WIND BASED POWER GENERATION BY PANAMA WIND ENERGY PRIVATE LIMITED IN MAHARASHTRA, INDIA

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Summary:

Verification purpose: The main purpose of this project activity is to generate clean form of electricity through renewable energy sources (wind energy). Panama Wind Energy Private Limited is the promoter and project proponent of the project activity. The project activity involves installations of 63 numbers of wind turbines of 1.6 MW capacity each (aggregating to 100.8 MW) in the state of Maharashtra. However, till now only 72 MW (45 WTGs) have been implemented in different phases and are in operation and 18 WTGs are yet to be implemented. Same are planned to be installed after signing of PPA with State Utility. The electricity generated from the WTGs is sold to state electricity board.

The project is registered with VCS with Project ID 1671[1]. Start date of the project activity is the 22/02/2013. The monitoring period for this VCS verification is chosen from 02/03/2017 to 28/02/2018 (including both days) and the project activity achieved **122,235** tCO_2e emission reductions during this monitoring period.

A risk based approach has been followed to perform this verification activity. In the course of verification, 03 Corrective Action request (CAR) and 00 Clarification Requests (CLs) were raised and successfully closed & one FAR was raised. 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/1671

CONTENTS

1 INTRODUCTION

1.1 Objective

LGAI Technological Center S.A. (Applus+ Certification) has been appointed by "Panama Wind Energy Private Limited" to perform the 2nd periodic VCS verification of the "Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India" 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 12.3.0"
- the project's monitoring plan is assessed against "ACM0002 - Version 12.3.0"
- 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 01.0
- CDM project standard for project activities Version 01.0
- CDM project cycle procedure for project activities Version 01.0
- 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 01.0, VCS PD Version 03 dated 05/04/2017 and Final Validation report version 02 dated 05/04/2017, Registered CDM PDD version 2 dated 14/08/2015 (Revised for post registration changes) & Final CDM Validation report version 2.5 dated 29/11/2012, CDM project standard for project activities Version 01.0, CDM project cycle procedure for project activities Version 01.0 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 main purpose of this project activity is to generate clean form of electricity through renewable energy sources (wind energy). Panama Wind Energy Private Limited is the promoter and project proponent of the project activity. The project activity involves installations of 63 numbers of wind turbines of 1.6 MW capacity each (aggregating to 100.8 MW) in the state of Maharashtra. However, till now only 72 MW (45 WTGs) have been implemented in different phases and are in operation and 18 WTGs are yet to be implemented. The electricity generated from the WTGs is sold to state electricity board.

The project is registered with VCS with Project ID 1671[2]. Start date of the project activity is the 22/02/2013. The monitoring period for this VCS verification is chosen from 02/03/2017 to 28/02/2018 (including both days) and the project activity achieved **122,235** tCO_2e 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 12.3.0. 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 12.3.0. The verification was based on the requirements in the CDM validation and verification standard for project activities Version 01.0, CDM project standard for project activities Version 01.0, CDM project cycle procedure for project activities Version 01.0 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 01.0 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),

[2] http://vcsprojectdatabase.org/#/project_details/1671

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.

The verification checklist consists of three tables. The different columns in these tables are described in the tables below:

Verification Checklist Table 1: Mandatory Requirements			
Requirement	Reference	Conclusion	Cross reference
The requirements which the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided (OK), or a Corrective Action Request (CAR) of risk or non-compliance with stated requirements. The corrective action requests are numbered and presented to the client in the draft verification report.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is verified. This is to ensure a transparent verification process.

Verification Checklist Table 2: Requirement checklist				
Checklist Question	Reference	Comment	Draft Conclusion	Final Conclusion
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is	Gives reference to documents where	The section is used to elaborate and discuss the checklist question and/or	Conclusions are presented based on the assessment of the first MR version. This is either acceptable based on evidence provided (OK), or a Corrective Action Request	Conclusions are presented in the same manner based on the assessment of the final MR version

organized in several different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	the answer to the checklist question or item is found.	the conformance to the question. It is further used to explain the conclusions reached.	(CAR) due to non-compliance with the checklist question (See below). Clarification is used when the audit team has identified a need for further clarification. Forward action request to highlight issues related to project implementation that requires review during the further verifications.	and further documents including assumptions presented in the documentation.

Verification Checklist Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	Ref. to checklist question in table 1&2	Summary of project owner response	Validation/Verification conclusion
If the conclusions from the draft verification are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 1&2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the Client or other project participants during the communications with the audit team should be summarized in this section.	This section should summarize the audit team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

Appointment of the audit team

Appointment of the audit 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 audit 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 is covered by the audit team.

Selection of Audit team as below:

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience
Dr. Atul Takarkhede	LA	YES	YES	YES	YES
Mr. Denny Xue	TR	YES	YES	NA	NA

The detail regarding the audit 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 03 dated 05/04/2017 and Final Validation report version 02 dated 05/04/2017, Registered CDM PDD version 2 dated 14/08/2015 (Revised for post registration changes) & Final CDM Validation report version 2.5 dated 29/11/2012, CDM 1st Verification FVR Version 01 dated 07/09/2015, CDM 2nd Verification FVR Version 01 dated 15/06/2016 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 3 submitted by PP on 30/04/2018 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.	Dabhole	Vinayak	Site Engineer	14/04/2018	Implementation of the project, monitoring and emission reduction calculations	Dr. Atul Takarkhede
2.	Jadav	Ajay	Site Engineer	14/04/2018		

2.4 Site Inspections

Duration of on-site inspection: 14/04/2018				
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.	Satara District, Maharashtra	14/04/2018	Dr. Atul Takarkhede

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.

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Areas of validation and verification findings	No. of CL	No. of CAR	No. of FAR
Project design document and Monitoring report	00	00	01
Description of project activity	00	02	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
- 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	01	00
-Calibration details	00	00	00
- Monitoring plan	00	00	00
Others (please specify)	00	00	00
Total	**00**	**03**	**01**

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

2.5.1 Forward Action Requests

This is 2nd periodic VCS verification of the project activity and FAR open from 2nd CDM verification[3]. Resolution of the same is presented in Appendix 2 of this report. However, same is open for subsequent verification.

2.6 Eligibility for Validation Activities

This section is not applicable as the project has undergone verification only.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The Project has applied for the CDM under the Kyoto protocol and registered with CDM having UNFCCC ref number as UN8524[4]. CERs for the period 05/12/2012 – 01/05/2015 & 02/05/2015 – 01/04/2016 are

[3] https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/iProcess/Applus1461150700.65/view

[4] https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/view

already issued as per UNFCCC website. The project activity is registered with VCS and [5] VCUs for the monitoring period 02/04/2016 to 01/03/2017 are issued. PP is claiming VCUs for 02/03/2017 to 28/02/2018 (including both days) during this monitoring period. A self-declaration letter from project proponent addressing that the project does not yield any green benefits / renewable energy certificates and has not claimed emission reductions under any other GHG program for the verification period (02/03/2017 to 28/02/2018) has been provided.

3.2 Methodology Deviations

Not applicable.

3.3 Project Description Deviations

When starting date of current monitoring period is not matching with the Credit note provided by the MSEDCL, apportioning is being carried out for that month and the procedure is mentioned below:

Net Export during the specific period = (Export value for complete billing cycle x apportioning ratio for that specific period)

Where, Apportioning Ratio = Controlled export during the days which are specific monitoring period of that month/ total controlled export during the complete billing cycle same month.

The same approach found to be appropriate and conservative, hence accepted by audit team.

3.4 Grouped Project

Not applicable.

[5] http://vcsprojectdatabase.org/#/project_details/1671

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

The project activity, "Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India" was registered as a CDM project on 05/12/2012 (UNFCCC Ref No.8524) applying the methodology ACM0002 - Version 12.3.0. The WTGs of the project activity are owned by the Project Proponent, i.e. Panama Wind Energy Private Limited, which was verified from commissioning certificate and the PPA for the project activity.

The project activity involves an installation of 63 Wind Turbine Generators (WTGs) of total generating capacity of 100.8 MW (63×1.6 MW) of GE make. But till date only 45 WTGs (72 MW) have only been commissioned. Remaining are planned to be installed after signing of PPA with State Utility. WTG (WTG 49) is not operational since 2014 due to technical issues. The WTG units are installed in Satara district in the state of Maharashtra and the electricity generated is exported to NEWNE grid of India. Verification team confirmed from the registered PD and on-site visit that the location of the project activity including the coordinates is same as mentioned in the registered CDM PDD.

The project boundary includes the electricity generation equipment at the site and Nerale village sub-station and the NEWNE grid.

The ex-ante fixed grid emission factor of 0.9486 tCO_2/MWh has been used for the baseline emission calculation which is line with the registered CDM PDD.

By comparing the actual ER claimed in this monitoring period with the estimate in the registered VCS PD (132,686 tCO_2e for the monitoring period estimated[6] for 45 WTGs), the actual emission reductions (122,235 tCO_2e for the monitoring period) are lower than by 7.88% what is stated in the registered VCS PD which surely will not lead to the overestimation of VERs.

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 12.3.0. 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 22/02/2013. The Project has applied for the CDM under the Kyoto protocol and registered with CDM having UNFCCC ref number as UN8524[7]. CERs for the period 05/12/2012 – 01/05/2015 & 02/05/2015 – 01/04/2016 are already issued as per UNFCCC website. The project activity will avail GHG emissions reductions for only one program i.e. VCS[8] and there will not be any double accounting for the same.

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[6] As per the VCS PD estimated ER for 63 WTGs (100.8 MW capacity) are 186,270 tCO_2e.

[7] https://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/view

[8] http://www.vcsprojectdatabase.org/#/project_details/1671

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 inclusion of first & last date of the monitoring period and was successfully closed by appropriate revision in MR. Further; CAR 02 was raised for the open FAR during previous 2nd CDM verification. PP has submitted revised MR with appropriate justification for non-implementation of 18 WTGs, however FAR is open for subsequent verifications till commissioning of all WTGs as per registered CDM PDD & VCS PD.

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 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 0.9486 tCO_2/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:- $BE_{y} = EF_{CO2, grid, y} * EG_{BL, y}$ Where: BE_y = Baseline emissions in year *y* (t CO_2/yr) $EG_{BL, y}$ = 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) $EF_{CO2, grid, y}$ = Combined margin CO_2 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" (t CO_2/MWh) $EG_{BL, y}$ **=** 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 12.3.0, 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 12.3.0, 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	No CAR/CL raised for the section.
Conclusion	The metering arrangement is tri-vector bi-directional energy meters of Elster 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 of the 4 feeders by the project proponent and respective electricity distribution company (MSEDCL).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 three years. However, Meters are usually calibrated yearly 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 3 years is complied. The break down log is checked and there is no major breakdown during the monitoring period except WTG 49. 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	
1.	Not applicable	Not applicable	Not applicable	Not applicable

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. 1533 dtd. 14/09/2006[9]) & 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 form the registered CDM PDD/VCS PD. Audit team confirmed the same during the verification site visit.

[9] envfor.nic.in/legis/eia/so1533.pdf

6 VERIFICATION CONCLUSION

LGAI Technological Center S.A. (Applus+ Certification) has been engaged by Panama Wind Energy Private Limited to perform the 2nd periodical verification of the "Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India"

The Panama Wind Energy 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 12.3.0.

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.

Verification period: 02/03/2017 to 28/02/2018 (including both days)

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

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
02/03/2017 to 31/12/2017	117,297	0	0	117,297
01/01/2018 to 28/02/2018	4,938	0	0	4,938
Total	**122,235**	**0**	**0**	**122,235**

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	Registered CDM PDD (Revised for post registration changes)	version 2 dated 14/08/2015	UNFCCC
6.	NA	Final CDM Validation report	version 2.5 dated 29/11/2012	UNFCCC
7.	NA	CDM 1st Verification MR	Version 01 dated 28/08/2015	
8.	NA	CDM 1st Verification FVR	Version 01 dated 07/09/2015	
9.	NA	CDM 2nd Verification MR	Version 02 dated 02/06/2016	
10.	NA	CDM 2nd Verification FVR	Version 01 dated 15/06/2016	
11.	NA	VCS PD	Version 03 dated 05/04/2017	Project participant
12.	NA	Final VCS GAP Validation & 1st Verification report	version 02 dated 05/04/2017	Project participant
13.	NA	Final Monitoring report for 1st verification	Version 02 Dated 23/03/2017	Project participant
14.	NA	The operational lifetime of the project activity from the manufacturer=(Technical specefications)	Manufacturer technical specifications	Project participant
15.	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
16.	NA	Tools/ guidelines used in the project activity • CDM Methodology ACM0002 - Version 12.3.0 • 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 • Glossary of CDM terms version 07	UNFCCC CDM web site	UNFCCC

No.	Author	Title	References to the document	Provider
		• VCS verification report template version 03.4		
17.	NA	JMR records for the complete monitoring period	JMR records	Project participant
18.	NA	MR version 1 MR version 2 MR version 3	03/04/2018 17/04/2018 30/04/2018	Project participant
19.	NA	Emission Calculation sheet version 01 Emission Calculation sheet version 02 Emission Calculation sheet version 03	03/04/2018 17/04/2018 30/04/2018	Project participant
20.	NA	Invoices for the complete monitoring period	Invoice	Project participant
21.	NA	Break down details of the complete monitoring period	Log sheet	Project participant
22.	NA	Self-Declaration from PP for not participating/claiming other emission reduction programme	Declaration	Project participant

APPENDIX 2: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS & FARWARD ACTION REQUEST (CL/ CAR/FAR)

Project Implementation Status

CL ID		**Section no.**		**Date:**
Description of CAR				
Project participant response				**Date:**
Documentation provided by project participant				
DOE assessment				**Date:**

CAR ID	01	**Section no.**	VCS MR	**Date:** 15/04/2018
Description of CAR				
MR not consistent about inclusion of first & last days of monitoring period.				
Project participant response				**Date:** 17/04/2018
Date inclusion statement has been included in the MR				
Documentation provided by project participant				
MR V2				
DOE assessment				**Date:**
Corrections have been carried out in MR appropriately. CAR closed.				

CAR ID	02	**Section no.**	1.1 of MR	**Date:** 15/04/2018
Description of CAR				
FAR open from 2nd CDM verification: During this verification it was observed that out of the proposed 63 WTGs only 45 WTGs has been commissioned and further 18 WTGs referring to the project is still under the implementation stage. FAR is open. PP requested provide status of forest clearance required for installation of remaining WTGs.				
Project participant response				**Date:** 17/04/2018
The Maharashtra State Electricity Distribution Company Limited (MSEDCL), the main power utility, has halted the signing power purchase agreements with wind developers due to its own administrative reasons. When the signing of PPA restarts, the uncommission part would be executed. The PP has obtained all the prerequisite approvals along with the forest clearances. There is no any impact on project due to non-commissioning of 18 WEGs of project activity and emissions reductions are calculated based on commissioned WEGs.				
Documentation provided by project participant				
MR V2				
DOE assessment				**Date:**
Reason for non-implementation of 18 WTGs is explained appropriately. CAR closed however FAR is still open for subsequent verification till commissioning of all WTGs.				

Accuracy of GHG Emission Reduction and Removal Calculations

CAR ID	03	**Section no.**	3.2 & 3.3 of MR	**Date:** 15/04/2018
Description of CAR				
As monitoring period is not matching with JMR period for the month of March 2017, apportioned values are used. PP requested to provide details of the apportioning procedure & conservative approach				

adopted and also deviation with VCS-PD.	
Project participant response	**Date:** 17/04/2018
Apportioning procedure has been followed due to mismatch of monitoring period and billing cycle period and daily generation ratio has been appropriately applied. This has been mentioned as deviation and been updated in the section 2.2.2.	
Documentation provided by project participant	
MR V2	
DOE assessment	**Date:**
The apportioning approach resulted in the conservative estimation of Net Export, hence accepted by verification team. CAR closed.	

FAR ID	01	**Section no.**	1.1 of MR	**Date:** 15/04/2018
Description of FAR				
FAR open from 2nd CDM verification: During this verification it was observed that out of the proposed 63 WTGs only 45 WTGs have been commissioned and further 18 WTGs referring to the project are still under the implementation stage. FAR is open. PP requested to provide status of forest clearance required for installation of remaining WTGs.				
Project participant response				**Date:**
Documentation provided by project participant				
DOE assessment				**Date:**

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.	Team Leader/Lead Assessor	OR	Takarkhede	Dr. Atul	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	Xue	Hanshen (Denny)	LGAI Technological Center S.A. (Applus+ Certification)
2.	Approver	IR	Sendin	Juan	LGAI Technological Center S.A. (Applus+ Certification) B.U. Managing Director

Short CVs of the Team:

1. Dr. Atul Takarkhede counts with 9 years of experience in field of Environmental Auditing, consulting and accreditation. He is an Expert in ISO 9001-14001, CO_2/GHG Reporting, Carbon Foot Print, Energy, Water and Waste Management Reporting for organizations environmental performance. His professional portfolio is mainly related with carrying out EIA, conducting QA/QC of EIA Reports; Conducting Environmental/water Audits; NABET requirements appliance. Furthermore, he counts with solid experience on CDM-VCS-GS consultancy and auditing. He has Ph.D. (Environmental Science) from Institute of Science, RTM Nagpur University, Nagpur, and he has already published different technical reports related to environmental science.

2. Mr. Hanshen (Denny) Xue (Master Degree in Environmental Engineering, Bachelor Degree in Thermal Engineering) is an Auditor appointed by LGAI Technological Center S.A. (Applus+ Certification) for the GHG project assessment. He is based on Shanghai. He has 1.5 years of work experiences in CDM project development. Before he joined LGAI Technological Center S.A. (Applus+ Certification), he has been worked for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

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
JMR	Joint Metering reading
PP	Project Participant

APPENDIX 5: CALIBRATION DETAILS OF THE METERS

Calibration Details of the WTGs installed in the project activity is provided below:

Details	Calibration details of the meters at Feeder No. 1			
Type of meter	**Main Meter**		**Check Meter**	
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 1 - 7304			
WTG Connected	Location no: 4, 8-13, 49			
Accuracy class	0.2 s		0.2 s	
Meter Make	Elster		Elster	
Meter Sr. No.	16595568		13813597	
Date of calibration	03/06/2016	08/06/2017	03/06/2016	08/06/2017
Calibration Compliance	Yes		Yes	

Details	Calibration details of the meters at Feeder No. 2			
Type of meter	**Main Meter**		**Check Meter**	
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 2 - 7305			
WTG Connected	Location no: 14-17, 19-20, 22-23, 25-28, 34,38,43			
Accuracy class	0.2 s		0.2 s	
Meter Make	Elster		Elster	
Meter Sr. No.	16595569		13813601	
Date of calibration	03/06/2016	08/06/2017	03/06/2016	08/06/2017
Calibration Compliance	Yes		Yes	

Details	Calibration details of the meters at Feeder No. 3			
Type of meter	**Main Meter**		**Check Meter**	
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 3 – 7308			
WTG Connected	Location no: 5-6, 32, 40-42, 45-48			
Accuracy class	0.2 s		0.2 s	
Meter Make	Elster		Elster	
Meter Sr. No.	13813600 till 23/06/2016 and 13813599 from 23/06/2016 onwards		13132610	
Date of calibration	23/06/2016	08/06/2017	03/06/2016	08/06/2017
Calibration Compliance	Yes		Yes	

Details	Calibration details of the meters at Feeder No. 4			
Type of meter	**Main Meter**		**Check Meter**	
Location	220/33kV Palshi (Nerale) S/Stn. Feeder No. 4 - 7309			
WTG Connected	Location no: 7,18,31,37,50-52,55-56,61-63			
Accuracy class	0.2 s		0.2 s	
Meter Make	Elster		Elster	
Meter Sr. No.	13132640		13813602	
Date of calibration	03/06/2016	08/06/2017	03/06/2016	08/06/2017
Calibration Compliance	Yes		Yes	