

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



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Summary:

LGA Technological Center, S.A. (hereafter referred to as Applus+ LGA) has been contracted by CLP Wind Farms (Theni – Project II) Private Limited to conduct the verification of the project “Grid Connected Wind Energy Project in Tamil Nadu”, VCS ID 911, against VCS Standard Version 3.7.

The verification includes confirming the implementation of the monitoring plan of the registered VCS PD and MR (Project ID 911) and the application of the monitoring methodology as per ACM0002 version 13.0.0: “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”. A site visit was conducted to verify the data submitted in the monitoring report.

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

A risk based approach has been followed to perform this verification. In the course of verification, 03 Corrective Action request (CARs), 00 Clarification request (CLs) and 00 Forward Action Request (FAR) were raised and satisfactorily closed.

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

Applus+ LGA confirms that the project is implemented in accordance with the registered VCS 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 emission reductions from the project activity “Grid Connected Wind Energy Project in Tamil Nadu” in India during the period 10/06/2016 – 09/10/2017 (including both days) amount to 168,880 tonnes of CO₂e.

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1 INTRODUCTION

1.1 Objective

Applus+ LGAI has been contracted by CLP Wind Farms (Theni – Project II) Private Limited (project proponent), to undertake the verification of the renewable energy project titled “Grid Connected Wind Energy Project in Tamil Nadu”(VCS ID-911) The verifiers have reviewed the GHG data collected to date for the monitoring period from 10/06/2016 to 09/10/2017 (both days included) covered in this verification. 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 the verification was the independent and objective review and ex-post determination of the monitored reductions in GHG emissions from “Grid Connected Wind Energy Project in Tamil Nadu” The verification of this project was based on the registered project description & monitoring report /05/ and supporting documents submitted by the project proponent to the verification team. The documents were reviewed against the following guidance and protocols:

VCS Standard: VCS Version 3, 21/06/2017, v3.7 (VCS Standard)

Approved Clean Development Mechanism (CDM) methodology ACM0002, version 13.0.0, “Consolidated methodology for grid-connected electricity generation from renewable sources”.

Validated VCS Project Description, version 03 dated 21/06/2012

VCS Program Guide, Version 3, 21/06/2017, v3.7

ISO 14064-3: Specification with guidance for the validation and verification of greenhouse gas assertions, 2006

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

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 Latlong.net (<https://www.gps-coordinates.net/>) and found consistent with the data provided in the registered PD /01/. The WTGs generate power and 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/12/. The emission reductions from the project activity during the period 10/06/2016 – 09/10/2017 (including both days) amount to 168,880 tonnes of CO₂e.

2 VERIFICATION PROCESS

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

2.1 Method and Criteria

Verification was conducted using Applus+ LGAI procedures in line with the requirements specified in the VCS Version 3 Requirements, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant decisions of the COP/MOP and the CDM EB and applying standard auditing techniques.

It is to be 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/01/, 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 06/11/2017 and the following stakeholders were interviewed.

S N	Name	Organization
1	Mr. G. Bharathidasan	CLP Wind Farms (Theni – Project II) Private Limited
2	Mr. Sandip Saha	CLP Wind Farms (Theni – Project II) Private Limited
3	Mr. S. Ashok	Vestas
4	Mr. T. Alexpandiyan	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 the verification team on 06/11/2017 to carry out the following;

- An assessment of the implementation and operation of the registered project activity as per the registered VCS PD and VCS MR;
- A review of information flows for generating, aggregating and reporting the monitoring parameters;
- Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PD;
- 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;
- 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;
- 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 Applus+ LGAI 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 3. 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 third verification under VCS; there were no FARs raised during the validation or previous verification.

2.6 Eligibility for Validation Activities

Not applicable.

3 VALIDATION FINDINGS

Not applicable.

3.1 Participation under Other GHG Programs

The project activity is registered under the VCS with VCS Project ID 911. The project is also registered under CDM but, project proponent has provided a self-declaration in this regards which confirms that project proponent will not claim Emission reductions for current monitoring period 10/06/2016- 09/10/2017 under any other GHG program except VCS, 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 a deviation in this project activity. 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 have been replaced with 0.2s and check meter replacement process is still on-going and expected to be completed by March-2018. 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 check with commissioning certificates/12/ and on-site assessment/19/. 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) The implementation status of project activity was found to be in compliance with registered PD
- b) DOE has conducted the on-site visit to confirm the implementation status of the project.
- c) The commissioning date of the project activity was found to be accurately and consistently recorded.
- d) The actual operation of project activity was found to be in compliance with the flow diagram provided in registered PD.
- e) There was no increase in emission reduction from estimates made in registered PD, and hence no further justification to be provided for the same.
- f) The project is registered under two VCS program and CDM. However, the project proponent provided self-deceleration which confirms that project proponent will not claim Emission reductions for current monitoring period 10/06/2016- 09/10/2017 under any other GHG program except VCS.

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 monitoring report/05/. The monitoring plan laid in the registered PD 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) in the MR/05/.

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/06/ 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 /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

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 specifications?	The registered monitoring plan indicates the frequency of accuracy testing/ calibration of the main and check meters as once in 3 years.
	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)/08/

	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 188,273.67 MWh. Furthermore monthly values of this parameter is reported in the ER calculation sheet/06/ are also verified with the monitoring report/05/ 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 /09/ 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 been approved by the CDM EB or ii) has the parameter been estimated as stipulated by Appendix 1 to the CDM Project Standard?	No such issues.

Findings	Not Applicable
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	TNB04329	08-Sep-15	07-Sep-18	0.5s	TNB04333	08-Sep-15	07-Sep-18	0.5s
	HPL624813	16-Mar-17	15-Mar-20	0.2s	HPL624819	16-Mar-17	15-Mar-20	0.2s
T-91	TNB02959	08-Sep-15	07-Sep-18	0.5s	TNB02958	08-Sep-15	07-Sep-18	0.5s
	HPL624812	15-Mar-17	14-Mar-20	0.2s	HPL624817	15-Mar-17	14-Mar-20	0.2s
T-92	TNB04384	08-Sep-15	07-Sep-18	0.5s	TNB04383	08-Sep-15	07-Sep-18	0.5s
	HPL624814	16-Mar-17	15-Mar-20	0.2s	HPL624978	16-Mar-17	15-Mar-20	0.2s
T-93	TNB04389	08-Sep-15	07-Sep-18	0.5s	TNB04390	08-Sep-15	07-Sep-18	0.5s
	HPL624972	16-Mar-17	15-Mar-20	0.2s	HPL624976	16-Mar-17	15-Mar-20	0.2s
T-94	TNB04385	09-Sep-15	08-Sep-18	0.5s	TNB04386	09-Sep-15	08-Sep-18	0.5s
	HPL624971	17-Mar-17	16-Mar-20	0.2s	HPL624975	17-Mar-17	16-Mar-20	0.2s
T-95	TNB02951	09-Sep-15	08-Sep-18	0.5s	TNB04056	09-Sep-15	08-Sep-18	0.5s

HTSC Number	Main Meter				Check meter			
	Sr. No.	Calibration Date	Validity	Class	Sr. No.	Calibration Date	Validity	Class
T-96	HPL624973	16-Mar-17	15-Mar-20	0.2s	HPL624977	16-Mar-17	15-Mar-20	0.2s
	TNB04326	09-Sep-15	08-Sep-18	0.5s	TNB04327	09-Sep-15	08-Sep-18	0.5s
	HPL624979	17-Mar-17	16-Mar-20	0.2s	HPL624980	17-Mar-17	16-Mar-20	0.2s
T-97	TNB04328	09-Sep-15	08-Sep-18	0.5s	TNB04332	09-Sep-15	08-Sep-18	0.5s
	HPL624820	18-Mar-17	17-Mar-20	0.2s	HPL624974	18-Mar-17	17-Mar-20	0.2s
T-98	TNB04387	09-Sep-15	08-Sep-18	0.5s	TNB04388	09-Sep-15	08-Sep-18	0.5s
	HPL625141	31-Mar-17	30-Mar-20	0.2s	HPL625146	31-Mar-17	30-Mar-20	0.2s
T-99	TNB04331	08-Sep-15	07-Sep-18	0.5s	TNB04335	08-Sep-15	07-Sep-18	0.5s
	HPL625144	01-Apr-17	31-03-20	0.2s	HPL625150	01-Apr-17	31-03-20	0.2s
T-100	TNB04077	08-Sep-15	07-Sep-18	0.5s	TNB04063	08-Sep-15	07-Sep-18	0.5s
	GENUS 4322544	01-Jun-17	31-May-20	0.2s	-	-	-	-
T-101	TNB04318	06-Sep-15	05-Sep-18	0.5s	TNB04319	06-Sep-15	05-Sep-18	0.5s
	GENUS 4321972	01-Jun-17	31-May-20	0.2s	-	-	-	-
T-102	TNB04047	07-Sep-15	06-Sep-18	0.5s	TNB04062	07-Sep-15	06-Sep-18	0.5s
	HPL625145	31-Mar-17	30-Mar-20	0.2s	HPL625149	31-Mar-17	30-Mar-20	0.2s
T-103	HT2160431	03-Mar-16	02-Mar-18	0.2s	HT2160432	03-Mar-16	02-Mar-18	0.2s
T-104	TNB02947	06-Sep-15	05-Sep-18	0.5s	TNB04091	06-Sep-15	05-Sep-18	0.5s
	GENUS 4321968	01-Jun-17	31-May-20	0.2s	-	-	-	-
T-105	TNB04420	07-Sep-15	06-Sep-18	0.5s	TNB04448	07-Sep-15	06-Sep-18	0.5s
	HPL624853	30-Mar-17	29-Mar-20	0.2s	HPL624860	30-Mar-17	29-Mar-20	0.2s
T-106	TNB02952	06-Sep-15	05-Sep-18	0.5s	TNB04057	06-Sep-15	05-Sep-18	0.5s
	HPL624856	13-Apr-17	12-Apr-20	0.2s	HPL624859	13-Apr-17	12-Apr-20	0.2s
T-107	TNB04320	07-Sep-15	06-Sep-18	0.5s	TNB04321	07-Sep-15	06-Sep-18	0.5s
	HPL625142	01-Apr-17	31-Mar-17	0.2s	HPL625148	01-Apr-17	31-Mar-17	0.2s
T-108	TNB02949	07-Sep-15	06-Sep-18	0.5s	TNB04054	07-Sep-15	06-Sep-18	0.5s
	HPL625143	30-Mar-17	29-Mar-20	0.2s	HPL625147	30-Mar-17	29-Mar-20	0.2s
T-109	TNB04325	07-Sep-15	06-Sep-18	0.5s	TNB04324	07-Sep-15	06-Sep-18	0.5s
	HPL624854	30-Mar-17	29-Mar-20	0.2s	HPL624855	30-Mar-17	29-Mar-20	0.2s
T-113	TNB04330	08-Sep-15	07-Sep-18	0.5s	TNB04334	08-Sep-15	07-Sep-18	0.5s
	HPL624811	15-Mar-17	14-Mar-20	0.2s	HPL624816	15-Mar-17	14-Mar-20	0.2s
T-114	TNB04417	08-Sep-15	07-Sep-18	0.5s	TNB04416	08-Sep-15	07-Sep-18	0.5s
	HPL624815	17-Mar-17	16-Mar-20	0.2s	HPL624818	17-Mar-17	16-Mar-20	0.2s

HTSC Number	Main Meter				Check meter			
	Sr. No.	Calibration Date	Validity	Class	Sr. No.	Calibration Date	Validity	Class
T-115	TNB04391	09-Sep-15	08-Sep-18	0.5s	TNB04392	09-Sep-15	08-Sep-18	0.5s
	HPL625081	17-Mar-17	16-Mar-20	0.2s	HPL625089	17-Mar-17	16-Mar-20	0.2s
T-116	TNB04418	07-Sep-15	06-Sep-18	0.5s	TNB04419	07-Sep-15	06-Sep-18	0.5s
	GENUS 4321967	01-Jun-17	31-May-20	0.2s	-	-	-	-
T-117	TNB04058	07-Sep-15	06-Sep-18	0.5s	TNB02953	07-Sep-15	06-Sep-18	0.5s
	HPL624741	20-Mar-17	19-Mar-20	0.2s	HPL624747	20-Mar-17	19-Mar-20	0.2s
T-118	TNB02948	08-Sep-15	07-Sep-18	0.5s	TNB04092	08-Sep-15	07-Sep-18	0.5s
	HPL624857	20-Mar-17	19-Mar-20	0.2s	HPL624858	20-Mar-17	19-Mar-20	0.2s
T-119	TNB04322	07-Sep-15	06-Sep-18	0.5s	TNB04323	07-Sep-15	06-Sep-18	0.5s
	HPL624743	21-Mar-17	20-Mar-20	0.2s	HPL624745	21-Mar-17	20-Mar-20	0.2s
T-120	TNB02954	06-Sep-15	05-Sep-18	0.5s	TNB02955	06-Sep-15	05-Sep-18	0.5s
	HPL624748	21-Mar-17	20-Mar-20	0.2s	HPL624750	21-Mar-17	20-Mar-20	0.2s
T-121	TNB04368	06-Sep-15	05-Sep-18	0.5s	TNB04369	06-Sep-15	05-Sep-18	0.5s
	GENUS 4322548	01-Jun-17	31-May-20	0.2s	-	-	-	-
T-122	TNB02956	06-Sep-15	05-Sep-18	0.5s	TNB02957	06-Sep-15	05-Sep-18	0.5s
	GENUS 4321971	01-Jun-17	31-May-20	0.2s	-	-	-	-

The details of monitoring the equipment are involved in the project activity and their calibration details/07/ are mentioned in the table under Section 3.3 of the VCS MR/05/. 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 /05/ 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, $BE_y = 188,273.67 \text{ MWh} * 0.8970 \text{ tCO}_2\text{e/MWh}$

$= 168,880 \text{ tCO}_2\text{e}$

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. 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

LGA Technological Center, S.A. (also referred to as Applus+ LGA), contracted by CLP Wind Farms (Theni – Project II) Private Limited, to perform 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 10/06/2016 – 09/10/2017 as reported in the Monitoring Report Version 3.0 dated 06/12/2017. 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

Applus+ LGAI 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 3.0 dated 06/12/2017 as per the process described under Section 2 of this report.

Applus+ LGAI 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. Applus+ LGAI planned and performed the verification by obtaining evidence and other information and explanations that Applus+ LGAI 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 10/06/2016 – 09/10/2017 are fairly stated in the Monitoring Report Version 3.0 dated 06/12/2017. 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 10/06/2016 – 09/10/2017 (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)
2016 (10/06/2016 to 09/01/2017)	82,694	0	0	82,694
2017 (10/01/2017 to 09/10/2017)	86,186	0	0	86,186
Total	168,880	0	0	168,880

APPENDIX 1: DOCUMENT REFERENCES

S. No	Title of Document	Version	Date
1.	Approved VCS PD	3.0	21/06/2012
2.	VCS Validation Report	3.0	22/06/2012
3.	Previous VCS Verification report (Monitoring period: 04/10/2012 to 09/06/2016)	1.0	07/11/2016
4.	CDM PDD registered with UNFCCC project reference no. 7416	6.0	12/09/2012
5.	VCS Monitoring Report	3.0	06/12/2017
6.	ER Sheet	2.0	06/12/2017
7.	Certificates of Calibration for all the meters belongs to project activity	-	-
8.	Monthly State Energy Statements (JMR) issued by TNEB	-	For the period 10/06/2016 to 09/10/2017
9.	Copy of all invoices raised to TANGEDCO by Project proponent for net electricity exported to the grid	-	For the period 10/06/2016 to 09/10/2017
10.	"Consolidated methodology for grid-connected electricity generation from renewable sources", ACM0002,	13.0.0	-
11.	CEA Database	07.0	-
12.	Commissioning certificate for all the WTGs of the project activity issued by state electricity authority	-	-
13.	Power Purchase Agreements signed between Project Proponent and respective state electricity authority	-	-
14.	VCS webpage for the project, VCS ID 911; http://www.vcsprojectdatabase.org/#!/project_details/911	-	Last accessed on 26/11/2017
15.	Letter of declaration dated from PP regarding not having created or sought any other form of environmental credit for the same period	-	-
16.	VCS Monitoring Report	01	01/11/2017
17.	VCS Standard	3.7	21/06/2017
18.	VCS Program Guide	3.7	21/06/2017
19.	On site assessment –interviews of staff personnel, photographs, physical inspection of monitoring system	-	-
20.	VCS Monitoring Report	2.0	30/11/2017
21.	ER Sheet	1.0	01/11/2017

APPENDIX 2: ABBREVIATIONS

Abbreviations	Full texts
CAR	Corrective Action Request
CLP	CLP Wind Farms (Theni – Project II) Private Limited
CDM	Clean Development Mechanism
CDM PCP	Clean Development Mechanism Project Cycle Procedure
CDM PS	Clean Development Mechanism Project Standard
CDM VVS	Clean Development Mechanism Validation and Verification Standard
EB	Executive Board
EF	Emission Factor
EPC	Engineering ,Procurement and Construction
ER	Emission Reductions
CEA	Central Electricity Authority
CER	Certified Emission Reduction
CL	Clarification Request
DOE	Designated Operational Entity
DNA	Designated National Authority
FAR	Forward Action Request
GCEES	Green Carbon Energy and Environment Services
GHG	Greenhouse Gas(es)
GOI	Government of India
IPCC	Intergovernmental Panel on Climate Change
JMR	Joint Meter Reading
MP	Monitoring Plan
MR	Monitoring Report
MWh	Megawatt hour
PDD	Project Design Document
PPA	Power Purchase Agreement
PP	Project Participant
PRC	Post Registration Changes
PS	Project Standard
RMP	Revised Monitoring Plan
SLDC	State Load Dispatch Centre
TNEB	Tamil Nadu Electricity Board
TR	Technical Review
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
UNFCCC	United Nations Framework Convention on Climate Change
WTG	Wind Turbine Generator
WEC	Wind Energy Convertor

APPENDIX 3: Findings Overview

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

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

Table 3. CAR from this verification

CAR ID	01	Section no.	1.4	Date : 26/11/2017
Description of CAR				
In section 1.1 of MR, the value of total emission reduction for the current monitoring period is not consistent with the value mentioned in ER sheet, please clarify?				
Project participant response				Date : 30/11/2017
Value of emission reduction has been revised consistently in revised monitoring report.				
Documentation provided by project participant				
Revised monitoring report.				
DOE assessment				Date: 01/12/2017
The PP has corrected the monitoring report and emission reduction value is correctly reported in revised MR, hence CAR#1 closed satisfactorily.				

CAR ID	02	Section no.	3.1	Date : 26/11/2017
Description of CAR				
1. During site visit , assessment team has observed that energy meters were replaced with high accuracy class 0.2s , please clarify the date of replacement and clarify the reason for change and its impact of project. 2. During site visit it was observed that the meters were replaced during current monitoring period , so the PP is requested to provide further details of new energy meters in section 3.3 of MR with latest validity of calibration .				
Project participant response				Date : 30/11/2017

1. In this project activity, project WTGs are generating electricity at 690 V which is then stepped up to 33 kV through 3 phase transformers located near to the WTG and dedicated energy meters are also connected to these transformers to monitor the electricity export and import by the WTGs. In accordance with 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 meters with 0.5s or better accuracy class needs to be installed if energy meter is connected to 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, now 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, CLP has to replace all interface energy meters at site and same is beyond the control of CLP. Presently, all main meters have been replaced with 0.2s and check meter replacement process is still on-going and expected to be completed by March-2018. Thus, this project activity is now using main energy meters with higher accuracy class to monitor export and import of electricity which is more conservative in nature.

As installation and maintenance of interface energy meter are the responsibility of state utility which is beyond the control of CLP, thus, a deviation has been proposed in this verification to incorporate this change of meter accuracy class.

2. New energy meter details are now incorporated in revised monitoring report.

Documentation provided by project participant

Revised monitoring report

DOE assessment

Date: 01/12/2017

The PP has submitted the revised MR and justifies the replacement of energy meters in MR and also provided the calibration details, same has been found to be corrected, hence accepted. The CAR#2 has been closed satisfactorily.

CAR ID	03	Section no.	3.3	Date : 26/11/2017
Description of CAR				
In section 3.2 of the MR, the value of $EG_{PJ,y}$, is not consistent with value mentioned in ER sheet, please clarify ?				
Project participant response				Date : 30/11/2017
Value of net electricity export emission reduction has been revised consistently in revised monitoring report.				
Documentation provided by project participant				
Revised monitoring report				
DOE assessment				Date: 01/12/2017
The PP has corrected the value of net electricity export emission reduction in MR. The value of Net electricity value in CELL G24 in 'Emission Reduction' worksheet, is not reproduce the same result when difference the value in CELL E24 and CELL F24. Please clarify? The PP is further clarify how achieved 11.18% higher PLF compared to registered PD, has been calculated as mentioned in section 4.4 of the MR.				
Project participant response				Date : 06/12/2017

To calculate total electricity export (cell E24) and electricity import (cell F24), cell E23 and F23 were not considered. Thus, same has been corrected in revised sheet.

In this monitoring period, two high wind availability seasons (June-16 to Oct-16 and May-17 to Oct-17) and one low wind availability season (Oct-16 to May-17) have been considered. Thus, cumulative net electricity generation for this periodic verification period is slightly higher than the envisaged value mentioned in registered PD. PLF value mentioned in registered PD has considered wind availability for the entire year. However, PLF estimation for the specification duration mentioned in this verification period would not be a correct representation of project performance as part of calendar year 2016 and part of calendar year 2017 are involved in this verification. In last three calendar years i.e. 2013, 2014 and 2015, this project has achieved 21.83% (actual net export of electricity was 94,658.89 MWh), 21.17% (actual net export of electricity was 91,779.37 MWh) and 14.98% (actual net export of electricity was 64,951.23 MWh) respectively.

Further, in calendar year 2016, project has net exported 109,844.40 MWh (17,654.16 MWh from 09-Jan-16 to 09-June-16 (considered in previous verification report) and 92,190.24 MWh from 10-June-16 to 09-Jan-17 (considered in this verification report)) which reproduced the PLF value of 25.33% which is below than the envisaged value of project considered during project registration.

Furthermore, from 10-Jan-17 to 09-Oct-17, project has achieved 29.6% PLF (96,083.43 MWh). However, same would be reduced when generation for entire year of 2017 would be considered. As the wind flow is a natural phenomenon. Thus, beyond control of CLP. Further, as VCS template doesn't requested any justification pertaining to higher generation of electricity, thus, same justification has been removed from the revised MR for better clarity.

Documentation provided by project participant

Revised monitoring report
Revised emission reduction report

DOE assessment

Date: 08/12/2017

The PP has submitted the revised MR and ER sheet; the value of emission reduction has been correctly calculated in ER sheet and reported in revised MR, hence accepted. The justification provided by the PP against comparison of emission reduction between estimated value and actual achieved found to be appropriate in response. Hence, the CAR#3 closed satisfactorily.

Table 4. FAR from this verification

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