GRID-CONNECTED WIND ELECTRICITY GENERATION PROJECT IN TAMIL NADU, INDIA

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Summary:

Verification purpose: This project activity generates clean form of electricity through Wind power source. National Enterprises has set up a 3.3 MW (2 X 1.65 MW) wind power project in the state of Tamil Nadu, India. The electricity generated from the project activity is supplied to the Indian electricity grid as per Power Purchase Agreement signed with the PP and Tamil Nadu Electricity Board (TNEB).

Start date of the project activity is 30/03/2008. The same is confirmed by the assessment team via the commissioning certificate and therefore the operation date is acceptable to the DOE. An undertaking has been submitted by PP for double counting confirming that no GHG reduction will be claimed in any other GHG mechanism for current monitoring period. Project activity undergoes continued operation and no major breakdown had taken place except routine maintenance.

This is 1st monitoring under VCS and covers this activity from 01/01/2010 to 31/12/2015 (inclusive both days). During the Current Monitoring Period the project activity has supplied 32,825 MWh of electricity to the national grid, and thus contributing to the GHG reductions 29,626 tCO_2e.

Thus, VCS crediting period is of 10 years. The start date of crediting period is 01/01/2010 and 31/12/2019 is the end date of the crediting period. The registered VCS PD mentioned about 10 years of crediting period but not mentioned about renewable type and VCS Validation report mentioned about10 years crediting period renewal twice as per Verified Carbon Standard Version 3.2.
Hence a project description deviation sought for 10 years crediting period with renewal twice, PP had already taken deviation approved for another project of same PP (VCS 1088) and as per communication from VERRA, this deviation is sought in this monitoring report.

A risk-based approach has been followed to perform this verification activity. In the course of verification, 06 Corrective Action requests (CAR), 00 Clarification Requests (CLs) and 00 Forward action requests (FARs) were raised and successfully closed. Few deviations were sought by the PP and assessment team accept all the deviation as it has no impact on Additionality, Applicability of the methodology or type of projects scenario. The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided VVB with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

LGAI Technological Center S.A. (Applus+ Certification) (Hereafter referred to as Applus+ Certification) has been appointed by "National Enterprises" to perform the 1st periodic verification of the "Grid-Connected wind Electricity Generation Project in Tamil Nadu, India" under VCS standard 4.1 and guideline version 4.0. The objective of this verification activity is to have an independent third party for the assessment of the project design, monitoring report and Final Verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "Renewable Energy Projects: Approved Small-Scale Methodology AMS –I.D. / Version 15"
- the project's monitoring plan is assessed against "Renewable Energy Projects: Approved Small Scale Methodology AMS –I.D. / Version 15"
- the project's compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline 4.0 and standard, version 4.1
- CDM Validation and Verification Standard for project activities, version 02.0
- CDM Project Standard for project activities, version 02.0
- CDM project cycle procedure for project activities, version 02.0
- VCS standard, version 4.1
- VCS guideline, version 4.0

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

The scope of the verification is the independent and objective review of the monitoring report (MR). The MR is reviewed against the relevant criteria (see above) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM Validation and Verification Standard for the project activities, version 02.0, review against registered PD and Final Validation report, CDM Project Standard for project activities, version 02.0; CDM Project Cycle Procedure for project activities, version 02.0 and VCS program guideline, version 4.0 and standard version 4.1.

The assessment team has employed a risk-based approach to assess the completeness and accuracy of the claims and conservativeness of the assumptions in the MR. The main focus of the assessment team is to identify the significant risks for the project implementation and the generation of VERs. The verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring report combined.

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

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

1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Hereinafter referred as Applus+ Certification) has been appointed by "National Enterprises" to perform the 1st periodic verification of the project entitled "Grid- Connected wind Electricity Generation Project in Tamil Nadu, India" under VCS standard version 4.1 and guideline version 4.0. The objective of this verification activity is to have an independent third party for the assessment of the project design, monitoring report and final verification report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against "Renewable Energy Projects: Approved Small-Scale Methodology AMS –I.D. / Version 15"
- the project's monitoring plan is assessed against "Renewable Energy Projects: Approved Small-Scale Methodology AMS –I.D. / Version 15"
- the project's compliance with the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline, version 4.0 and standard version 4.1
- CDM Validation and Verification Standard for project activities, version 02.0
- CDM Project Standard for project activities, version 02.0
- CDM project cycle procedure for project activities, version 02.0
- VCS standard, version 4.1
- VCS guideline, version 4.0

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

1.2 Scope and Criteria

The scope is defined as an independent and objective review of the Monitoring report (MR) prepared as per the registered PD and registered approved methodology - Renewable Energy Projects: Approved Small-Scale Methodology AMS –I.D. / Version 15. The MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard, version 4.1 and guideline version 4.0, including the approved baseline and monitoring methodology Renewable Energy Projects: Approved Small Scale Methodology AMS – I.D. / Version 15. The verification was based on the requirements in the CDM validation and verification standard for project activities, Version 02.0, CDM Project Standard for project

activities, version 02.0, CDM project cycle procedure for project activities, version 02.0 and VCS program guideline, version 4.0 and standard version 4.1

The verification is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the Monitoring report. In line with Guidelines for Application of materiality in verifications, the verification team has conducted a complete verification of all the information presented in the monitoring report and data monitored as presented in the emission reduction calculation spread sheet. It invoices follows the paper trail back to the raw data such as meter reading records and invoices. There are no material errors, overestimation of ER, omission or misstatement. The verification team has reviewed all the documents like commissioning certificates, Joint Balance Sheet, invoices etc.

1.3 Level of Assurance

The verification has been planned and organized to achieve a Reasonable Level of assurance as per the requirement of VCS. The entire documents checked/Power plant verification conducted to arrive at positive verification conclusions

1.4 Summary Description of the Project

The main purpose of this project activity is to generate clean form of electricity through Wind power source. National Enterprises has set up 3.3 MW (2 X 1.65) of wind power project in Tamil Nadu state of India. The electricity generated from the project activity is supplied to Indian electricity grid. The commissioning dates and locations of all plant is mentioned in section 4.1.

The Project activity is a Wind power energy, a renewable energy generation and the electricity generated by the project activity is exported to the Indian electricity grid. The project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The PP has entered into long term power purchase agreement with Tamil Nadu Electricity Board. The electricity generated by the project activity is supplied to the Indian electricity grid.

During the Current Monitoring Period from 01/01/2010 to 31/12/2015 (First and last date included) the project activity has supplied 32,825 MWh of electricity, and thus contributing to the GHG reductions 29,626 tCO2e.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification Process: The project assessment is based on the Clean Development Mechanism Validation and Verification Standard for project activities, version 02.0 and VCS standard 4.1 and guideline, version 4.0 and is conducted using standard auditing techniques to assess the correctness of the information provided by the project participants. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VCS project activity are appointed.

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

I. A desk review of the monitoring Report against the registered PD;
II. Follow-up interviews with project participant;
III. The resolution of outstanding issues and the issuance of the final verification report and opinion.

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

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

Appointment of the assessment team

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

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

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

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

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

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

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

Document review

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

Follow-up interviews

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

Resolution of Clarification and Corrective Action Request

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

The final MR Version 02 submitted by PP on 02/07/2021 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country

Internal quality control

As final step of a verification of the final documentation including the final verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or

the deputy. In case one of these two persons is part of the assessment team approval can only be given by the other one to avoid any conflict of Interest.

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

2.2 Document Review

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

2.3 Interviews

A site visit was conducted for the project activity on 30/04/2021.

Technical details & metering/monitoring arrangement verified through onsite photographs/name plates and calibration certificates shared by PP. All the documents were cross checked to ensure conservative estimation of emission reduction.

During the site visit, the PP representatives were questioned about the implementation of the project activity. Several topics like the verification of commissioning date of meters, the generation, recording, and monitoring of the data and the error accountability were discussed. To cross check the information provided by PP, various documents like technical specifications, commissioning certificates, PPA, JMR sheets, invoice, calibration certificates, etc. were also verified. The names of the persons interviewed during site visit is given below;

Organization	Name of Persons/Designation	Topics discussed	Team Member
National Enterprises	Mr. Charanjit Singh Grewal	Project activity implementation Operation, Calibration, O&M practices, JMR etc. LSC mechanism Mechanical maintenance Electrical maintenance Project description Invoicing practices	Pankaj Kumar
EKI Energy	Sumant Saurabh	MR, ER calculations etc.	
	Mr. Sukanta Das, Consultant	MR, ER calculations etc.	

2.4 Site Inspections

Duration of Site visit: 30/04/2021				
No.	Activity performed on-site	Site location	Date	Team member
1.	Assessment team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring. Assessment team also checked that whether the monitoring plan as described in the VCS PD is actually practised onsite. Also assessment team checked any change in host country criteria which may affect the baseline of the project activity.	Tamil Nadu	30/04/2021	Pankaj Kumar

2.5 Resolution of Findings

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

The final MR Version 02 submitted by project owners on 02/07/2021 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	01	00
Description of project activity	00	01	00
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00

Areas of verification findings	No. of CL	No. of CAR	No. of FAR
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
Project boundary	00	00	00
Establishment and description of baseline scenario	00	00	00
Demonstration of additionality	00	00	00
Emission reductions	00	00	00
Calibration details	00	01	
Monitoring plan	00	00	00
No Net harm assessment	00	00	
Local stakeholder consultation	00	01	
Others (please specify)- -Matter related to double counting Declaration - ER Sheet -PPA Agreement - consents from State pollution control Board	01	02	00
Total	**01**	**04**	**00**

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

2.5.1 Forward Action Requests

This is 1st periodic verification of the project activity and no FAR was raised from previous validation and during this verification process.

2.6 Eligibility for Validation Activities

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

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project activity was registered under VERRA (https://registry.verra.org/app/projectDetail/VCS/498) and this is first verification. Project is also registered under CDM (https://cdm.unfccc.int/Projects/DB/BVQI1356857977.65/view). However, no CERs issued since its registration under UNFCCC. VVB cross verified with UNFCCC and VCS website and on the basis of undertaking provided by PP, VVB confirmed that there will be no counting of emission reduction for this monitoring period under any other GHG programme.

3.2 Methodology Deviations

The project activity used - Renewable Energy Projects: Approved Small-Scale Methodology AMS –I.D. / Version 15 which is as per the registered VCS PD and thus no deviation is sought regarding the methodology. The project complies with all the requirement of the methodology and thus deviation to the methodology is not a requirement for the present project activity.

3.3 Project Description Deviations

PP sought following deviations in the project description

Deviation 1:

The registered VCS PD mentioned about 10 years of crediting period but not mentioned about renewable type and VCS Validation report mentioned about10 years crediting period renewal twice as per Verified Carbon Standard Version 3.2.

Hence a project description deviation is seek for 10 years crediting period with renewal twice, as per VCS standard v 3.2, The same is mentioned in the section 1.6. VVB checked the registered PD and validation report and concluded that it was typo error in approved PD, hence correction proposed in the approved PDD.

Deviation 2:

The registered VCS PD mentioned start date of crediting period as 30-March-2008. PP wants to start VCS verification period from 01-January- 2010 onwards.

VVB confirmed that PP has already taken deviation approval for the change in start date of crediting period from the registered PDD from VERRA board. VERRA confirmed that this deviation request can be part of current monitoring period. On the basis of VERRA's communication, VVB confirmed that, PP can seek change in start date of CP. Based on communication received from

VERRA, VVB confirmed the request for change in start date of crediting period is appropriate and in line with VERRA guidelines and the same is accepted by the Verification team

Deviation 3:

For the entire monitoring period main Meter is used for billing purpose. For this monitoring period check meter is not installed at the site, since the meters are under the custody of state electricity board PP has no role in it. Hence, PP has requested deviation in this regard.

The above-mentioned deviations are of permanent nature and does not have any impact on the project applicability, baseline scenario and additionality. Hence VVB confirmed the deviation sought can be accepted.

3.4 Grouped Project

The project does not involve any addition of new project activity and thus the project do not fall under grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

During the site visit, it was concluded that the project is implemented as per the instruction of the VCS PD and this is verified from the commissioning certificate. During the current monitoring period it was observed that no unforeseen situation evolved which can impact the operation of the project activity. The same was verified through the breakdown summary sheet of the project activity. Scheduled maintenance was carried out as per the instruction of the manufacturer and the same is acceptable to the assessment team.

Project location is confirmed by the assessment team through interview with PP during site visit and assessment of monitoring report. Assessment team also checked the technical details of the project site containing latitude and longitude of the project site and confirmed that the details as mentioned in the registered PD are correct. The latitude and longitude of the project activity is given below;

District	Site	HTSC No.	Latitude	Longitude	Local grid sub station
Tirunelveli	Samugarangapuram Village	2570	N 8°19'32.7"	E 77°40'59.2"	TNEB 33 KV (Tirunelveli)
		2595	N 8°19'59.4"	E 77°19'27.4"	

The technical specifications have been verified during site visit as well as with the technical specifications of WTGs and also cross checked from the technical manual of the Manufactures. The technical specification the project activity is given below:

Technical specification of E-53 are given in table below:

Features of WTG		
Sr.No.	**Particulars**	**Specifications**
Main Specifications		
1.	Rotor diameter	82 m
2.	Number of blades	3
3.	Power Control	Active Stall
4.	Rotational Speed (Synchronous)	14.4 rpm
5.	Rotor position	Upwind
6.	Nominal Power	1650 KW
7.	Hub height	78 m
Rotor		
8.	Rotor Diameter	82 m
9.	Tilt Angle	5^0
10.	Swept Area	5281 m^2
Blade		
11.	Material	Fibre/Epoxy/Wood
12.	Blade Length	40 m
13.	Blade Profile	FFA – W3, NACA 63.4
14.	Air Brake	Full Blade
Hub		
14.	Type	Spherical
15.	Material	EN-GJS-400-18U-LT
Main Shaft		
16.	Type	Forged shaft and flange
17.	Material	34 CrNiMo6

Main Bearings		
18.	Front Bearings	Spherical roller bearings
Main Gear box		
19.	Gear Ratio	1:70.2
20.	Mechanical Power	1800 kW
Couplings		
21.	Gearbox/Generator	Flexible
Generator		
22.	Nominal Power	1650 kW
23.	Rotational Speed (Synchronous)	1012 rpm at rated power
24.	Insulation class	F/B
25.	Protection class (IEC529)	IP 54
Machine Frame		
26.	Type	Casted front end
27.	Material	EN-GJS-400-18U-LT
Yawing System		
28.	Yaw bearing	Ball bearing, internal gearing
29.	Yaw Motor	6 Nos.
30.	Yaw gear	6 pcs
31.	Gearing ratio	1:1666
32.	Yaw brake	Hydraulic disc brakes, 6 pcs
Tower		
33.	Type	Conical tubular
34.	Height	75.5 m
35.	Corrosion Protection	Acc. To ISO 12944:C5 I
Control System		
36.	Manufacturer	Vestas Control systems

37.	Type	Microprocessor based

The start date of the project is 30/03/2008. This is connected to Indian grid in line with the approved VCS PD and VCS Standard version 4.1.

The assessment team confirmed through interview with O & M personal during site visit that there are no changes in to the project design during this monitoring period. It was found that the monitoring plan was implemented as per the requirement of the VCS PD & approved monitoring Plan and applied methodology Renewable Energy Projects: Approved Small-Scale Methodology AMS –I.D. / Version 15. The organisational role and responsibility as mentioned in the registered VCS PD is followed onsite. As per the registered PD the meter calibration is annual. However, the calibration is not done for the entire Monitoring period. PP have the latest calibration report dated 16/March/ 2016 which shows that calibrated meter is under the error limit. Therefore, the accuracy class of the meter is applied for the entire monitoring period which is conservative. All the emergency preparedness as mentioned in the registered VCS PD is followed onsite and no discrepancies were found regarding the same.

The Project participant contribution from the project activity towards sustainable development in accordance to host country as explained below:

Social well-being:

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

Economic well-being:

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

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The assessment team observed that the project is in line with the registered PD and applied methodology and few clarifications/deviations was there . CAR 01 and CAR 02 were raised during the verification process and closed successfully. Please refer below Appendix 2 for the detail closure of the CAR

Assessment team confirms following during the verification site visit audit:

1. Start date of the project is 30/03/2008 (as per VCS PD).
2. An undertaking letter dated: 13/04/2021 has been submitted by PP for double counting with any other GHG program. PP also has given a written declaration that project has not claimed other form of GHG credit for the concerned monitoring period.
3. Assessment team confirms that this is the 1st monitoring under VCS and covers the activity from 01/01/2010 to 31/12/2015 (inclusive of both dates). Thus, VCS crediting period

should be maximum of 10 years till end date of VCS crediting period. 01/01/2010 is the start date and crediting period end on 31/12/2019.

The GHG credits from 01/01/2010 to 31/12/2015 will be claimed under VCS only. At any point of time during the crediting period, the project proponent will abide by the "Double Counting".

4. Assessment team checked and found that the Project proponent of the project activity is as below for the current monitoring period:

Organization name	National Enterprises
Contact person	Mr. Charanjit Singh Grewal
Title	Proprietor
Address	National Enterprises P.O.-Box No.44 Barabil, Keonjhar Orissa Pin-758035
Telephone	06767-275521
Email	gapl sponge@yahoo.co.in

VVB also confirmed that EKIESL is other entity as verified from VERRA registry.

5. The quantified emission reduction calculation for the monitoring period is correct and conservative. Assessment team also compared actual VER with the estimated VER and found that the actual VER is 29,626 tCO_2e which is 33% less than the estimated emission reduction 44,412 tCO_2e during this monitoring period which is due to climatic conditions and low PLF attained by the wind power plant during the current monitoring period.

4.2 Safeguards

4.2.1 No Net Harm

No potential environment or socio-economic matter was found during the discussion with PP during site visit. The project is renewable energy project and thus no negative impact observed onsite as confirmed by PP during site visit.

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation. The report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013. This report

clearly mentioned that wind power project activity operations do not result in direct air pollution, noise pollution.

4.2.2 Local Stakeholder Consultation

All the stakeholders are happy with the implementation and operation of the project activity and no negative comments envisaged for the project activity. There was no change in project description form the VCS PD. Complaint/suggestion/feedback register is maintained at site as a part of ongoing communication with stakeholders in line with clause 3.16.17 of VCS Standard, ver. 4.1 and appropriate actions taken time to time by PP. Assessment team during the current monitoring period checked the grievance register and found that there is no official/unofficial complaint received from the local stakeholders. The stakeholders are happy with the implementation of the project activity as it creates employment opportunities and improve the lifestyle of the nearby people. The same is confirmed by the assessment team during the site visit audit and therefore confirm that the current monitoring period is in line with clause 3.16.17 of VCS Standard, ver. 4.1

4.3 AFOLU-Specific Safeguards

Not applicable

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the MR. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the VCS PD and MR.
Findings	No CAR was raised.
Conclusion	Baseline emission: The baseline Emissions for a given year is calculated by multiplying the energy baseline (EB) with the regional grid emission factor of the grid. Formula Used:- $BE_y = EG_{BL,y} \times EFCO_2$ Where: BE_y=Baseline Emissions. $EG_{BL,y}$= Quantity of net electricity supplied to the grid as a result of the implementation of the VCS project activity in year y (MWh) $EFCO_2$= CO_2 Emission Factor in year y; t CO_2e/MWh

	Ex-ante parameters" The grid emission factor i.e. 0.93 tCO2/MWh is sourced from the VCS registered PDD. The same is used for calculation of emission reductions. In addition to this, other ex-ante parameters which are soured from the VCS registered PDD are provide below: $EF_{grid,OM,y}$ - Operating Margin CO2 emission factor in year y. The value monitored is 0.97 tCO2/MWh. $EF_{grid,BM,y}$ - Build Margin CO2 emission factor in year y. The value monitored is 0.82 tCO2/MWh. $EF_{grid,CM,y}$ - Combined Margin CO2 emission factor of the Southern regional Grid of India is 0.93 Monitored Parameters $EG_{BL,y}$- Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh. The value monitored is 32,825 MWh. The verification team has checked the entire monthly Joint metering report applicable for the monitoring period as per the project activity applied for verifications and found the monitoring parameters are monitored and recorded as per the monitoring plan in the registered VCS PD. Electricity supplied to the grid by the project activity during the year y (EGBL,y) by the project activity during the current monitoring period 32,825 MWh. The net electricity supplied by project activity to grid is calculated by subtracting total electricity imported by project from grid from total electricity delivered by project to grid. The verification team has crosschecked the emission reduction sheet and monitoring report data with the Joint meter reading energy statement and sales invoice bills and found all the values are matching. Project emission: As per the registered PDD , project emission is zero. Leakage: As per registered PDD the leakage is zero. Thus, Emission Reductions are: The emission reductions (ERy) by the Project activity during a given year y is the difference between baseline emissions (BEy), project activity emissions (PEy) and leakage, as follows ERy = BEy − PEy – Ly = 29,626 (rounded down)-0-0 = 29,626 t CO_2e VVB confirmed that GHG reductions and removals has been quantified correctly and in line with monitoring procedure in VCS PD and applied

	methodology.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Means of verification	The verification team checked the break down log for the monitoring period. During the verification of site visit, the energy meters are also checked. The Calibration details of the monitoring meters are also checked with calibration certificates.
Findings	No finding raised on this section.
Conclusion	The project activity has installed a special energy meter sealed by the State electricity board. The metering system includes the main meter that measure, record and control the various monitoring parameters Latest state -of art monitoring and control equipment that measure, record and control the various monitoring parameters. These meter record parameters including electricity exported & imported. Moreover, the meter is located at the grid connected point are of accuracy class of 0.5s for project activity applied for verification. These electricity meter are being used by Power grid corporation of India for preparing electricity generation statements. The Net electricity supplied to the grid is then calculated from export and import values. The electricity Export, Import and Net electricity exported to the grid are cross checked from the sales invoices raised to respective state utilities which is in line with Methodology requirement for large scale project activity. Hence assessment team confirmed that the value of net electricity exported to the grid as used in emission reduction calculation is correct. The main meter reading is taken jointly on a fixed day of every month for the preceding month at the delivery point and signed by the representatives of TNEB and PP representative. The meter were not calibrated as per the frequency mentioned in the registered PDD. Therefore appropriate error factor applied as per the accuracy class of the meter for the whole monitoring period. Assessment team checked latest calibration report dated 16 March 2016 and found that the meter are within the error limit and therefore the applied error factor is conservative for the calculation of emission reduction. It is reported that the data will be kept for 2 years following the end of the crediting period or till the last issuance of VERs for the project activity whichever occurs later.

	The responsibilities and authorities of project management, data handling and recording, measurement methods and QA/QC procedure have been systematically established and formalized and the same was verified during the site visit audit. As only main meter is installed at grid connection point and there is no back up meter. Hence in case of failure of main meter, meter to be replaced immediately and correction factor will be applied for the duration when main meter was not in working condition or will not claim carbon credits for that duration. VVB confirmed that the meter falls under scope of state utility and PP does not have role in metering and calibration. Site visit and interview with site personnel also confirms that the operational and organizational chart as mentioned in VCS PD is as per the site practice and thus assessment team confirms that the details are correct. The break down log is checked and found that the plant undergone scheduled maintenance and break down. VVB checked the breakdown and routine maintenance log book which also provided in appendix 1 of MR and confirmed that it does not have any impact on project design and monitoring procedures. No unforced error observed. VVB confirmed that data/ information used for determining GHG reductions and removals was sufficient in quantity and of appropriate quality. Calibration certificates of meters/ QA/QC procedure checked and found to be appropriate.

4.6 Non-Permanence Risk Analysis

No.	*Risk that could lead to material errors, omissions or misstatements*	*Assessment of the risk*		*Response to the risk in the verification plan and/or sampling plan*
		Risk level	*Justification*	
1.	*Not applicable*	*Not applicable*	*Not applicable*	*Not applicable*

5 VERIFICATION CONCLUSIONS

Applus+ Certification has been engaged by National Enterprises to perform the verification of the "Grid- Connected wind Electricity Generation Project in Tamil Nadu, India"

The management of the project participant/owner is responsible for the preparation of the GHG emissions data and the reported/estimated GHG emissions reductions on the basis set out

within the project's Monitoring Plan in the VCS PD and MR and the approved methodology Renewable Energy Projects: Approved Small-Scale Methodology AMS –I.D. / Version 15.

Our Verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board and VCS Standard version 4.1. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is operated as planned and described in the project document;
- the monitoring plan is as per the applied methodology;
- the monitoring process in Monitoring Report is as per the PD
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.
- A reasonable level of assurance was achieved during the verification.
- No limitation observed for the present verification

Verification period: From 01/01/2010 to 31/12/2015 (first and last date included).

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)
2010	5,707	0	0	5,707
2011	5,687	0	0	5,687
-2012	5,829	0	0	5,829
2013	4,852			4,852
2014	4,161			4,161
2015	3,390			3,390
Total	29,626	0	0	29,626

The estimated emission reduction achieved from the project activity for the current monitoring period is 44,412 tCO_2e, whereas actual emission reductions achieved are 29,626 tCO2e, which is 33 % less than the estimated emission reductions. This is due to climatic conditions and less PLF attained by the plant during the current monitoring period. As actual VERs are less than estimated value for the MP, VVB confirmed the value is conservative and acceptable.

APPENDIX I: DOCUMENTS REVIEWED DURING VERIFICATION

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificate	Commissioning of the wind plants	Project participant
2.	NA	Contract of the other entity with the DOE	Contract of the other entity with the DOE	Project participant
3.	NA	Technical specifications	Technical specifications of Wind Power projects manufactured	Project participant
4.	NA	Power Purchase agreement for the project activity	PPAs	Project participant
5.	NA	Approved Joint VCS PD&MR	--	VERRA
6.	NA	VCS validation report	--	VERRA
7.	NA	Initial Monitoring report Final Monitoring report	Version 01, dated 04/02/2021 Version 02, dated 02/07/2021	Project participant
8.	NA	Emission Calculation sheet	Version 1, dated 04/02/2021	Project participant
9.	NA	Emission Calculation sheet	Version 02, dated 02/07/2021	Project participant

No.	Author	Title	References to the document	Provider
10.	NA	Tools/ guidelines used in the project activity • UNFCCC Methodology: AMS –I.D. / Version 15 • VCS verification report template Version 4.0 • VCS Standard, version 4.1	UNFCCC CDM web site VERRA website	UNFCCC & VERRA
11.	NA	Calibration details of the project activity undergoing verification	Calibration certificates	Project participant
12.	NA	JMR records+ Invoices for the complete monitoring period	Joint balance sheet copies Sales Invoices for the complete Monitoring period	Project participant
13.	NA	PPA Agreements	Power purchase Agreement between Project proponent and respective state utilities	Project participant
14.	NA	Break down details of the complete monitoring period	Log Sheet	Project participant
15.	NA	VCS Declaration	Declaration dated 13/04/2021 from PP for Participation under Other GHG Programs	Project participant

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

CAR ID	01	**Section no.**	1.1/5.3	**Date: 04**/05/2021
Description of CAR				
1. Value of electricity to grid/year and anual GHG reduction achieved/year could not be verified as no ER sheet proivided. PP shall provide ER sheet and MR also need to be revised accordingly. 2. In section 1.1, Southern Regional grid is mentioned which need to be replaced by Indian grid.				
Project participant response				**Date:18-06-2021**
1. ER sheet has been now provided. *2. This was a typographical error. The same has been corrected in VCS MR versión 02 now submitted to the DOE for further assessment.*				
Documentation provided by project participant				
1. ER Sheet *2. VCS MR Version 02*				
DOE assessment				**Date: 03/07/2021**
1. PP has now provided ER sheet for the verification of value of electricity to and anual GHG reduction achieved/year, along with that PP has also revised the MR, which is checked by DOE. Hence, **comment closed**. 2. PP has now replaced Southern Regional grid with Indian grid in section 1.1 of revised MR. Hence, **Comment closed**.				

CAR ID	02	**Section no.**	1.5	**Date: 04**/05/2021
Description of CAR				
1. PP shall provide evidence for Project start date.				

2. Declaration from PP regarding participation in other trading / GHG programs, rejection under other GHG program etc. is missing. PP requested to submit the same.
Project participant response **Date:18-06-2021**
1. *The Commissioning Certificate issued by the State Utility is now provided to the DOE as evidence of Project start date for further assessment.* 2. *The* Declaration from PP regarding participation in other trading / GHG programs, rejection under other GHG program etc. Is now submitted *to the DOE for further assessment.*
Documentation provided by project participant
1. *Commissioning Certificate* 2. *VCS Declaration*
DOE assessment **Date: 03/07/2021**
1. PP has now provided commissioning certificates for the verification of project start date. Hence, **comment closed**. 2. PP has now provided the document of declaration of participation in other GHG programs to the DOE. Hence, **comment closed**.

CAR ID	03	**Section no.**	2.2	**Date: 04**/05/2021
Description of CAR				
PP is requested to provide supporting documentation for Local Stakeholders consultation conducted for all project activities (invitation/ public notice/ Summary of consultations/ agenda etc.).				
Project participant response				**Date:18-06-2021**
Stakeholder meetings were organized at the time of registration of project activity in order to identify the major challenges around the area, stakeholders were invited well in advance through printed invitation, calls, meeting and a notice is placed around the local common areas. As a part of continual improvement process, feedback from the associated stakeholders is vital, therefore a dedicated Visitor register cum grievance register has been placed at the project site which is accessible to stakeholders to provide their feedback on the project. It is at publicly accessible location at which local stakeholders can provide their feedback on the project. This location is also conducive to continuous and regular checks for stakeholder comments. During the current monitoring period no any grievances or feedback received.				
Documentation provided by project participant				
LSC Documents				

DOE assessment	Date: 03/07/2021
PP has now given proper explanation on local stakeholder meetings in section 2.2 of the revised MR VER.02.Hence, **Comment closed**.	

CAR ID	04	Section no.	4.3	Date: 04/05/2021
Description of CAR				
PP is requested to provide the copies of daily generation report which is send by Vestas for the cross check of data on grid availability, machine availability and generation of electricity.				
Project participant response				**Date:18-06-2021**
The DGR are now provided to the DOE for further assessment.				
Documentation provided by project participant				
DGR				
DOE assessment				**Date: 03/07/2021**
PP has now provided the copies of daily generation report sent by Vestas for the cross check of data on grid availability, machine availability and generation of electricity. Comment is therefore closed.				

CAR ID	05	Section no.	4.3	Date: 04/05/2021
Description of CAR				
PP is requested to provide following documents, 1. Operation and Maintenance agreement 2. JMR/Invoices 3. Metering certificates of all meters 4. Commissioning Certificates				
Project participant response				**Date:18-06-2021**
The commissioning certificates, JMR/Invoices, Metering Certificates and Operation and Maintenance agreement are now provided to the DOE for further assessment.				
Documentation provided by project participant				

1. *Operation and Maintenance agreement* 2. *JMR/Invoices* 3. *Metering Certificates of all meters* 4. *Commissioning certificates*
DOE assessment **Date: 03/07/2021**
PP has now provided JMR/Invoices, Metering Certificates and Operation and Maintenance agreement to the DOE. Hence**, comment closed**.

CAR ID	06	**Section no.**	5.2	**Date:** 04/05/2021
Description of CAR				
PP is requested to provide all relevant consents/ clearance needed from State pollution control Board and other statutory bodies.				
Project participant response				**Date:18-06-2021**
The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation. The report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013 This report clearly mentioned that solar/Wind power project activity operations do not result in direct air pollution, noise pollution. Moreover, also as per the Central Pollution Control Board of India notification solar/wind project falls under White Category and are practically non-polluting.				
Documentation provided by project participant				
NA				
DOE assessment				**Date: 03/07/2021**
PP has now given proper explanation that, according to the report on "Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects" prepared by MNRE dated September 2013, this project which comes under solar/Wind and do not result in direct air pollution, noise pollution. Hence, **Comment closed**.				

APPENDIX 3: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Verification team member

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

Technical reviewer and approver of the verification and certification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer (TR)	EI	Shen	Simon	Applus+ Certification
2.	Approver	IR	Calle de Miguel	Agustin	Applus+ Certification

Short CVs of the Team:

1. **Pankaj Kumar** worked as team leader – Bihar for South Asia Climate Proofing and Growth Development (CPGD) – Climate Change Innovation Programme (CCIP) supported by DFID that seeks to mainstream climate change resilience into planning and budgeting at the national and sub-national level in India, Pakistan, Nepal, and Afghanistan. Pankaj Kumar has worked previously with IL&FS Infrastructure Development Corporation and BUIDCO (Bihar Urban Infrastructure Development Corporation), Govt. Of Bihar as Environmental Specialist for WB & ADB funded projects. Prior to this, he worked with Carbon Check (UNFCCC accredited DoE), Johannesburg, RSA as Team Leader for validation, verification of around 100 GHG projects in Asia, Africa, USA, Asia Pacific & Americas. Pankaj is accredited Lead Auditor, Validator, Verifier and Technical Expert for Sectoral Scope/Technical Area – 1.1, 1.2, 3.1 & 13.1 by UNFCCC DoE (Designated Operational Entity), APPLUS, Spain. He is also member of task force

on climate change & human health, Health Department, GoB and on roster of UNICEF's WASH experts.

He is an experienced, qualified and result oriented Environment Professional having more than 14 yrs. Of relevant experience in Climate Change (Mitigation &Adaptation), Environmental Due Diligence, Disaster Risk Reduction, Validation and Verification of GHG project under CDM, Verified Carbon Standard, Gold Standard & Social Carbon Standard, Brazil. He provides technical support for environmental investigative, consultative and remedial projects involving air, water and soil, Waste management, EIA, Environmental Compliance, ISO 14001, OHSAS 18001, GHG accounting (ISO 14064) and Carbon foot printing

Pankaj Kumar is Masters in Environment Management from Forest Research Institute (University), I.C.F.R.E, Dehradun, which is Centre of Excellence in South East Asia for Forestry education & research and PGDEL from National Law School of India University, Bangalore (India).

2. **Mr. Simon Shen** (Master's Degree in Thermal Energy Engineering, Bachelor's Degree in Environmental Engineering) is an Auditor appointed by Applus+ LGAI for the GHG project assessment, auditing and technical review. He has more than 6 years of work experience in CDM/GS4GG/VCS project assessment and review with Applus+, apart from the years of experience working as GHG Auditor and ISO 9001/14001 in TUV SUD for 5 years before he joined Applus+. Mr. Simon Shen has extensive experience also as former Applus+ Shanghai CDM Technical Manager.

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
TNEB	Tamil Nadu Electricity Board
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS

The Energy Meters details for the project activity are as below:

HTSC No.	Meter Type	Accuracy Class	Date of Calibration
2595	Main Meter	0.5s	16-March-2016
2570	Main Meter	0.5s	16-March-2016

As per the registered PD the meter calibration is annual. However the calibration is not done for the entire Monitoring period. PP have the latest calibration report dated 16/March/ 2016 which shows that calibrated meter is under the error limit. Therefore the accuracy class of the meter is applied for the entire monitoring period which is conservative.