VCS VERIFICATION REPORT

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

Document Prepared By:

Carbon Check (India) Private Ltd.

Project Title	Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India (CDM Reference number 8524)
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Summary:

Carbon Check (India) Private Ltd. (CCIPL) has been contracted by Panama Wind Energy Private Limited, the project proponent, to carry out the gap validation and verification of voluntary greenhouse gas emission reductions generated by the project "Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India". The gap validation and verification is based on the desk review of the VCS PD /13/, CDM registered PDD (UNFCCC Ref. 8524) /B01/ and the corresponding validation report /B01/, Monitoring report /2/, supporting emission reduction calculation spread sheet /4/ and other relevant supporting documents made available to the verification team by the project proponent accompanied by a site visit and subsequent interview. This verification involves the period of 02/04/2016 to 01/03/2017 (including both the days).

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 achieved an emission reductions of 134,368 tCO_2e for the monitoring period by displacing 141,649.263 MWh amount of electricity from the generation-mix of power plants connected to the NEWNE regional grid, which is mainly dominated by thermal/fossil fuel based power plant.

The purpose of the verification is to review the monitoring results and verify that monitoring methodology was implemented according to monitoring plan and monitoring data, used to confirm the reductions in anthropogenic emissions by sources is sufficient, definitive and presented in a concise and transparent manner. In particular, monitoring plan, monitoring report and the project's compliance with relevant VCS, UNFCCC and host Party criteria are verified in order to confirm that the project has been implemented in accordance with previously registered design and conservative assumptions, as documented.

The CDM approved methodology ACM 0002, Version 12 has been applied.

A risk based approach has been followed to perform this verification. In the course of the verification, 01 Corrective Action Requests (CARs) and 03 Clarification Requests (CLs) were raised. No Forward Action Request was raised. All the CARs and CLs were successfully closed.

In Carbon Check's opinion, the emission reductions reported for the "Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India" in the monitoring report are fairly and correctly stated. CCIPL is therefore able to certify that the emission reductions from the "Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India" during the period from 02/04/2016 to 01/03/2017, amount to 134,368 tCO_2 equivalent.

CCIPL does not assume any responsibility towards the issuance and utilisation of VCUs hereby verified and certified. Request for issuance of VCUs shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration. The verification of reported emission reductions is based on the information made available to CCIPL and the engagement conditions detailed in this report. Hence, CCIPL cannot be held liable by any party for decisions made or not made based on this report.

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1 INTRODUCTION

1.1 Objective

Carbon Check (India) Private Ltd. has been contracted by Panama Wind Energy Private Limited, the project proponent (PP), to undertake the verification of the project titled “Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India” for the period of 02/04/2016 to 01/03/2017 (including both the days). Through the verification activities, it is being confirmed that:

- the project is implemented as described in the CDM registered PDD;
- the monitoring system is implemented and fully functional to generate Verified Carbon Units (VCUs) without any double counting; and
- the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reductions calculation.

The verification followed the requirements of the current version of the VCS Standard Version 3.6 and VCS program guide 3.6 /B04/ to ensure the quality and consistency of the verification work and the report.

1.2 Scope and Criteria

The verification of this project is based on the registered CDM PDD /B01/, the Monitoring Report of this monitoring period /2/, emission reduction calculation spread sheet /4/, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment. Furthermore, publicly available information was considered as far as available and required.

Carbon Check has employed a risk-based approach in the verification, focusing on the identification of significant risks and reliability of project monitoring and generation of emission reductions.

The verification is carried out on the basis of the following requirements, applicable for this project activity:

- VCS Standard /B04/
- VCS Program Guide /B04/
- VCS Validation and Verification Manual /B04/,
- Approved CDM methodologies ACM0002: Grid-connected electricity generation from renewable sources - Version 12.0) /B02/
- Other relevant rules, including the host country legislation

The scope of this verification, by independent checking of objective evidence, is as follows:

- To verify that the project is implemented as described in the project description and the CDM PDD /B01/

- To assess the project's compliance with other relevant rules including the host country legislation.
- To assess the implementation of the monitoring plan content as mentioned in the registered PDD /B01/
- To confirm that the monitoring system is implemented and fully functional to generate voluntary emission reductions (VERs/VCUs) without any double counting and
- To establish that the data reported are accurate, complete, consistent, transparent and free of material error or omission by checking the monitoring records and the emissions reduction calculation /4/.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.
- The verification shall ensure that the reported emission reductions are complete and accurate in order to be certified.

The method and criteria used for verification consisted of the following phases:

1. Completeness check and desk review:
2. On site visit;
3. Resolution of outstanding issues and issuance of final verification report and applicable VCS Verification Deed of Representation.

CCIPL conducts all its work under strict rules to safeguard impartiality and ensure the independence of the verification team. The verification does not provide any consulting or recommendations for the client. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the monitoring activities.

1.3 Level of Assurance

The verification report is based on registered CDM PDD /B01/, Monitoring report /2/, supporting documents made available to the verifier and information collected through performing interviews and during the on-site assessment.

The verification has been planned and organised to achieve a

- ☒ Reasonable level of assurance as per VCS standard 3.6.
- ☐ Limited level of assurance

1.4 Summary Description of the Project

The project activity involves installation of 63 numbers of WTGs having installed /rated capacity of 1.6 MW each aggregating to 100.8 MW. However, till now only 45 WTGs have been installed and in operation. The WTGs are located in the Satara district of Maharashtra state in India. All the WTGs are of GE make. Commissioning dates of WTGs of the project activity were in between 22/02/2013 to 13/02/2014 as stated in section 1.5 of the MR /2/. Hence the VCS start date is considered as the earliest among these dates, i.e. 22/02/2013. These dates have been verified from the commissioning certificates issued by MSEB /5/.

Section 4.1.5 2) (a) (i) of VCS procedural document "Registration and Issuance Process: VCS Version 3", dated 19 October 2016, version 3.7, states "The other GHG program validation (or verification, where the approved GHG program does not have a validation step) or VCS validation shall be completed within two years of the project start date". The CDM validation report date for this project activity, as per UNFCCC project page is 29/11/2012 which can be treated as validation completion date and is within the two years of project start date i.e. 22/02/2013 /B02/. Hence the project activity complies with the above referred VCSA requirement. Furthermore, under VCS, the PP is claiming emission reductions under VCS) for the period from 02/04/2016 to 01/03/2017. PP will not be claiming either CDM credits or any other credits for this period and hence there is no overlap for claim of emission reductions in between VCS program and the other GHG program, i.e. CDM.

The project activity has been implemented as described in the registered CDM PDD in particular sections A.2, A.4.2 and B.7 of the CDM PDD. As per paragraph 3.11.1 of "VCS Standard: VCS Version 3", dated 19 October 2016, version 3.6, the requirements with respect to evidencing proof of "Right of Use" the validated documents, i.e. Letter of Approval /B07/, is matching with the evidencing proof for Right of Use "a right of use arising or granted under statute, regulation or decree by a competent authority" i.e. the right of PP to use the emission reductions arising due to this project activity.

During the reported monitoring period 02/04/2016 to 01/03/2017 (including both days), the project activity supplied 141,649.263 MWh of net electricity to the integrated NEWNE grid, which forms the basis of emission reductions calculation. The validated ex-ante grid emission factor value 0.9486 tCO_2/MWh for NEWNE grid, is applied for the calculation of baseline emissions and emission reductions for this monitoring period. The applied approved CDM methodology is ACM0002, version 12. The baseline emissions and thus emission reductions during this monitoring period are 134,368 tCO_2e.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The method and criteria used for verification:

The verification consists of the following three phases:

1. Completeness check and desk review of the validation report, monitoring plan, monitoring report, monitoring methodology, registered CDM PDD, VCS PD, applicable tools in particular attention to the frequency of measurements, quality of metering equipment's including calibration requirements, QA/QC procedures and other relevant documents;

2. On-site visit (including follow-up interviews with project stakeholders, when deemed necessary). The on-site assignment includes the following;
   - An assignment of implementation and operation of project activity with respect to validated CDM PDD and VCS PD;
   - Review of information flows for generating, aggregating and reporting the monitoring parameters;
   - Interview with relevant personals to determine whether the operational and data collection procedures are implemented and in accordance with monitoring plan of the validated CD PDD and VCS PD;
   - Cross check of information and data provided in the monitoring report with plant logbooks, inventories, purchase records or similar data sources;
   - Check of monitoring equipment's, calibration frequency and monitoring practice in-line with methodology and validated CDM PDD and VCS PD;
   - Review of assumptions made in calculating the emission reductions;
   - Implementation of QA/QC procedure in-line with the validated CDM PDD and VCS PD and methodology requirement.

3. Resolution of outstanding issues and the issuance of the final Verification report and if applicable the VCS Verification Deed of Representation.

2.2 Document Review

During the document review, CCIPL has applied standard auditing techniques to assess the quality of information provided. The verification was performed primarily based on the review of the monitoring report and the supporting documentation. This process included:

- a review of data and information presented by the PP to verify their completeness
- a review of the MP and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the QA/QC procedures, and
- an evaluation of data management and the QA/QC system in the context of their influence on the generation and reporting of ERs.

The monitoring report version 01 dated 17/03/2017 /1/ was initially reviewed and CCIPL requested the PP to present the supporting information and documents. The documents reviewed by CCIPL are listed below. Through the process of the verification, the revised monitoring report and the supporting documents were evaluated to confirm the actions taken by the PP to the CARs and CLs issued by the verification team.

The following table outlines the documentation reviewed during the verification:

Category A documents (documents from the PP)

/1/	Monitoring Report, version 01, dated 17/03/2017 (published MR)
/2/	Final Monitoring Report, version 02, dated 23/03/2017
/3/	Emission reduction spreadsheet corresponding to /1/
/4/	Emission reduction spreadsheet corresponding to /2/
/5/	Commissioning certificates of the 45 WTGs of the project
/6/	Technical specifications of the project WTGs including operation and maintenance manual
/7/	Copy of PPA
/8/	Training records
/9/	Joint meter readings / Credit notes for the monitoring period
/10/	Invoices raised by the PP to MSEB for the monitoring period
/11/	Calibration certificates for the electricity meters used during the monitoring period for all the four feeders
/12/	Plant breakdown / shutdown records
/13/	• VCS Project Description (VCS PD) for completed clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13, version 01 dated 17/03/2017 • VCS Project Description (VCS PD) for completed clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13, version 02 dated 23/03/2017
/14/	Evidence for the start date of project activity as 22/02/2013
/15/	Right of Use: LoA for the project activity (available on UNFCCC web site project page issued by the Designated National Authority of Uganda: http://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1367560620.84/view
/16/	Declaration from PP for the statement "…*not sought or received another form of GHG-related environmental credit, including renewable energy certificates. The project is neither rejected under any other GHG-related environmental credit and the related program*" in section 1.9 of the Monitoring report.

Category B documents (other documents referenced)

/B01/	CDM Registered PDD, version 2.0, 14/08/2015 and the corresponding validation report
/B02/	Documents related to previous two CDM monitoring periods as available on the project page on UNFCCC web site of project number 8524
/B03/	Approved CDM monitoring methodology: ACM0002: Grid-connected electricity generation from renewable sources - Version 12.0
/B04/	VCS Requirements: • Verified Carbon Standard Program Guide, v3.6; • Verified Carbon Standard, v3.6; • VCS Program Definitions, Ver. 3.6
/B05/	CDM Validation and Verification Standard, version 09.0 CDM Project Standard, version 09.0
/B06/	Project page on UNFCCC web site for the project activity: http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/view
/B07/	LoA for the project activity (available on UNFCCC web site project page issued by the Designated National Authority of Uganda:

	http://cdm.unfccc.int/Projects/DB/LRQA%20Ltd1354531234.95/view

2.3 Interviews

The detail of the on-site assessment is as follows:

Date	Location	Team Members on site	Subjects covered	Persons interviewed
23/03/2017	Project site	Sanjay Kumar Agarwalla	• Project implementation and management • Site tour • Confirmation of technical specifications of the project WTGs • Data management and reporting systems • Data verification • QA/QC, management systems, calibration, training • Data archiving	1. Ram Krishna Patil (through skype) 2. Jitendra Patil 3. Vinayak Dabhole 4. Shivaji Surve 5. Swapnil Desai 6. Ajay Jadav 7. S S Bhosale

2.4 Site Inspections

Carbon Check has conducted on-site inspection in order to confirm all physical features of the project activity proposed in the registered CDM PD are in place and that the project proponent has operated and correctly monitored all parameters of the project activity as per the registered PD during this monitoring period.

An on-site assessment was conducted on 23/03/2017 as a part of verification activity which involved:

1) An assessment of the implementation and operation of the project activity as per the registered CDM PDD
2) A review of information flows for generating, aggregating and reporting of the monitoring parameters
3) Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the MP
4) A cross-check between information provided in the MR and data from other sources
5) A check of the monitoring equipment including calibration performance, and observations of monitoring practices against the requirements of the CDM PDD and the applied monitoring methodology
6) A review of calculations and assumptions made in determining the GHG data and ERs, and
7) An identification of QA/QC procedures in place to prevent, or identify and correct, any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

Carbon Check, during this verification, identified issues related to the monitoring, implementation or operation of the VCS project that could impair the capacity of the proposed VCS project to achieve emission reductions or influence the reporting of emission reductions. Carbon Check has identified, discussed these issues within the Verification report in Appendix B.

- Clarification requests (CLs): Project reporting lacks transparency and further information is needed to determine if a material discrepancy is present.

- Corrective action requests (CARs): The VVB has identified a material discrepancy or non-conformance that the project proponent must address.

The verification team identified 01 CAR and 03 CLs. All CARs and CLs raised by Carbon Check during this verification have been resolved. If this was not completed, the ERs cannot be certified and recommended for issuance to the VCS Registry.

2.5.1 Forward Action Requests

Forward Action Request (FAR) is to be raised when the monitoring and reporting require attention and / or adjustment for the next verification period. FARs does not relate to VCS requirements for issuance of ERs achieved during the subject monitoring.

Carbon Check has not raised any FAR during this verification.

2.6 Eligibility for Validation Activities

The project activity falls under sectoral scopes 1 and the Carbon Check is accredited for validation / verification of project activities under this scope.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

This is a registered CDM project activity by UNFCCC (Reference number 8524) validated by the DOE "Lloyd's Register Quality Assurance Limited". The validation report was issued on 29/11/2012 and the project was registered by UNFCCC on 05/12/2012.

UNFCCC Clean Development Mechanism is approved by VCS Program and meets VCS criteria. As the project has been validated under CDM, validation of only the clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS PD as per VCS Version 3 were carried out as below:

1.2: Sectoral Scope and Project Type

According to the VCS version 3.3 Guidelines and the list of Sectoral Scopes of the UNFCCC, the project is applicable under the following activity categories:

According to Annex A of the Kyoto Protocol, the project is applicable under the sectoral scope 1
- Energy Industries (renewable/ non-renewable sources) and

1.3: Project Proponent

Panama Wind Energy Private Limited is the Project Proponent for the project activity.

1.5: Project Start Date

The start date of the project activity is 22/02/2013 as verified from the WTGs commissioning dates /5/ and this has been considered as start date for the project activity.

1.6: Project Crediting Period

The CDM crediting period of the project activity is from 05/12/2012 to 04/12/2022 which has also been considered as the VCS crediting period.

1.7: Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	√
Large project	

Estimated GHG emission reductions as per the registered PDD are 186,270 tCO_2e/annum.

1.9: Project Location

The project is located in Satara district of Maharashtra State in India.

1.10: Conditions Prior to Project Initiation

Prior to the implementation of the project activity, electricity was generated in NEWNE grid which is majorly fossil fuel based. Since, the wind power is Green House Gas (GHG) emissions free, the power generated will prevent the anthropogenic GHG emissions generated by the fossil fuel based thermal power stations comprising fossil fuels.

1.12.1: Right of Use

Evidence of Right of Use has been demonstrated by the right of PP to use the emission reductions arising due to this project activity provided by the LoA /B07/.

1.12.2: Emissions Trading Programs and Other Binding Limits

This is not applicable as the project is registered by UNFCCC Registration Reference number – 8524 and is approved by the DNA.

1.12.3: Other Forms of Environmental Credit

The project is located in India and is developed and operated by Panama Wind Energy Private Limited. There is no other environmental credit which has or will be produced by or obtained for the project. 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 (02/04/2016 to 01/03/2017) has been provided /16/.

1.12.4: Participation under Other GHG Programs

The project has been registered as a CDM project, and it does not fall into rejected projects under any other GHG programs. The reference number of the project with UNFCCC is 8524.

1.13: Additional Information Relevant to the Project

No such additional requirement is relevant to the project that needs to be provided and verified by CCIPL.

Hence the project activity meets the criteria of the clauses 1.2, 1.3, 1.5, 1.6, 1.7, 1.9, 1.10, 1.12.1, 1.12.2, 1.12.3, 1.12.4 and 1.13 of the VCS PD as per VCS Version 3 and is likely to achieve the estimated emission reductions.

3.2 Methodology Deviations

Not applicable

3.3 Project Description Deviations

Not applicable

3.4 Grouped Project

This is not a grouped project

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, "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" /B03/. 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 and the rest 18 WTGs are expected to be commissioned in the Financial year 2017-18. 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.

Comparison of monitored data in MR and in the registered CDM PDD is as follows:

Sr. No.	Parameter	Symbol	Value in PD	Actual value as in MR for the Monitoring period

1.	Quantity of net electricity generation supplied by the project plan/unit to the grid	$EG_{facility,y}$	128,347 MWh (this corresponds to the monitoring period from 02/04/2016 to 01/03/2017)	141,649.263 MWh
2.	Emission reductions	tCO_2e	121,740 tCO_2e (this corresponds to the monitoring period from 02/04/2016 to 01/03/2017)	134,368 tCO_2e

The net electricity supplied to the grid and also the emission reductions during the monitoring period are higher during the monitoring period (10.36%) due to higher plf achieved. The verification team deemed this marginal increase in ERs which is not in the control of the PP.

No change from the registered CDM PDD of physical features which may impact the emission reductions of the project activity has been identified. The verification team confirms all the physical features of the project activity in the registered CDM PDD are in place.

The monitoring plan in the registered PDD requires monitoring of the net energy exported to the grid. The value of the monitoring parameter is indicated appropriately in the section 3.2 of the Monitoring report as per the registered CDM PDD. The verification team confirms that the data were generated at the required frequency as per the monitoring plan in the registered PDD. It was confirmed that the information of the meters were consistent with that described in the MR through physical observation and document review.

Measurement of electricity generated by the project activity is done at the substation meters at four feeders by a set of main and check meters for each feeder. The meters are bidirectional type trivector meter. These meters were used to measure the electricity export and import on continuous basis and are in custody of MSEDCL. The main meter reading is considered for the calculation net electricity supplied to the grid. The check meter is also installed for purpose of any fault in main meter or any other technical failure. The check meter reading is considered in case of any failure of main meter. During this monitoring period no incidence of main meter failure was found.

Joint meter readings (JMRs) are taken once each month in presence of the representative of PP and MSEB personnel. Based on these JMRs, credit notes are issued and PP raised invoices to the State Utility. The JMRs / Credit Notes and also forms the basis of emission reductions calculation during this monitoring period. Verification team has cross-checked the net electricity supplied to the grid by the WTG of the project activity with the monthly invoices raised by the PP to state electricity company. This cross-check reveals that there is no discrepancy between the values of the net electricity supplied to the grid by the WTG of the project activity reported in the Credit notes and the invoices.

During the on-site verification, QA/QC procedures were identified which demonstrate that: operation management regulations of the power plant were in place; all meters were calibrated; electricity data was crosschecked; data was archived electronically; emergency procedures were in place; and all operational staff were trained before taking up positions. The verification team thus confirmed that the monitoring of the project activity has been implemented in accordance with the monitoring plan in the registered PDD.

The accuracy of substation energy meters is 0.2s. The energy meters are to be calibrated once in three years as per the registered PDD. Calibrations of all the energy meters was properly done as per the registered monitoring plan and frequency.

The monitoring plan is in accordance with the UNFCCC approved methodology ACM0002, version 12. All the data is collected and archived in accordance with the methodology and included in the monitoring plan.

The team confirms that the calculation of the emission reductions following the applied methodology has been correctly done.

Base line emissions:

As per the registered PDD and the applied methodology, the baseline is the energy supplied by the renewable generating unit (Net saleable energy) multiplied by the emission coefficient (Emission Factor of the grid).

Baseline emission=Net saleable energy X Emission factor of the grid

Project emissions:
Project emissions and leakage emissions are considered nil as per the applied methodology.

Leakage emissions:
As per the applied methodology leakage are not considered for the project activity.

Since the project emission and the leakage emissions are nil, the emission reductions by the project activity is the same as the baseline emissions.

The verification team confirms that the project activity leads to sustainable development contributions of the host country.

There is no material discrepancy found between the information in the PDD, MR and related supporting document and the monitoring system of the project activity. Hence the verification team confirms that the project has been implemented as described in the project description in the registered CDM PDD.

4.2 Accuracy of GHG Emission Reduction and Removal Calculations

Emission Reductions Due to Project Activity

Emission reductions = Baseline emission – Project emission – Leakage

Being a wind energy project, the project activity does not lead to any form of emission; Hence Project Emission (PEy) =0.

Also the leakage for the project activity is nil as per the registered PD and the applied methodology. Hence Leakage (Ly) =0

So, Emission Reductions = Baseline Emissions

According to the registered PD and the MR, the baseline emissions for the project activity have been calculated as:

$BEy = EG_{facility,y} * EF_y$

Where, BEy = Baseline emissions,

$EG_{facility,y}$ = Net electricity supplied to the grid

EF_y = Grid emission factor

Monitoring parameter and calibration checklist:

<table>
<tr><th colspan="2">Data / Parameter (as in the MP)</th><th>$EG_{facility,y}$ <Net Electricity exported to grid></th></tr>
<tr><td rowspan="2">Value</td><td>Ex ante</td><td>128,347.06 MWh (for the monitoring period)</td></tr>
<tr><td>Ex-post</td><td>141,649.26 MWh</td></tr>
<tr><td colspan="2">Measuring frequency</td><td>Continuously</td></tr>
<tr><td colspan="2">Reporting frequency</td><td>Monthly</td></tr>
<tr><td colspan="2">Is the measuring and reporting frequency in line with the MP and the Monitoring Methodology?</td><td>Yes</td></tr>
<tr><td colspan="2">Recording (Manually / electronically)</td><td>Manually and electronically</td></tr>
<tr><td colspan="2">QA/QC How are values verified? (Cross-checked, double-checked,)</td><td>Invoices prepared by the PP / Daily generation readings for the WTGs</td></tr>
<tr><td colspan="2">Type of Monitoring Equipment and Identification number or Reference in the PDD</td><td>Monitoring equipment: Electronic tri-vector meters</td></tr>
<tr><td colspan="2">Is accuracy of the monitoring equipment as stated in the PDD? If not stated in the PDD, does it represent good monitoring practices?</td><td>Yes.
Accuracy of the substation meters is stated as 0.2s in the PDD which was confirmed from the site visit.</td></tr>
<tr><td colspan="2">Period of operating time</td><td>02/04/2016 to 01/03/2017</td></tr>
<tr><td colspan="2">Instrument type</td><td>Bi-directional trivector energy meter</td></tr>
<tr><td colspan="2">Manufacturer, model and serial number</td><td>
<table>
<tr><th>Feeder Connectivity</th><th>Main Meter Sr. No.</th><th>Check Meter Sr. No.</th><th>Meter Make Accuracy Class</th></tr>
</table>
</td></tr>
</table>

Data / Parameter (as in the MP)	$EG_{facility,y}$ <Net Electricity exported to grid>
	Feeder No. 1 | 16595568 | 13813597 | Elster 0.2s Feeder No. 2 | 16595569 | 13813601 Feeder No. 3 | 13813600 till 23/06/2016 and 13813599 from 23/06/2016 onwards | 13132610 Feeder No. 4 | 13132640 | 13813602
Specific location	The sub-station meters are located at the sub-station
Calibration dates	Last calibration was done in June 2016
Company performing the calibration	Maharashtra State Electricity Distribution Co. Ltd.
Required calibration frequency: Is it in line with the MP? Or represent good monitoring practices?	Yes
Is calibration valid for the whole reporting period?	Yes
Maintenance	The sub station meters are maintained by the PP under the supervision of the state electricity board
Does the data management (from monitoring equipment to emission reductions calculation) ensure correct transfer of data and reporting of emission reductions?	Yes. The net electricity exported to the grid was jointly taken by the representative of the PP and government agency, based on which credit notes are prepared. This is also used for billing. Verification team confirmed from the review of the credit notes, invoices and measurement readings that correct data has been transferred. Further, for calculation of the emission reductions only the net electricity generation is required to be monitored. Therefore, it can be concluded that correct data has been transferred for reporting of emission reduction.
Key reporting risks	Low risk The meter is also the resettlement meter for the grid company and the PP. It was installed, maintained and calibrated according to the relevant industry standard.

BEy = 141649263.01 x 0.9486

= 134,368 tCO_2e

EFy is the baseline emission factor which has been determined ex-ante in the registered PDD as 0.9486 tCO_2e/MWh.

The verification team has checked and confirmed the calculations in the spreadsheet and found to be correct. The monitoring report is supported by Microsoft excel based spreadsheet for the calculation of emission reductions. The consistency and formula were verified and found to be accurate.

Verification team confirms that the electricity board calculates the electricity figures based on the methodology and formulae provided in the PDD.

Through these approaches, the verification team confirmed that the data for calculation of emission reductions in the MR and Emission reductions spreadsheet submitted were fully substantial.

Although as per the section 5.3.1 #4 of the VCS standard, the threshold for materiality with respect to the aggregate of errors, omissions and misrepresentations relative to the total reported GHG emission reductions and/or removals shall be restricted to 5%, the validation team has checked 100% of the monitoring data and no error in the calculation of emission reduction was detected. This is beyond the stated requirement and hence conservative.

After the closure of all the CARs and CLs raised, the verification team confirms that the GHG emission reductions for the project activity have been quantified correctly in accordance with the project description and the applied methodology ACM 0002, version 12.

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

When verifying the report emission reduction, CCIPL ensured that there was a clear audit trail that contained the evidence and records that validate the stated figures. All source documents that form the basis for assumptions and other information underlying the GHG data are shown in paragraph 2.2 above.

When assessing the audit trails, CCIPL also examined:

1. whether sufficient evidence was available, both in terms of frequency and in covering the full monitoring period
2. the source and nature of the evidence
3. if comparable information was available from sources other than that used in the monitoring report, CCIPL cross-checked the monitoring report against the other sources to confirm that the stated figures were correct. The sources and the data referenced are shown in paragraph 2.2.

CCIPL also assessed that the data collection system met the requirements of the monitoring plan as per the applied methodology.

Proper data management inclusive of data acquisition and aggregation, data management system is being followed for the project activity.

The monitoring personnel at site are well trained and follow reproducible routines. Thus, they are competent to carry out the relevant tasks with sufficient accuracy.

4.4 Non-Permanence Risk Analysis

The project activity was operational during the complete monitoring period. Hence there is no further requirement for the non-performance analysis rating during the monitoring period of the project activity.

5 SAFEGUARDS

5.1 No Net Harm

No any potential negative environmental and socio-economic impacts have been identified by the project proponent which is deemed acceptable for the project activity.

5.2 Local Stakeholder Consultation

Not applicable.

6 VERIFICATION CONCLUSION

The scope of the verification relates to the registered CDM PDD (UNFCC reference number - 8524). The verification team confirms that the project has been implemented in accordance with the project description and the registered CDM PDD.

Verification period: From 02/04/2016 to 01/03/2017 (both days inclusive)

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)
02/04/2016 to 31/12/2016	127,168	-	-	127,168
01/01/2017 to 01/03/2017	7,200	-	-	7,200
Total	134,368		-	**134,368**

The verification team is of the opinion, that the project has been implemented in accordance with the registered project description, the MP with complies with the approved monitoring

methodology, the monitoring complies with the MP and the monitored data and calculation of ERs are assessed and confirmed as correct.

Therefore, CCIPL hereby certifies, and requests the issuance of, the reported ERs of “Wind based power generation by Panama Wind Energy Private Limited in Maharashtra, India” during the monitoring period of 02/04/2016 to 01/03/2017 amounting to 134,368 tCO_2e to the VCS Registry.

APPENDIX A: ABBREVIATIONS

BE	Baseline emissions
BOD	Biological Oxygen Demand
CAR	Corrective action request
CCIPL	Carbon Check (India) Private Ltd.
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification
DOE	Designated Operational Entity
ERs	Emission reductions
FAR	Forward action request
GHG	Greenhouse gas
kW	Kilo Watt
kWh	Kilo Watt hour
MP	Monitoring plan
MR	Monitoring Report
MSEB	Maharashtra State Electricity Board
MSEDCL	Maharashtra State Electricity Distribution Company Limited
MW	Mega Watt
MWh	Mega Watt hour
NA	Not applicable
O&M	Operation & Maintenance
PD	Project Description
PD	Project description
PP	Project proponent
PS	Project Standard
QA/QC	Quality Assurance / Quality Control
tCO_2e	Tonne of carbon dioxide equivalent
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	VCS Association
VCU	Verified Carbon Unit
VVM	Validation and Verification Manual
VVS	Validation and Verification Standard

APPENDIX B: Finding Log

Finding	**CAR 01**		
Classification	☒ CAR	☐ CL	☐ FAR
Description of finding *(DOE)*	FAR raised during the previous (2nd) CDM verification: "During this verification it was observed that out of 63 WTGs only 45 WTGs were implemented. Rest 18 WTGs were scheduled to be implemented by 30th September 2016. The implementation (=18 WTGS) along with the latitude and longitude should be checked in the subsequent verifications. FAR is open".		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	For the project activity, the implementation plan of entire set of 63 WEGs as per supply order by the equipment supplier (GE India Industries Private Limited), dated 04/05/2011, is broadly divided into two phases i.e. phase I comprising of 45 WEGs in private land and phase II comprising of 18 WEGs in forest land (public land). All the 45 WEGs in Phase I are commissioned, the remaining 18 WEGs proposed in forest land are not yet commissioned. Installation of WEGs in forest land requires mandatory clearance from the forest department (Maharashtra State Forest department as well as Ministry of Environment & Forest (MoEF), Govt of India). Procedural delay in according mandatory clearance by the Forest department has contributed the delay in commissioning of the remaining 18 WEGs. The remaining 28.8 MW (18*1.6) are expected to be implemented by 30th September 2016. The PP has taken steps securing the forest clearance and execution of the remaining WEGs, however the same are not completed, thus 18 WEGs are not commissioned for current monitoring period. 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.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	Till date only 45 WTGs are commissioned and the 18 WTGs are yet pending implementation due to clearance from Forest department. As confirmed during the on-site visit interview, the pending 18 WTGs are expected to be implemented in the financial year 2017-18. This delay in implementation does not have any impact on the claim of the emission reductions for the current monitoring period. Hence the CAR is closed.		

Finding	**CAR 01**
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	**CL 01**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	PP needs to clarify the monitoring period. In the ER sheet it is stated from 02/04/2016 to 01/03/2017 whereas in the MR it is stated 02/04/2016 to 28/02/2017.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The MR is revised (Version 02 dated 23/03/2017) with end date of monitoring period as 01/03/2017.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has revised the end date of monitoring period as 01/0/2017. Hence the CL is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

Finding	**CL 02**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	In section 1.3 of the MR and PD, PP's name is incorrectly stated. In section 1.6 of the MR and PD, PP needs to clarify the correctness of the statement "The PP has taken CDM benefits from period 05/12/2012 to 04/12/2022". In section 2.1 of the MR PP needs to clarify the statement "The wind power generated from the Project will be displacing the electricity generated from thermal power stations feeding into NEWNE grid and will be replacing the usage of diesel generators for meeting the power demand during shortage periods".		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	Section 1.3 of MR and PD are revised with correct PP name. The CDM monitoring period for which PP has availed CDM benefits are correctly mentioned now. The sentence in section 2.1 of MR is revised.		

Finding	**CL 02**
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has submitted revised MR and PD against the raised clarification. Hence the CL is closed.
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed

Finding	**CL 03**		
Classification	☐ CAR	☒ CL	☐ FAR
Description of finding *(DOE)*	There is no apportioning involved in the project monitoring as confirmed during the on-site visit. PP needs to confirm on the same as it is stated “Monthly meter readings are taken from the main and check meter installed at the substation and certified by the representatives of SEB Officials and the representatives of the project proponent. for apportioning procedure refer section 4.3 of the PD” in section 3.2 of the MR.		
Corrective Action or clarification #1 *(PP shall write a detailed and clear corrective action or further information for clarification as per finding)*	The irrelevant sentence is removed from the revised MR.		
DOE Assessment #1 *The assessment shall encompass all open issues in the finding. In case of non-closure, additional corrective action and DOE assessments (#2, #3, etc.) shall be added.*	PP has submitted revised MR with appropriate correction. Hence the CL is closed.		
Conclusion *Tick the appropriate checkbox*	☐ To be checked during the next periodic verification ☐ Outstanding finding (not closed) ☒ The finding is closed		

APPENDIX C: Certificate of appointment

Carbon Check (India) Private Ltd.

Sanjay Agarwalla

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒		
Verifier	☒	Technical Expert	☒	Local Expert[1]	☒		

In the following Technical Areas:

TA 1.1	☒	TA 3.1	☒	TA 5.2	☒	TA 9.2	☒	TA 13.2	☐
TA 1.2	☒	TA 4.1	☒	TA 8.1	☐	TA 10.1	☐	TA 14.1	☐
TA 2.1	☒	TA 5.1	☒	TA 9.1	☒	TA 13.1	☒		

Mr. Vikash Kumar Singh
Compliance Officer

Mr. Amit Anand
CEO

Date of Approval
23/12/2016

Valid Till
22/12/2017

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2016	Annual Revision

[1] India

CARBON CHECK (INDIA) PRIVATE LIMITED
Registered in India: U74930DL2012PTC232495
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e-mail: info@carboncheck.co.in

Carbon Check (India) Private Ltd.

Vikash Kumar Singh

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 06.0):

For following functions:

Validator	☒	**Team Leader**	☒	**Technical reviewer**	☒		
Verifier	☒	**Technical Expert**	☒	**Local Expert**[1]	☒		

In the following Technical Areas:

TA 1.1	☐	**TA 3.1**	☒	**TA 5.2**	☐	**TA 9.2**	☐	**TA 13.2**	☒
TA 1.2	☒	**TA 4.1**	☒	**TA 8.1**	☐	**TA 10.1**	☐	**TA 14.1**	☐
TA 2.1	☐	**TA 5.1**	☐	**TA 9.1**	☐	**TA 13.1**	☒		

Mr. Amit Anand
CEO

Date of Approval
23/12/2016

Valid Till
22/12/2017

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[1] India, South Africa

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