

Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)



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

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Summary:

Verification purpose: The purpose of the project activity is to generate electrical energy using renewable energy source (wind) for the purpose of captive utility. The project activity generates electricity using wind potential and converts it into kinetic energy using Wind turbines, which drives the alternators to generate energy. The total installed capacity of the project is 233.1 MW; which involves operation of 156 Wind Turbine Generators (WTGs) with capacity of 0.85 MW each located at Karnataka (112 WTGs) and Andhra Pradesh (44 WTGs) implemented by Mytrah Vayu Krishna Private Limited and 67 Wind Turbine Generator (WTGs) of 1.5 MW implemented by Mytrah Vayu (Manjira) Private Limited Tamil Nadu state in India. These are the subsidiary companies of Mytrah Energy (India) Limited. However the project is promoted by Mytrah Energy (India) Limited, which is also the project proponent in the project activity. The generated electricity is exported to the regional grid system which is under the purview of the Southern grid of India.

The power produced displaces an equivalent amount of power from the grid, which is fed mainly by fossil fuel fired power plants. Hence, as per VCS PD, it results in reduction of GHG emissions. GHG emission reductions from the project activity will be 479,448 tons of CO₂e per year and total GHG emission reductions for the chosen 10 year crediting period will be 4,794,480 tons of CO₂e. The project is registered with VCS with Project ID 1521. Start date of the project activity is the 21/02/2014. The monitoring period for this VCS verification is chosen from 02/05/2018 to 01/08/2019 (including both days) and the project activity achieved 487,697 tCO₂e emission reductions during this monitoring period.

A risk based approach has been followed to perform this verification activity. In the course of verification, 04 Corrective Action request (CAR) and 1 CL were raised and successfully closed. The review of the Monitoring report and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and PP have provided LGAI Technological Center S.A. (Applus+ Certification) with sufficient evidence to verify the fulfilment of the stated criteria of VCS.

¹ http://vcsprojectdatabase.org/#!/project_details/1521

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Applus+ Certification) has been appointed by “Mytrah Energy (India) Limited (subsidiary of Mytrah Vayu Krishna Private Limited and Mytrah Vayu (Manjira) Private Limited)” to perform the 3rd periodic VCS verification of the “Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)” under VCS standard and guideline version 3.7. The objective of this verification activity is to have an independent third party for the assessment of the project design, Monitoring report and Final Validation report and to ensure a thorough assessment of the proposed project activity against the applicable CDM and VCS requirements. In particular;

- the project's baseline is assessed against “ACM0002 - Version 16.0”
- the project's monitoring plan is assessed against “ACM0002 - Version 16.0”
- the projects compliance with, the requirements of Article 12 of the Kyoto Protocol, the CDM Modalities and Procedures as agreed in the Marrakech Accords under decision 3/CMP.1, the annexes to this decision, subsequent decisions and guidance made by COP/MOP & CDM Executive Board and other relevant rules, including the Host Country legislation and sustainability criteria along with VCS guideline and standard version 3.7
- CDM validation and verification standard for project activities Version 2.0
- CDM project standard for project activities Version 02.0
- CDM project cycle procedure for project activities Version 02.0
- VCS standard v3.7
- VCS guideline v3.7

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

1.2 Scope and Criteria

The scope of the verification is the independent and objective review of the Monitoring report (MR). The MR is reviewed against the relevant criteria (see 1.1) and decisions by the CDM Executive Board and VCS executive board, including the approved baseline and monitoring methodology. The verification was based on the guidance given in the CDM validation and verification standard for project activities Version 02.0, VCS PD Version 02 dated 10/02/2016 and Final Validation report version 01 dated 12/02/2016, CDM project standard for project activities Version 02.0, CDM project cycle procedure for project activities Version 02.0 and VCS guideline and standard version 3.7.

The audit 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 audit 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.

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. No sampling procedure applied for site visit or document verifications. The entire documents checked/WTGs verification conducted to arrive at positive verification conclusions.

1.4 Summary Description of the Project

The project activity, consisting of 223 Wind Turbine Generators (WTGs) installed in states of Andhra Pradesh, Karnataka and Tamilnadu, India. The intent of the Project Activity is to reduce GHG emission and promote sustainable development by use of renewable energy (Wind) for generation of power by bringing together a number of investors with small power requirements to invest into wind turbines. In the absence of the project activity, the equivalent amount of electricity would have been generated by the power plants connected with the southern grid which is predominantly based on fossil fuel.

The project is registered with VCS with Project ID 1521. Start date of the project activity is the 21/02/2014. The monitoring period for this VCS verification is chosen from 02/05/2018 to 01/08/2019 (including both days) and the project activity achieved **487,697** tCO₂e emission reductions during this monitoring period.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification Scope: The scope is defined as an independent and objective review of the Monitoring report (MR) prepared as per the registered PD and registered approved methodology ACM0002 - Version 16.0. The MR is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board and VCS standard and guideline version 3.7, including the approved baseline and monitoring methodology ACM0002 - Version 16.0. 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 guideline and standard version 3.7.

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.

Verification Process: The project assessment is based on the CDM validation and verification standard for project activities Version 02.0 and VCS standard and guideline version 3.7 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 audit team, the members of the audit team carried out:

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

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

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

Appointment of the assessment team

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

The composition of audit team shall be approved by the Applus+Certification ensuring that the required skills are covered by the team.

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

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

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

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

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

Document review

The Monitoring report submitted by the Client was reviewed against the approved methodology, VCS PD Version 02 dated 10/02/2016 and Final Validation report version 01 dated 12/02/2016 and other relevant criteria to verify the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in this report below in appendix 1.

Follow-up interviews

A site visit is conducted by LGAI Technological Center S.A. (Applus+ Certification) performed interviews, telephone conferences, and physical site inspection with project stakeholders to confirm selected information and to resolve issues identified in the document review. The detail is provided in this report in Section 2.3.

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 LGAI Technological Center S.A. (Applus+ Certification)'s positive conclusion on the 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 verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 4 submitted by PP on 26/09/2019 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Internal quality control

As final step of a verification of the final documentation including the verification report and the checklist have to undergo an internal quality control by the technical review committee, i.e. each report has to be finally approved either by the head of the technical review committee or the deputy. In case one of these two persons is part of the audit team approval can only be given by the other one to avoid any conflict of Interest.

After confirmation of the PP the positive verification opinion and relevant documents are submitted to the VCS board through the VCS web-platform

2.2 Document Review

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

2.3 Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Khan	Aslam	Site Engineer	07/09/2019 to 09/09/2019	Implementation of the project, monitoring and emission reduction calculations	Mr. Pankaj Kumar
2.	Patil	Sadanand	Site Engineer			
3.	Kumar	Senthil	Site Engineer		monitoring report and emission reduction calculations	
4.	Sahu	Prakash	Project Manager-EKI			
5.	Rao	Anjali	Asst. Manager- EKI			

2.4 Site Inspections

Duration of on-site inspection: 07/09/2019 to 09/09/2019				
No.	Activity performed on-site	Site location	Date	Team member
1.	Audit team checked the implementation of the project, Baseline emission, Emission reduction calculation, technical description of the project and Monitoring. Audit team also checked that whether the monitoring plan as described in the PD is actually practised onsite. Also audit team checked any change in host country criteria which may affect the baseline of the project activity.	Tamilnadu, AP & Karnataka, India	07/09/2019 (TN), 08/09/2019 (Karnataka) & 09/09/2019 (A.P.)	Mr. 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 from validation which need to be clarified for LGAI Technological Center S.A. (Applus+ Certification)'s positive conclusion on the 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 verification process, the concerns raised and responses given are summarized below in the appendix 2.

The final MR Version 4 submitted by PP on 26/09/2019 serves as the basis for the final assessment presented. Additional changes to the project during the verification process are not considered to be significant with respect to the main CDM/VCS objectives. The two CDM/VCS main objectives are the reduction of anthropogenic GHG emissions and the contribution of sustainable development to the host country.

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	00	00
Description of project activity	00	01	00

Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Application of selected baseline and monitoring methodology and selected standardized baseline			
- Applicability of methodology and standardized baseline	00	00	00
- Deviation from methodology	00	00	00
- Clarification on applicability of methodology, tool and/or standardized baseline	00	00	00
- Project boundary	00	00	00
- Establishment and description of baseline scenario	00	00	00
- Demonstration of additionality	00	00	00
- Emission reductions	00	02	00
- Calibration details	01	01	01
- Monitoring plan	00	00	00
Others (please specify)	00	00	00
Total	01	04	01

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

2.5.1 Forward Action Requests

This is 3rd periodic VCS verification of the project activity and no FAR raised in this monitoring period, however there was one FAR open from 2nd VCS verification. Resolution of the same is presented in Appendix 2 of this report.

2.6 Eligibility for Validation Activities

This section is not applicable for present verification.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project is not applied under any other GHG program like CDM, GS, hence not applicable. Since electricity from 45 MW (30 WTGs of 1.5 MW) of Tamilnadu WTGs is claiming REC credit for this monitoring period, hence equivalent amount of electricity is not claiming VCS credit.

3.2 Methodology Deviations

This section is not applicable for present verification.

3.3 Project Description Deviations

Not applicable

3.4 Grouped Project

Not applicable

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity, "Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)" was registered as a VCS project on 12/02/2016 applying the methodology ACM0002 - Version 16.0. The WTGs of the project activity are owned by the Project Proponent, i.e. Mytrah Energy

(India) Limited (subsidiary of Mytrah Vayu Krishna Private Limited and Mytrah Vayu (Manjira) Private Limited), which was verified from commissioning certificate and the PPA for the project activity.

The proposed project activity involves the installation of Wind Power Projects. The total installed capacity of the project is 233.1 MW; which involves operation of 156 Wind Turbine Generators (WTGs) with capacity of 0.85 MW each located at Karnataka (112 WTGs) and Andhra Pradesh (44 WTGs) implemented by Mytrah Vayu Krishna Private Limited and 67 Wind Turbine Generator (WTGs) of 1.5 MW implemented by Mytrah Vayu (Manjira) Private Limited Tamil Nadu state in India. These are the subsidiary companies of Mytrah Energy (India) Limited. However the project is promoted by Mytrah Energy (India) Limited, which is also the project proponent in the project activity.

The ex-ante fixed grid emission factor of 0.9817 tCO₂/MWh has been used for the baseline emission calculation which is line with the registered VCSPD.

By comparing the actual ER claimed in this monitoring period with the estimate in the registered VCS PD (600,295 tCO₂e for the monitoring period estimated), the actual emission reductions (487,697 tCO₂e for the monitoring period) are lower than by 18.76% what is stated in the registered VCS PD which surely will not lead to the overestimation of VERs. Verification team confirms that The PP has not applied this project in any Emission Trading Programs and other Binding Limits. DoE has checked with other applicable GHG mechanism and conformed that this project is not included in any other carbon trading mechanism.since validation and previous verification.

Though PP has not applied this project in any other form of environmental credits other than Tamil Nadu 45 MW WTGs. The electricity generated from 45 MW REC component of Tamil Nadu are not included for VCU calculations to avoid any double accounting. The HTSC numbers DRA-01,03,04,05,06,07,08,09,12,13,15,17,18,21,22,23,24,25,26,27,31,32,33,43,44,46,47,48,49,54 (TOTAL 30 WTGs of 1.5 MW from Tamil Nadu site) are availing REC. Thus electricity generated from these WTGs having REC component are not considered for VCU calculations for current complete monitoring period. DoE checked MR and corresponding ER sheet and confirm that 30 no. of WTGs located in Tamilnadu site not taken into account for emission reduction calculation. PP also submitted undertaking for Project neither has any intends to generate any form of GHG related environmental credit for neither GHG emission reductions nor removals claimed under the VCS program.

In this project activity, no consumption of any fossil fuel and hence the project does not lead to any greenhouse gas emissions. Thus, electricity would be generated through sustainable means without causing any negative impact on the environment.

In the Pre- project scenario the equivalent amount of electricity delivered to the grid by the project activity, would have otherwise been generated by the operation of grid-connected fossil fuel based power plants and by the addition of new generation sources. The Pre- project scenario for the facility where the electricity is wheeled (in case of TN WEGs), the electricity was sourced from southern grid. Verification team confirms that implementation of this project activity contributes to reduction of share of fossil fuel based electricity to the grid by using renewable energy and implementation of this project also resulted into numerous social and economic benefits to the people in the project area which was confirmed during site visit by interviewing local people

The audit team confirmed that there is no proposed or actual change to the project design during this monitoring period.

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

It was observed that the monitoring plan was implemented as per the requirement of the registered PD, FVR and approved methodology ACM0002 - Version 16.0. The organisational role and responsibility as

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

Start date of the project activity is 21/02/2014. The audit team observed that the project is in line with the registered PD, FVR, previous verifications and approved methodology. CAR 01 was raised for editorial mistake in VCS declaration provided by PP and was successfully closed by appropriate corrections in Declaration.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

Means of verification	The verification team assessed whether the data and calculations of GHG emission reductions achieved resulting from the VCS PD. The verification team has checked whether calculations of baseline GHG emissions, project GHG emissions and leakage GHG emissions have been carried out in accordance with the formulae and methods described in the monitoring plan of the VCS PD
Findings	CAR 02 & CAR 03 was raised during the verification. The description of the CAR and its closure is described below in Appendix 2 of this report.
Conclusion	Ex-ante Parameter: EF_{grid,CM,y}= Parameter is fixed ex-ante for the entire crediting period and as per the validated VCS PD same is fixed 0.9817 tCO₂/MWh. Verification team found same was used in the ER calculations. Baseline Emissions: The baseline Emissions for a given year is calculated by multiplying the energy baseline with the grid emission factor. The grid in this case would be the 'Indian Grid' Formula Used:- $BE_y = EG_{PJ, y} * EF_{grid, CM, y} \quad (1)$ Where: BE_y: Baseline emissions in year y (tCO₂e/yr) EG_{PJ, y}: Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr) EF_{grid,CM,y}: Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO₂e/MWh) EG_{PJ, y}= The verification team has checked the entire monthly JMR reports for net electricity generated & supplied to the grid and crosschecked same with the invoices raised by PP towards State Utilities for the monitoring period. All values are found correct. All the parameters are monitored and recorded as per the monitoring plan in the registered VCS PD. The verification team has crosschecked the revised emission reduction sheet and monitoring report data with the JMR sheet and invoice and found all the values are matching. PE_y= As per ACM0002 - Version 16.0, all renewable energy power generation project activities, emissions due to the use of fossil fuels for the backup generator can be neglected. As the project activity involved wind project emissions (PE_y) are taken as zero. Leakage: As per ACM0002 - Version 16.0, Leakage emissions are not considered for the project activity.

4.3 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 site visit the feeder wise location of the WTGs is also checked. The Calibration details of the monitoring meters are also checked with calibration certificates.
Findings	CAR 2 & 3 was raised during the verification. The description of the CAR and its closure is described below in Appendix 2 of this report.
Conclusion	The metering arrangement is tri-vector bi-directional energy meters of Elster /L&T Make; accuracy class 0.2s (main and check) at the State Electricity Board (SEB) substation. For measuring the energy delivered by the project activity, one set of main meters (part of interconnection facilities) and check meters is provided at each feeders by the project proponent and respective electricity distribution company. These meters record several parameters including electricity exported & imported. These electricity meters are being used by state electricity board for JMR (Joint Meter Reading) electricity generation statements. During commissioning of the WTGs monitoring meters of accuracy class i.e. 0.2s were installed. The meters are monitored continuously & cumulative readings are taken at the end of the month by joint meter reading procedure. These are sealed by State Utilities to avoid malfunctioning with meter readings. Calibration frequency of the monitoring meters is once in a 5 years. However, Meters are calibrated by the meter testing division of the state utility in the presence of O&M Contractor / investor's representatives and State Utilities officials to ensure the working of meter within permissible limits, however, calibration frequency and schedule is under the complete discretion of State Utility and PP do not have control on it. The calculation of net electricity supplied to grid is under purview of state electricity board and PP does not have control on it. Calibration details of the monitoring meters checked with calibration certificates submitted by PP and found that calibration frequency of once in 5 years is complied. However, PP do not have all calibration certificates available with them for Tamil Nadu site WTGs, hence maximum error factor i.e. maximum permissible limit is applied for complete monitoring period for Tamil Nadu site WTGs. In India State Utilities are owned by respective State Government and have their own working practices. Hence the verification team accepted the conservative approach of ER calculations. The break down log is checked and there is no major breakdown during the monitoring period. No unforced error observed.

4.4 Non-Permanence Risk Analysis

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

5 SAFEGUARDS

5.1 No Net Harm

No potential environment or socio economic matter was found during the site visit. The project is renewable energy project and thus no negative impact observed in Air or water quality onsite. Being renewable power source and no environmental emissions involved, Wind projects are exempted from

Environmental Impact Assessment (EIA) studies and environmental clearance vide EIA Notification 2006 (SO S.O. 1533dtd. 14/09/2006²) & amendments thereof issued by Ministry of Environment, Forest & Climate Change (MoEFCC).

5.2 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 from the registered VCS PD. Local persons were given employment in security & maintenance work. Audit team confirmed the same during the verification site visit by interviews of some local persons. Same is presented in below table;

Name	Mr. Sadanand
Occupation	Security Guard
Ques: Does project have any adverse impact in the area?	
Ans: No. There are no any adverse impacts. We are happy due to project implementation.	
Ques: Have local peoples are given employment?	
Ans: Yes. Employed in O&M work and unskilled as security & labour work.	

² envfor.nic.in/legis/eia/so1533.pdf

6 VERIFICATION CONCLUSION

LGAI Technological Center S.A. (Applus+ Certification) has been engaged by Mytrah Energy (India) Limited (subsidiary of Mytrah Vayu Krishna Private Limited and Mytrah Vayu (Manjira) Private Limited) to perform the 3rd periodical verification of the “Wind Based Power Generation by Mytrah Energy (India) Limited (EKIESL-VCS-January-16-01)”

The Mytrah Energy (India) Limited (subsidiary of Mytrah Vayu Krishna Private Limited and Mytrah Vayu (Manjira) Private Limited) is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s Monitoring Plan in the registered VCS PD and the applied methodology ACM0002 - Version 16.0.

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the CDM Executive Board. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. 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 VCS PD;
- the development and maintenance of records and reporting procedures are in accordance with the monitoring plan;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

As the result of the verification of VCS VERs, the verifier confirms that the GHG emission reductions are calculated without material misstatements in a conservative and appropriate manner. Applus herewith confirms that the project has achieved emission reductions in the below mentioned reporting period. The project complies with the verification criteria for projects and their GHG emissions reductions or removals set out in VCS Standard and VVM.

Verification period: 02/05/2018 to 01/08/2019(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)
02/05/2018 to 31/12/2018	284,418	0	0	284,418
01/01/2019 to 01/08/2019	203,279	0	0	203,279
Total	487,697	0	0	487,697

Applus confirms a positive verification opinion confirming that the project complies with the applicable VCS requirements, thus recommending the project for issuance.

APPENDIX 1: DOCUMENTS REVIEWED OR REFERENCED (VERIFICATION)

No.	Author	Title	References to the document	Provider
1.	NA	Commissioning certificates of the WTGs implemented in the project site.	NA	Project participant
2.	NA	Contract of the project participant with the DOE	Contract document signed between PP and DOE	Project participant
3.	NA	Technical specifications of wind turbine generators from manufacturers	Manufacturer technical specifications	Project participant
4.	NA	Power Purchase agreement for the project activity	NA	Project participant
5.	NA	VCS PD	Version 02 dated 10/02/2016	Project participant
6.	NA	Final Validation report	version 01 dated 12/02/2016	Project participant
7.	NA	Final Monitoring report for 1 st verification	Version 04 Dated 25/05/2017	Project participant
8.	NA	Verification Report for 1 st verification	Version 01 Dated 26/05/2017	Project participant
9.	NA	Ministry of Environment and forest: www.envfor.nic.in UNFCCC: www.cdm.unfccc.int CEA: Central electricity authority: www.cea.nic.in VCS: Verified Carbon Standard: www.v-c-s.org	Reference link is provided.	Independent Search
10.	NA	Tools/ guidelines used in the project activity - CDM Methodology ACM0002 - Version 16.0 - Tool to determine the remaining lifetime of the project activity in line with Annex 15 EB 50 - Tool to calculate the emission factor for an electricity system - Version 05.0 - Glossary of CDM terms version 07 - VCS verification report template version 03.4	UNFCCC CDM web site	UNFCCC
11.	NA	JMR records for the complete monitoring period	JMR records	Project participant
12.	NA	MR version 1 MR version 2 MR version 3 MR version 4	28/08/2019 09/09/2019 17/09/2019 26/09/2019	Project participant
13.	NA	Emission Calculation sheet version 01	11/09/2019	Project participant
14.	NA	Invoices for the complete monitoring period	Invoice	Project participant
15.	NA	Break down details of the complete monitoring period	Log sheet	Project

No.	Author	Title	References to the document	Provider
				participant
16.	NA	Self-Declaration from PP for not participating/claiming other emission reduction programme	Declaration	Project participant

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

Project Implementation Status

CL ID	01	Section no.	3.3 of MR	Date: 03/09/2019
Description of CAR				
FAR from 2nd Verification: <i>For TN WTGs: PP has applied an error of 0.2% (maximum permissible error of the meter) for the whole period due to non-availability of the calibration certificates for some of the WTGs. Thus PP is requested to adjust the VER for the next verification if actual error is more the applied error.</i> PP requested to clarify status of availability of calibration certificates after end date of first verification.				
Project participant response				Date: 09/09/2019
Due to non availability of calibration reports with PP, respective correction factors had been applied. Now the meter calibration reports are readily available which covers the entire monitoring period, also the calibration reports states that the error are within permissible limit. Therefore PP don't need to adjust the VERs.				
Documentation provided by project participant				
NA				
DOE assessment				Date: 13/09/2019
For Tamil Nadu Vagarai site, the metering arrangements, monitoring practices, accuracy class of monitoring meters, calibration schedule is completely under control of State Electricity Board and PP do not have control or access to it. For this monitoring period, PP have provided all calibration certificates, hence verification team conclude that no need to apply error for this monitoring period. The same approach found to be appropriate and conservative, hence accepted by audit team. FAR closed				

CAR ID	01	Date: 03/09/2019
Description of CAR		
In sec. 1.1, para 3, GHG reductions from the project activity mentioned as 600,295 tCO₂e is not consistent with registered VCS-PD. In same section, para 4, total electricity generation value is also not consistent with VCS-PD		
Project participant response		Date: 09/09/2019
GHG reductions have been updated with this submission and now they are consistent in VCS MR V2. The total electricity generation value also has been updated in the MR V2.		

Documentation provided by project participant	
VCS-MR V2	
DOE assessment	Date: 13/09/2019
Necessary corrections made in revised MR, VER. 02 dated 09/09/2019 checked and found to be correct. Comment closed.	

Quality of Evidence to Determine GHG Emission Reductions and Removals

CAR ID	02	Date: 03/09/2019
Description of CAR		
The breakdown details of the Wind turbines are missing in the MR. However, the supporting document regarding the breakdown details are not provided to the assessment team. Corrective action is sought in this regard.		
Project participant response		Date: 09/09/2019
Breakdown is being updated in Appendix of MR V2.		
Documentation provided by project participant		
MR V2 and Breakdown Sheet		
DOE assessment		Date: 13/09/2019
The break down details of the WTGs are now updated in appendix -3 of revised MR, ver, 02		
which was cross checked with day wise break down details for all three sites provided by PP and found to be correct. CAR closed.		

Accuracy of GHG Emission Reduction and Removal Calculations

CAR ID	03	Date: 03/09/2019
Description of CAR		
The JMR sheets/ Credit note/ B form of respective state utilities and Invoice for the complete monitoring period is missing. ER sheet also not provided.		
The comparison of actual VER and estimated VER is also missing in the MR.		
Corrective action is sought.		

Project participant response	Date: 09/09/2019
The comparison of actual VER and estimated VER have been now been provided in the MR. JMR/Credit note and respective B-forms with ER sheet is being provided.	
Documentation provided by project participant	
<i>JMR, Invoice and ER sheet.</i>	
DOE assessment	Date: 13/09/2019
The comparison of actual VER accrued from this monitoring period and estimated VER as per registered PDD, now provided in revised MR, ver.02 which was found to be correct. JMR/Credit notes along with invoices from all three state utilities also provided and ER calculations found to be correct in ER sheet provided. CAR closed.	

CAR ID	04	Date: 03/09/2019
Description of CAR		
The calibration certificates for the complete monitoring period are missing. The details are also missing in the MR. Corrective action sought for the same		
Project participant response		Date: 09/09/2019
Calibration details are now added in appendix of MR V2. The calibration certificates is being submitted to the DOE.		
Documentation provided by project participant		
Calibration Certificates		
DOE assessment		Date: 13/09/2019
PP has provided calibration details of meters for all three locations, however for Tamilnadu site, calibration certificates of year 2018 and for Andhra Pradesh site, calibration conducted on 15/12/2018 not provided.		
Calibration certificates for Karnataka checked and discrepancy in the name of HESCOM observed. In some of the certificate, “Hubli” mentioned whereas in some of the certificate, “ Huballi” mentioned which is confusing. PP shall clarify this discrepancy. Comment open		
Project participant response		Date: 17/09/2019
The calibration details for Tamil Nadu & Andhra Pradesh sites for respective date are being provided with		

this submission.

Also, “Huballi” was the former name of “Hubli”, that’s why the discrepancy in the names was observed. As these letter heads and documents are provided and controlled by State Electricity Board, so PP have no control over it. Therefore, it is requested to consider the provided calibration records.

DOE assessment**Date:** 19/09/2019

The calibration details of meters conducted in year 2018 for Tamilnadu site and Andhra Pradesh site provided by PP which was checked and found to be in line with calibration requirements. Comment closed.

Justification provided by PP regarding inconsistency in the name of state utility for Karnataka site accepted and 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	Sendin	Juan	Applus+ Certification B.U. Managing Director

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. Meng (Simon) Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ LGAI for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for more than 5 years

APPENDIX 4: ABBREVIATIONS

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CEA	Central Electricity Authority
CL	Clarification request
CM	Combined Margin
CMS	Central Monitoring system
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reductions
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GWP	Global Warming potential
RBI	Reserve Bank Of India
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS OF THE METERS

VagaraiTamil Nadu state55.5 MW (37*1.5 MW WTGs)³

S. No.	HTSC No.	Old meter S. No.	Calibration date	Meter change date	New meter S. No.	Due date of calibration
1.	DRA 002	12092331	01/06/2014	25-05-2017	4321945	24-05-2022
2.	DRA 010	14190323	01/06/2014	23-05-2017	4322515	22-05-2022
3.	DRA 019	12091451	01/06/2014	22-05-2017	4322252	21-05-2022
4.	DRA 037	12091997	23/06/2014	20-05-2017	4322069	19-05-2022
5.	DRA 038	12092349	23/06/2014	20-05-2017	4321884	19-05-2022
6.	DRA 039	12092267	23/06/2014	05-05-2017	4322063	04-05-2022
7.	DRA 042	12092317	23/06/2014	20-05-2017	4321949	19-05-2022
8.	DRA 050	12092323	23/06/2014	20-05-2017	4322064	19-05-2022
9.	DRA 052	14190336	23/06/2014	20-05-2017	4321888	19-05-2022
10.	DRA 055	14190278	16/06/2014	22-05-2017	4322067	21-05-2022
11.	DRA 011	14190249	01/06/2014	23-05-2017	4322519	22-05-2022
12.	DRA 014	14190299	01/06/2014	23-05-2017	4322517	22-05-2022
13.	DRA 016	14190312	01/06/2014	23-05-2017	4322521	22-05-2022
14.	DRA 020	14190301	01/06/2014	23-05-2017	4322433	22-05-2022
15.	DRA 028	14190333	01/06/2014	22-05-2017	4322566	21-05-2022
16.	DRA 029	14190313	01/06/2014	22-05-2017	4322574	21-05-2022

³ PP is claiming VCS benefits for only 37 WTGs out of 67 WTGs. Rest 30 WTGs are availing Renewable Energy Certificate (REC) benefits. Meter calibration of the 37 WTGs claiming VCS benefits was done at the date of commissioning. Later on these meters were changed in the year 2017 (respective dates are mentioned in the table above). The calibration records of newly installed meters in 2017 submitted by PP checked and found to be correct. As calibration of meters to be done after every 5 years, accordingly next due date of calibration mentioned in the table, which is in line with registered PDD.

17.	DRA 030	14190294	01/06/2014	22-05-2017	4322374	21-05-2022
18.	DRA 034	14190337	01/06/2014	23-05-2017	4321977	22-05-2022
19.	DRA 035	14190331	01/06/2014	22-05-2017	4322581	21-05-2022
20.	DRA 036	14190316	04/06/2014	22-05-2017	4322582	21-05-2022
21.	DRA 040	14190292	23/06/2014	25-05-2017	4322160	24-05-2022
22.	DRA 041	14190257	23/06/2014	25-05-2017	4321952	24-05-2022
23.	DRA 045	14190319	23/06/2014	20-05-2017	4321943	19-05-2022
24.	DRA 051	14190325	23/06/2014	20-05-2017	4322065	19-05-2022
25.	DRA 053	14190267	23/06/2014	20-05-2017	4321944	19-05-2022
26.	DRA 065	14190268	09/01/2015	22-05-2017	4322579	21-05-2022
27.	DRA 061	13197046	03/12/2014	20-05-2017	4322154	19-05-2022
28.	DRA 056	14190263	31/10/2014	25-05-2017	4321973	24-05-2022
29.	DRA 060	14190320	03/12/2014	20-05-2017	4321948	19-05-2022
30.	DRA 058	14190273	31/10/2014	23-05-2017	4322514	22-05-2022
31.	DRA 057	14190341	31/10/2014	23-05-2017	4322513	22-05-2022
32.	DRA 059	14190315	31/10/2014	20-05-2017	4322068	19-05-2022
33.	DRA 064	14190279	06/01/2015	20-05-2017	4322066	19-05-2022
34.	DRA 067	14190276	26/02/2015	22-05-2017	4322573	21-05-2022
35.	DRA 062	14190280	18/12/2014	25-05-2017	4321892	24-05-2022
36.	DRA 063	14190338	24/12/2014	20-05-2017	4322158	19-05-2022
37.	DRA 066	14190269	04/02/2015	20-05-2017	4321947	19-05-2022

Calibration details for Karnataka site WTGs 95.2 MW (112*0.85 MW WTGs)

Location	Meter Type	Meter Serial Number	Make	Accuracy Class	Calibration Date	Calibration Date	Due date of Calibration
Feeder 1	Main Meter	13191120	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191121	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022

Feeder 2	Main Meter	13191094	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191095	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 3	Main Meter	13191100	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191104	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 4	Main Meter	13191096	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191097	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 5	Main Meter	13191114	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191122	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Feeder 6	Main Meter	13191159	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
	Check Meter	13191380	L & T	0.2s	19/12/2014	20/05/2017	19/05/2022
Sub Station	Main Meter	13194679	L & T	0.2s	24/12/2014	20/05/2017	19/05/2022
	Check Meter	13194671	L & T	0.2s	24/12/2014	20/05/2017	19/05/2022

Calibration details for Andhra Pradesh site WTGs 37.4 MW (44*0.85 MW WTGs)

Meter Type	Meter Serial Number	Make	Accuracy Class	Calibration Date	Calibration Date	Due Date
Main Meter	16538864	Elster	0.2s	02/03/2015	15/12/2018	14/12/2023
Check Meter	16538867	Elster	0.2s	02/03/2015	15/12/2018	14/12/2023
Standby Meter	16538885	Elster	0.2s	02/03/2015	15/12/2018	14/12/2023