emission reductions is described in the following sections.

2.1 Method and Criteria

ESPL 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/verification process consist of the following three phases;

- A desk review of the VCS PD and VCS MR
- Site visit and follow up interviews with project stakeholders
- The resolution of outstanding issues and issuance of final report and opinion.

2.2 Document Review

The verification is performed primarily as a document review of the registered VCS PD, previous MR and Verification report and associated documents as stated in details in appendix 1 of this document. The assessment is performed by a verification team using a protocol. The cross checks between information provided in the Monitoring report, VCS PD and information from sources other than those used, if available, the team's sectoral or local expertise and, if necessary, independent background investigations.

2.3 Interviews

The site visit for the project location, by the assessment team, was conducted on 17/10/2018 and the following stakeholders were interviewed.

S N	Name	Organization
1	Darshak Patil	CLP Wind Farms (Theni – Project II) Private Limited
2	Ilavaransan Arunachalam	VESTAS

The topics covered during interview ranges from general features and implementation of project to technical details of the project like calibration details, monitoring and measuring system and data collection, recording and archiving procedures. The assessment was drawn based on the feedback received during interview coupled with the documentation and on-site observations.

2.4 Site Inspections

A site visit was undertaken by ESPL team on 17/10/2018 to carry out the following;

- a. An assessment of the implementation and operation of the registered project activity as per the registered VCS PD and VCS MR;
- b. A review of information flows for generating, aggregating and reporting the monitoring parameters;
- c. Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PD;
- d. A cross check between information provided in the monitoring report and data from other sources such as plant logbooks, inventories, purchase records or similar data sources;
- e. A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PD, the applied methodology including applicable tool(s), and, where applicable, the applied standardized baseline;
- f. A review of calculations and assumptions made in determining the GHG data and emission reductions;
- g. An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

The objective of this step is to identify, discuss and conclude on the issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions. This is done based on the desk review and onsite assessment. The verification team prepares and/or updates a verification protocol (internal document) that records the conformities and non-conformities, which may be of following types;

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

- 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;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- 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 CDM requirements have been met. All CARs and CLs raised by the ESPL during verification shall be resolved prior to submitting a request for issuance.

FAR (Forward Action Request) is raised during verification if the monitoring and reporting require attention and/or adjustment for the next verification period.

All the findings that are raised and communicated to project participant during the verification are included under Appendix 4. The section also includes the response, if provided, by the project participants and an assessment by the verification team if it was closed out or otherwise.

2.5.1 Forward Action Requests

The project activity is undergoing fifth verification under VCS; there were no FARs raised during the validation or previous verification/2.1/.

2.6 Eligibility for Validation Activities

Not applicable.

3 VALIDATION FINDINGS

Not applicable.

3.1 Participation under Other GHG Programs

- This project is registered under VCS (Project ID-911).As verified through the records available at VCS registry, VERs for the previous monitoring period (10/06/2016 – 09/10/2017) are already issued.
- The project has been registered under Clean Development Mechanism (CDM) with reference number 7416 and the crediting period (renewable) is from 04/10/2012 to 03/10/2019. There is no CERs issued under CDM till date as verified through the project webpage (<https://cdm.unfccc.int/Projects/DB/RWTUV1348485861.38/view>).

Even though the project has been registered under the CDM, it shall not claim credits for the same GHG emission reduction under the VCS and the CDM. This was confirmed through a declaration/14/ submitted by the PP and hence accepted by the assessment team.

3.2 Methodology Deviations

There is no methodology deviation identified during the current monitoring period.

3.3 Project Description Deviations

The Project proponent has considered project deviation in the previous monitoring period that is also applicable and valid in the current monitoring period. There is a change of accuracy class of energy meters installed project site. In accordance with the registered VCS PD, two identical energy meters – main meter and check meters of 0.5s accuracy class at each WTG's 33 kV outgoing feeder (metering point) were installed. As per Standards on Installation and Operation of Meters (pg no 15 of 20) 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), interface meter with 0.5s or better accuracy class needs to be installed if energy meter is connected above 650 volts and up to 33 kV. Thus, during project commissioning state utility has installed energy meters with 0.5s accuracy class as energy meters are connected to grid at 33 kV. However, TNEB (state utility) has decided to upgrade accuracy class of all energy meters from 0.5s to 0.2s. Thus, being a project developer under TNEB jurisdiction, the PP has to replace all interface energy meters at site and same is beyond the control of the PP. During site visit, it was observed that all main meters and check meters have been replaced with 0.2s. Thus, this project activity is now using energy meters with higher accuracy class to monitor export and import of electricity which is more conservative in nature. This is likely to be a permanent deviation. The assessment team has accepted this deviation for the reasons below:

- There is no loss of accuracy as a result of the alteration in monitoring (the energy meter's accuracy class improving from 0.5s to 0.2s)
- Due to improvement of accuracy class of energy meter, resulting in a more accurate value of the generation.

The deviation also has no effect on the applicability of the methodology, additionality or the appropriateness of the baseline scenario as it is only related to the monitoring arrangements within the project. The assessment team is of the opinion therefore, that the deviation taken by Project proponent is acceptable and it will not affect computation of ER or impact the project activity performance.

3.4 Grouped Project

Not applicable. The project activity is not a grouped project

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity consists of 30 WTGs installed at G.Usulampatti, Mottanoothu, Kothapatti, Shanmuga Sundara Puram & Marikundu villages of Theni district in state of Tamil Nadu. The first 20 WTGs and last 10 WTGs under the project activity was commissioned on 25/06/2010 and 02/07/2010 respectively. The WTGs are Vestas make with an individual capacity of 1.65 MW, summing up to 49.5 MW of total installation capacity.

The installation and specification of WTGs has been checked with commissioning certificates/11/ and on-site assessment/18/. The commissioning has also been duly validated in the VCS validation report of the project activity/02/. There was no major breakdown or shut downs during the monitoring period which might affect the applicability of methodology or might cause material errors in emission reductions.

Assessment team concludes the following:

- a) There is 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 is no material discrepancies between the actual monitoring system, and the monitoring plan set out in the project description and the applied methodology/09/.
- 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/17/.
- 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/2.1/.
- f) The project is registered under VCS and CDM as well.
- g) The project activity is comply with indicators for sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India as discussed under section 1.10 of MR.

In view of the information's as verified above the assessment team is able to 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 registered VCS PD/01/ and the VCS MR/04/. The monitoring plan laid in the registered PD is being followed at the site/18/. The assessment team has verified the information flow (from data generation, aggregation, to recording, calculation and reporting for these parameters including the values) in the MR/04/. The emission reductions are purely based on the net electricity generated and exported from the machines. PP has provided all the sufficient data for current monitoring period. The values of the parameter net electricity generation supplied to the grid by each phase used in deriving the GHG emission reduction could be very well correlated between the data sets and ER spreadsheet/05/ provided by PP. the verification of each monitoring parameter has been discussed later in section 4.3.

The calculation method and formulae used in calculating baseline emission is in compliance to the methodology used i.e. ACM0002 Version 13.0.0 /09/. 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

The below tables describe how the parameter, that is to be measured according to the monitoring plan, has been verified to confirm that the actual monitoring complies with the monitoring plan, monitoring data has been thoroughly assessed and that the calibration requirements are met.

The below tables describe how the parameter, that is to be measured according to the monitoring plan, has been verified to confirm that the actual monitoring complies with the monitoring plan, monitoring data has been thoroughly assessed and that the calibration requirements are met.

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, $EG_{PJ,y}$ (MWh/Year)	
Means of verification	Criteria/Requirements	Assessment/Observation
	Measuring /Reading /Recording frequency	The main meter and check meters, located near the foot of 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. The reporting frequency is in line with the monitoring plan as outlined in the registered PD/01/ and monitoring methodology/10/.
	Monitoring equipment	A set of bidirectional (main and check) energy meters are installed near each WECs to account

		the electricity supplied to the grid. The main meter readings are recorded monthly by representatives of the respective electricity board (TANGEDCO) and Project participant's representative. Based on this monthly recording, the state electricity board issues the 'joint meter reading' (JMR) termed as Statement of Energy every month. 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.
	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 registered PD.
	Is the accuracy valid for the entire measuring range or do different accuracy levels apply to different measuring ranges?	Yes the accuracy valid for the entire measuring range.
	Calibration frequency /interval:	Once in 3 Years
	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	The registered monitoring plan indicates the frequency of accuracy testing/ calibration of the main and check meters as once in 3 years.

	specifications?	
	Is the calibration of measuring equipment carried out by an accredited person or institution?	Calibration of the measuring equipment's is carried out by an accredited entity i.e. by state utility (TNEB)/06/
	Is (are) calibration(s) valid for the whole reporting period?	Calibration of energy meters recording energy exported is valid for whole reporting period.
	Is the calibration carried out for a measuring range comparable with the range for which measurements have been carried out?	Yes, calibration carried out for a measuring range comparable with the range for which measurements have been carried.
	How were the values in the monitoring report verified?	Reported values of this parameter have been verified with monthly Joint Meter Reading Report /08/ during site visit .Value of this parameter for the current monitoring period is verified as 88,501.29 MWh. Furthermore monthly values of this parameter is reported in the ER calculation sheet/05/ are also verified with the monitoring report/04/ and found to be consistent.
	If applicable, has the reported data been cross-checked with other available data?	The monthly reported values of net electricity supplied to the grid as reported in the ER calculation sheet were further cross checked with the monthly invoices raised by the PP /07/ and found to be consistent.
	Does the data management ensure correct transfer of data and reporting of emission reductions and are necessary QA/QC processes in place?	Yes, the adequate QA/QC procedures were implemented by all the stakeholders, namely, the Grid Authority, the PP and the O&M Contractor. The data transfer process for the said parameter is as follows: The readings at the Metering Point are undertaken every month jointly by the representatives of the State Grid/ TNEB and CLP/Vestas representative.
	In case project participants have temporarily not monitored the parameter, has either i) a deviation	No such issues.

	been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	
Findings	CL #1 ,CAR #2,CAR # and CAR #4 was raised and resolved	
Conclusion	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/10/. The monitoring results were recorded consistently as per the approved frequency in the monitoring plan.	

Parameter fixed ex-ante:

EF_{grid,OM,y}; tCO₂e/MWh: The Combined CO₂ emission factor for the first crediting period of the Project activity has been determined ex-ante in the registered VCS PD/1/. The emission factor value of 0.8970 tCO₂e/MWh used in the monitoring report has been verified against the registered VCS PD/1/ and found it to be consistent.

EF_{grid,OM,y}; tCO₂e/MWh: The Operating margin CO₂ emission factor for the first crediting period of the Project activity has been determined ex-ante in the registered VCS PD/1/. The emission factor value of 0.9513 tCO₂e/MWh used in the monitoring report has been verified against the registered VCS PD/1/ and found it to be consistent.

EF_{grid,BM,y}; tCO₂e/MWh: The Build margin CO₂ emission factor for the first crediting period of the Project activity has been determined ex-ante in the registered VCS PD/1/. The emission factor value of 0.7339 tCO₂e/MWh used in the monitoring report has been verified against the registered VCS PD/1/ and found it to be consistent.

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 during the on-site inspection and were found to be satisfactory. Details of meters are provided in below table:

HTSC Number	Main Meter				Check meter			
	Sr. No.	Calibration Date	Validity	Class	Sr. No.	Calibration Date	Validity	Class
T-90	HPL624813	23-Feb-17	22-Feb-20	0.2s	HPL624819	22-Feb-17	21-Feb-20	0.2s
T-91	HPL624812	25-Feb-17	24-Feb-20	0.2s	HPL624817	25-Feb-17	24-Feb-20	0.2s
T-92	HPL624814	24-Feb-17	23-Feb-20	0.2s	HPL624978	24-Feb-17	23-Feb-20	0.2s
T-93	HPL624972	24-Feb-17	23-Feb-20	0.2s	HPL624976	24-Feb-17	23-Feb-20	0.2s
T-94	HPL624971	24-Feb-17	23-Feb-20	0.2s	HPL624975	24-Feb-17	23-Feb-20	0.2s

HTSC Number	Main Meter			Class	Check meter			Class
	Sr. No.	Calibration Date	Validity		Sr. No.	Calibration Date	Validity	
T-95	HPL624973	25-Feb-17	24-Feb-20	0.2s	HPL624977	25-Feb-17	24-Feb-20	0.2s
T-96	HPL624979	22-Feb-17	21-Feb-20	0.2s	HPL624980	22-Feb-17	21-Feb-20	0.2s
T-97	HPL624820	22-Feb-17	21-Feb-20	0.2s	HPL624974	22-Feb-17	21-Feb-20	0.2s
T-98	HPL625141	23-Mar-17	22-Mar-20	0.2s	HPL625146	23-Mar-17	22-Mar-20	0.2s
T-99	HPL625144	24-Mar-17	23-Mar-20	0.2s	HPL625150	23-Mar-17	22-Mar-20	0.2s
T-100	GENUS 4322544	29-May-17	28-May-20	0.2s	HPL 3033738	08-Dec-17	07-Dec-20	0.2s
T-101	GENUS 4321972	30-May-17	29-May-20	0.2s	HPL 3033737	08-Dec-17	07-Dec-20	0.2s
T-102	HPL625145	24-Mar-17	23-Mar-20	0.2s	HPL625149	24-Mar-17	23-Mar-20	0.2s
T-103	HT2160431	01-Mar-16	28-Feb-19	0.2s	HT2160432	01-Mar-16	28-Feb-19	0.2s
T-104	GENUS 4321968	30-May-17	29-May-20	0.2s	HPL 3033733	08-Dec-17	07-Dec-20	0.2s
T-105	HPL624853	22-Mar-17	21-Mar-20	0.2s	HPL624860	22-Mar-17	21-Mar-20	0.2s
T-106	HPL624856	22-Mar-17	21-Mar-20	0.2s	HPL624859	27-Feb-17	26-Feb-20	0.2s
T-107	HPL625142	22-Mar-17	21-Mar-20	0.2s	HPL625148	23-Mar-17	22-Mar-20	0.2s
T-108	HPL625143	23-Mar-17	22-Mar-20	0.2s	HPL625147	23-Mar-17	22-Mar-20	0.2s
T-109	HPL624854	27-Feb-17	26-Feb-20	0.2s	HPL624855	27-Feb-17	26-Feb-20	0.2s
T-113	HPL624811	21-Feb-17	20-Feb-20	0.2s	HPL624816	21-Feb-17	20-Feb-20	0.2s
T-114	HPL624815	22-Feb-17	21-Feb-20	0.2s	HPL624818	21-Feb-17	20-Feb-20	0.2s
T-115	HPL625081	23-Feb-17	22-Feb-20	0.2s	HPL625089	23-Feb-17	22-Feb-20	0.2s
T-116	GENUS 4321967	29-May-17	28-May-20	0.2s	HPL 3033735	08-Dec-17	07-Dec-20	0.2s
T-117	HPL624741	25-Feb-17	24-Feb-20	0.2s	HPL624747	25-Feb-17	24-Feb-20	0.2s
T-118	HPL624857	27-Feb-17	26-Feb-20	0.2s	HPL624858	27-Feb-17	26-Feb-20	0.2s
T-119	HPL624743	25-Feb-17	24-Feb-20	0.2s	HPL624745	25-Feb-17	24-Feb-20	0.2s
T-120	HPL624748	27-Feb-17	26-Feb-20	0.2s	HPL624750	25-Feb-17	24-Feb-20	0.2s
T-121	GENUS 4322548	29-May-17	28-May-20	0.2s	GENUS 4322548	27-Feb-17	26-Feb-20	0.2s
T-122	GENUS 4321971	30-May-17	29-May-20	0.2s	HPL 3033748	08-Dec-17	07-Dec-20	0.2s

The details of monitoring the equipment are involved in the project activity and their calibration details/06/ are mentioned in the table under Section 3.3 of the VCS MR/04/. The energy meters installation dates and calibration dates were verified with respective energy meter replacement and calibration certificate issued by TNEB and also each meter has been physically inspected during the site visit and the meter details are found to be consistent with that observed during the site visit.

The assessment team has verified the monthly JMR issued by state utility and confirmed that only the data recorded through main meters is used to calculate net electricity supplied to the grid by the WTGs belongs to developer and consequently for ER calculations. As verified through the calibration certificates, that meters were working satisfactorily during the current monitoring period. The registered VCS PD/01/ & MR /04/ and site visit observations confirm that the metering equipment are sealed and maintained by the state utility.

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.

GHG Calculations

The emission reduction as per the applied methodology equals the baseline emissions (project emissions and leakage emissions for such project activities is considered zero). The formula provided for the calculation of baseline emissions is:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y} \text{ -----Equation 6 of ACM0002}$$

Where:

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

$EG_{PJ,y}$: Electricity supplied by the project activity to the grid in year y (MWh/yr)

$EF_{grid,CM,y}$: Combined Margin (CM) Emission Factor of Southern grid (tCO₂e/MWh)

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

Thus, $BE_y = 88,501.29 \text{ MWh} * 0.8970 \text{ tCO}_2\text{e/MWh}$

$= 79,385 \text{ tCO}_2\text{e}$

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 20.08% lesser than the estimated amount of emission reductions at the time of validation, which is due to the low PLF achieved by the project activity during the monitoring period.

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.

4.4 Non-Permanence Risk Analysis

Not applicable for the project activity.

5 SAFEGUARDS

5.1 No Net Harm

Not applicable for this verification.

5.2 Local Stakeholder Consultation

Not applicable for this verification.

6 VERIFICATION CONCLUSION

Earthood Services Private Limited (ESPL), contracted by CLP Wind Farms (Theni – Project II) Private Limited, has performed the independent verification of the emission reductions for the VCS project activity (VCS ID- 911) “Grid Connected Wind Energy Project in Tamil Nadu” in India for the monitoring period 10/10/2017 – 09/09/2018 as reported in the Monitoring Report Version 02 dated 24/10/2018. The CLP Wind Farms (Theni – Project II) Private Limited is responsible for the collection of data in accordance with the monitoring plan and the reporting of GHG emissions reductions from the project activity.

It is our responsibility to express an independent verification statement on the reported GHG emission reductions from the project activity

ESPL commenced the verification on the basis of the baseline and monitoring methodology ACM0002 Version 13.0.0, the monitoring plan contained in the registered VCS PD Version 03, dated 21/06/2012 and VCS guidelines version 3.7, Monitoring Report Version 02 dated 24/10/2018 as per the process described under Section 2 of this report.

ESPL verification approach is based on the understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these. ESPL planned and performed the verification by obtaining evidence and other information and explanations that ESPL considered necessary to give reasonable assurance that reported GHG emission reductions are fairly stated.

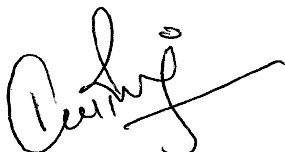
In our opinion the GHG emissions reductions reported for the project activity for the period 10/10/2017 – 09/09/2018 are fairly stated in the Monitoring Report Version 02 dated 24/10/2018. The GHG emission reductions were calculated correctly on the basis of the approved baseline and monitoring methodology ACM0002, Version 13.0.0, and the VCS standard.

Verification period: From 10/10/2017 – 09/09/2018 (including both days)

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

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2017 (10/10/2017 – 09/01/2018)	5,792	0.00	0.00	5,792
2018 (10/01/2018 - 09/09/2018)	73,593	0.00	0.00	73,593
Total	79,385	0.00	0.00	79,385

Approved by



Dr. Kaviraj Singh
Managing Director

Earthood Services Privated Limited

Date: 26/10/2018

Place: Gurgaon, Haryana

APPENDIX 1: References

S. No	Title of Document	Version	Date
1.	Registered VCS PD	3.0	21/06/2012
2.	VCS Validation Report	3.0	22/06/2012
2.1	Previous VCS Verification report (Monitoring period: 10/06/2016 to 09/10/2017)	2	08/12/2017
3.	VCS Monitoring Report	1	04/10/2018
4.	VCS Monitoring Report (Final)	02	24/10/2018
5.	ER spread sheet (corresponding to the final monitoring report)	02	24/10/2018
6	Certificates of Calibration for all the meters belongs to project activity	-	-
7.	Copy of all invoices raised to TANGEDCO by Project proponent for net electricity exported to the grid	For the period 10/10/2017 to 09/09/2018	-
8.	Monthly State Energy Statements (JMR) issued by TNEB	For the period 10/10/2017 to 09/09/2018	-
9.	"Consolidated baseline methodology for grid-connected electricity generation from renewable sources", ACM0002,	13.0.0	-
10.	CEA Database	version 07	-
11.	Commissioning certificate for all the WTGs of the project activity issued by state electricity authority	-	Commissioned between 25/06/2010 and 02/07/2010
12.	Power Purchase Agreements signed between Project Proponent and state electricity authority	-	-
13.	VCS webpage for the project, VCS ID 911; http://www.vcsprojectdatabase.org/#/project_details/911	-	Last accessed on 25/10/2018
14.	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period	-	-
15.	Central Electricity Authority (Installation and Operation of Meters) Regulations Notified on 17/03/2006 No. 502/70/CEA/DP&D Amendments Notified on 26/06/2010 No. 502/6/2009/DP&D/D-I	-	Dated 17/03/2006
16.	VCS Standard	Version 3.7	21/06/2017
17.	VCS Program Guide	Version 3.7	21/06/2017
17.1	CDM VVS for project activities	Version 01.0	-
18.	On site assessment –interviews of staff personnel, photographs, physical inspection of monitoring system	-	17/10/2018

APPENDIX 2: Competency Statement

Competence Statement			
Name	Vivek Kumar Ahirwar		
Country	India		
Education	B. E (Mechanical Engineering) M.Tech (Energy and Environmental Studies)		
Experience	9 Years +		
Field	Climate Change & Environment		
Approved Roles			
Team Leader	YES		
Validator	YES		
Verifier	YES		
Methodology Expert	AMS-I.D and ACM0002		
Local expert	YES (India)		
Financial Expert	YES		
Technical Reviewer	YES		
TA Expert (1.2)	YES		
Reviewed by	Ashok Gautam	Date	10/10/2018
Approved by	Kaviraj Singh	Date	10/10/2018

Competence Statement	
Name	Ravi Kant Soni
Country	India
Education	B. Tech. (Mechanical Engineering) M. Tech. (Energy Management)
Experience	7 Years +
Field	Energy and Climate Change
Approved Roles	
Team Leader	YES
Validator	YES
Verifier	YES
Methodology Expert	AMS-I.D., AMS-I.C., ACM0002
Local expert	YES (India)
Financial Expert	NO
Technical Reviewer	YES
TA Expert (1.2)	YES

Reviewed by	Abhishek Mahawar	Date	09/09/2016
Approved by	Kaviraj Singh	Date	09/09/2016

APPENDIX 3: Abbreviations

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
EPC	Engineering, Procurement and Construction
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
MW	Megawatt
MWh	Megawatt-hour
O&M	Operation and Maintenance
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

TOD	Time of the Day
UNFCCC	United Nations Framework Convention on Climate Change
WEC	Wind Energy Converter
WEG	Wind Energy Generator
WTG	Wind Turbine Generator
VCS	Voluntary Carbon Standard
VCSA	Voluntary Carbon Standard Association
VCS PD	VCS Project Description
VCUs	Voluntary Carbon Units

APPENDIX 4: Findings Overview

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

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

Table 2. CL from this verification

CL ID	01	Section no.	3.3	Date : 23/10/2018
Description of CL				
Please submit the latest calibration certificates of all the meters installed at substation and used to measure the data.				
Project participant response				Date : 24/10/2018
Calibration certificates of all the energy meters are now attached with this submission.				
Documentation provided by project participant				
Calibration Certificates				
DOE assessment				Date: 24/10/2018
Calibration details of the energy meters are provided in the revised MR and the same is found consistent with calibration certificates provided by the PP. CL #1 is closed.				

Table 3. CAR from this verification

CAR ID	02	Section no.	1.6	Date : 23/10/2018
Description of CAR				
Please submit 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 : 24/10/2018
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 are now attached with this submission.				
Documentation provided by project participant				
Project Declaration by CLP Wind Farms (Theni – Project II) Private Limited				
DOE assessment				Date: 24/10/2018
Project proponent has submitted the declaration pertaining to confirmation for 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 satisfactory, hence accepted. CAR #2 is closed.				

CAR ID	03	Section no.	3.2	Date : 23/10/2018
Description of CAR				
Please submit the joint meter reading issued by TNEB and invoices raised by the project proponent to the state utility for period 09/09/2018 to 09/10/2018.				
Project participant response				Date : 24/10/2018

Energy generation data for the period of 09/09/2018 to 09/10/2018 is available with CLP. However, approved and signed generation statement for the period of 09/09/2018 to 09/10/2018 still awaited from state utility (TNEB) which is beyond the control of CLP. Thus, for better clarity and consistency, CLP has decided to reduce the monitoring period till 09/09/2018. Emission reductions for the period from 09/09/2018 to 09/10/2018 would be claimed in next periodic verification. Monitoring report and emission reduction sheet are now revised appropriately.

Documentation provided by project participant

MR version 2
Emission reduction sheet

DOE assessment
Date: 24/10/2018

The PP has provided the revised MR and ER sheet with corrections in monitoring period and same has been check and found to be consistent and confirm from JMRs and Invoices.
CAR #3 is closed.

CAR ID	04	Section no.	4.4	Date : 23/10/2018
Description of CAR				
The PP is requested to provide comparison between estimated values of ER to actual value for current monitoring period. Also please justify the variation with appropriately reason.				
Project participant response				Date : 24/10/2018
The actual emission reductions achieved during this monitoring period is 20.08% lower than the estimated value as per registered PD which is due to lower wind availability at site. Wind availability is a natural phenomenon which is beyond the control of CLP. Same is now incorporated in the revised monitoring report.				
Documentation provided by project participant				
MR version 2				
DOE assessment				Date: 24/10/2018
The PP has submitted the revised MR with inclusion of justification on variation between estimated ER and actual ER for current monitoring period. There was reduction in emission reduction about 20.08% which is due to lower wind availability during current monitoring period. The CAR #4 is closed.				

Table 4. FAR from this verification

FAR ID	xx	Section No.		Date :DD/MM/YYYY
Description of FAR				
No FAR raised				
Project participant response				Date :DD/MM/YYYY
N/A				
Documentation provided by project participant				
N/A				
DOE assessment				Date: DD/MM/YYYY
N/A				

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