



**Verified Carbon
Standard**

VERIFICATION REPORT 'LONGYUAN MULILO DE AAR MAANHAARBERG WIND ENERGY FACILITY'



Document Prepared By Carbon Check India Pvt. Ltd.

Project Title	Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility
Version	2.0
Report ID	CCIPL875A/VERRA/VER/LMDA/20201105

Report Title	Verification report 'Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility'
Client	Blue World Carbon Asset Management (Pty) Ltd
Pages	32

Date of Issue	15/04/2021
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Summary:

Blue World Carbon Asset Management Pty Ltd, herein after referred as BWC (One of the Project proponent), has appointed the validation/verification body Carbon Check (India) Private Ltd. to perform verification of the greenhouse gas emission reductions reported for the project activity " Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility" in Republic of South Africa, VCS ID 1949, for the following monitoring period with regard to the relevant requirements for VCS activities.

- Monitoring Period 1: 1-November-2017 to 30-November-2017
- Monitoring Period 2: 1-December-2017 to 31-December-2017
- Monitoring Period 3: 1-January-2018 to 31-January-2018
- Monitoring Period 4: 1-February-2018 to 28-February-2018
- Monitoring Period 5: 1-March-2018 to 31-March-2018
- Monitoring Period 6: 1-April-2018 to 30-April-2018

- Monitoring Period 7: 1-May-2018 to 31-May-2018
- Monitoring Period 8: 1-June-2018 to 30-June-2018
- Monitoring Period 9: 1-July-2018 to 31-July-2018
- Monitoring Period 10: 1-August-2018 to 31-August-2018
- Monitoring Period 11: 1-September-2018 to 30-September-2018
- Monitoring Period 12: 1-October-2018 to 31-October-2018
- Monitoring Period 13: 1-November-2018 to 30- November-2018
- Monitoring Period 14: 1-December-2018 to 31-December-2018
- Monitoring Period 15: 1-January-2019 to 31-January-2019
- Monitoring Period 16: 1-February-2019 to 28-February-2019
- Monitoring Period 17: 1-March-2019 to 31-March-2019
- Monitoring Period 18: 1-April-2019 to 30-April-2019
- Monitoring Period 19: 1-May-2019 to 31-May-2019
- Monitoring Period 20: 1-June-2019 to 30-June-2019
- Monitoring Period 21: 1-July-2019 to 31-July-2019
- Monitoring Period 22: 1-August-2019 to 31-August-2019
- Monitoring Period 23: 1-September-2019 to 30-September-2019
- Monitoring Period 24: 1-October-2019 to 31-October-2019
- Monitoring Period 25: 1-November-2019 to 30- November-2019
- Monitoring Period 26: 1-December-2019 to 31-December-2019
- Monitoring Period 27: 1-January-2020 to 31-January-2020
- Monitoring Period 28: 1-February-2020 to 29-February-2020
- Monitoring Period 29: 1-March-2020 to 31-March-2020
- Monitoring Period 30: 1-April-2020 to 30-April-2020
- Monitoring Period 31: 1-May-2020 to 31-May-2020
- Monitoring Period 32: 1-June-2020 to 30-June-2020

- Monitoring Period 33: 1-July-2020 to 31-July-2020
- Monitoring Period 34: 1-August-2020 to 31-August-2020
- Monitoring Period 35: 1-September-2020 to 30-September-2020
- Monitoring Period 36: 1-October-2020 to 31-October-2020
- Monitoring Period 37: 1-November-2020 to 30-November-2020
- Monitoring Period 38: 1-December-2020 to 31-December-2020

The objective of the verification is to have an independent review ex-post determination of the monitored reductions in GHG emission reductions. Verification was conducted using Carbon Check procedures in line with the requirements specified in the VCS Version 4.0, VCS validation and verification manual version 3.2, VCS Program Guide version 4.0, Registration and issuance process version 4.0, /B03/ and applying standard auditing techniques. The verification consisted of desk review, off-site assessment and the resolution of outstanding issues and the issuance of the final verification report and certification.

The verification shall ensure that reported emission reductions are complete and accurate in accordance with applicable VCS / CDM requirements in order to be certified.

The GHG emission reductions are calculated on the basis of the approved methodology ACM0002 version 19 and the monitoring plan included in the registered VCS PD, version 2.1 dated 20/11/2019./02/

During this verification, 2 Corrective Action Request (CAR) and 0 clarification requests (CL) were raised related to operation, GHG emission reduction estimation, monitoring and baseline scenario of the VCS project activity in relation to all relevant VCS requirements for the project activity and the applied baseline and monitoring methodology, and these CAR and CL are successfully closed after necessary corrections/clarifications by the client. The same has been discussed in Appendix B of this verification report.

In conclusion, it is Carbon Check's opinion that the project activity "Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility" in RSA, VCS project ID 1949, meets all relevant requirements for VCS standard and guidelines and correctly applies the baseline and monitoring methodology ACM0002 'Grid-connected electricity generation from renewable sources' version 19/B02/. The monitoring system is in place and the emission reductions are calculated without material misstatement. Hence, Carbon Check is able to certify that the

emission reductions from the project during the monitoring period 01 to 38 amount to 906,090 tCO₂e.

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1 INTRODUCTION

1.1 Objective

Carbon Check (India) Pvt. Ltd. Has been commissioned by "Blue World Carbon Asset Management (Pty) Ltd,." To perform an independent verification of its VCS project, "Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility", already registered under VCS with Project ID. 1949 for the reported GHG emission reductions for the given monitoring period 01 to 38. The VCS projects must undergo independent third party verification and certification of emission reductions as the basis for issuance of Verified Carbon Units (VCUs).

The objectives of this verification exercise are, by review of objective evidence, to establish that:

- The project activity has been implemented and operated as per the project description (PD) /02/ and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- Monitoring report /01/ and other supporting documents are complete;
- The data is recorded and stored as per the monitoring methodology /B02/ and approved monitoring plan.
- To confirm that the monitoring system is implemented and fully functional to generate Verified Carbon Units (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.

1.2 Scope and Criteria

The verification scope is:

- to verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- 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 project is assessed against the requirements of VCS Version 4.0, VCS validation and verification manual version 3.2, VCS Program Guide version 4.0, Registration and issuance process version 4.0. /B03/ Carbon Check has, based on the recommendations in the latest version of CDM Validation and Verification Standard, VCS validation and verification manual and employed a rule-based approach (as criteria) in the verification, focusing on the identification of significant reporting rules and the reliability of project monitoring.

Verification is not meant to provide any consultancy towards the project proponent. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Level of Assurance

All the revisions of the verification report before being submitted to the client were subjected to an independent internal technical review to confirm that all verification activities had been completed according to the pertinent Carbon Check instructions, with reasonable level of assurance.

The technical review was performed by a technical reviewer(s) qualified in accordance with Carbon Check's qualification scheme for VCS and CDM validation and verification.

1.4 Summary Description of the Project

The purpose of this project activity is to generate clean form of electricity through renewable energy sources (Wind). Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd and BWC both are the project proponent of the project activity. The project activity involves installations of 67 number of WTG of 1.5 MW capacity each (aggregating to 100.5 MW). The electricity generated from the project activity is sold to the national grid of the host country, RSA which is integrated into the grid of Southern African Power Pool (SAPP), where South Africa is represented by Eskom. Estimated annual power generation is as below

The proposed project is located Farm Re/130 and 2/131 outside of the town of De Aar. The coordinates of the proposed project location are at Geographical latitude 30.7278. Geographical longitude: 23.8831. The project's initial crediting period is from 31/10/2017 to 30/11/2027.

As verified during the remote interview, the Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility has an installed capacity of 100.5 MW and annually supplies to the grid about 290 500 MWh of electricity. Wind generated electricity is stepped up to 33kV and transported by overhead lines to the Maanhaarberg IPP Substation, where it further stepped up to 132kV. There are 2 supplying lines from the Maanhaarberg IPP Substation to the Phiri Eskom 132kV Switching Station. The supply voltage level is 132kV. Each line is equipped with the electricity meters (main and check). After the Phiri Eskom 132kV Switching Station the generated renewable electricity is transmitted through the national grid of the RSA. /10/

Electricity delivered to the grid by the wind farm would have otherwise been generated by the operation of the grid-connected power plants of the SAPP and by the addition of new generation sources that is reflected in the combined margin CO₂ emission factor of 0.9871 t CO₂/MWh adopted for the electricity system of the SAPP.

The project is going for the 1st verification under the first crediting period. The emission reductions are calculated conservatively as per the applied methodology.

The main information of the project activity is summarized in the table below:

Project Proponent(s)	Blue World Carbon Asset Management (Pty) Ltd (Primary project Proponent) Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd (Longyuan Mulilo)		
Project Title	Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility		
Location of the project	The project is located on Farm Re/130 and 2/131 outside of the town of De Aar. Total area of the site is approximately 350 hectares. De Aar is the main town of the Emthanjeni Local Municipality located in the Northern Cape Province of the RSA		
Methodology(ies)	ACM0002 version 19		
Sectoral Scope(s)	1	Carbon Check's Technical Area(s)	1.2
Registered VCS PD	Version 02.1 of 20/11/2019		
Starting date of the crediting period	31 October 2017		
Project's crediting period	31 October 2017– 30 October 2027 (First crediting period)		
Project documentation link	https://registry.verra.org/app/projectDetail/VCS/1949		

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification was conducted using Carbon Check procedures in line with the requirements specified in the VCS Version 4.0, VCS validation and verification manual version 3.2, VCS Program Guide version 4.0, Registration and issuance process version 4.0. /B03/ The GHG emission reductions are on the basis of the approved Baseline and monitoring methodology ACM0002 version 19./B02/

The verification consisted of the following phases

- Document review;
- Off-site assessment including Interviews;

Resolution of any Material Discrepancy and the issuance of the final verification report and certification.

The following sections outline each step in more detail.

2.2 Document Review

The monitoring report (MR) version 02 of 30/03/2021 /01/, the emission reduction calculations spreadsheet /03/, were assessed as part of the verification. In addition, the registered VCS-PDs /02/ in particular the baseline estimations and the monitoring plan for the project were reviewed.

The following table lists the documentation that was reviewed during the verification:

/01/	Final monitoring report: Version 02 dated 30/03/2021
/02/	Registered VCS project description for project activity " Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility , version 2.1 dated 20/11/2019
/03/	Emission Reduction spread sheet corresponding to /01/
/04/	Evidence for the Technical specifications of the project (UP 86 Design Certificate by wind turbine manufacturer- United Power)
/05/	Monthly meter readings for the monitoring period • Raw data from tariff meters_De Aar 1
/06/	Calibration certificates for the electricity meters • Calibration Certificate from SANAS calibration laboratory dated: 08/05/2017
/07/	Tax invoices and Eskom's monthly reports for cross check of the meter readings • Eskom Payment Certificates • Longyuan Mulilo_Tax Invoices
/08/	Training record of the monitoring personnel

/09/	Evidence for the start of the commercial operation of the project activity/ Plant Commissioning certificate dated: 30/10/2017
/10/	Technical specifications of the project including operation and maintenance manual • single line diagram
/11/	Plant breakdown / shutdown records
/12/	Grievance mechanism
/13/	Power Purchase Agreement between PP (Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd) and electricity utility (ESKOM Holdings Soc Ltd)

Background documents

S. No.	Document
/B01/	Validation report for /02/
/B02/	Approved CDM monitoring methodology: ACM0002: Grid-connected electricity generation from renewable sources – Version 19.0
/B03/	VCS Requirements: • VCS Standard (v4.0, dated 19/09/2019) • VCS Program Guide (v4.0, dated 19/09/2019) • VCS Validation and Verification Manual version (v3.2, dated 19/10/2016) • Registration & Issuance Process (v4.0, dated 19/09/2019) • VCS Programme Definitions version (v4.0, dated 19/09/2019) • VCS monitoring report template version 4.0
/B04/	CDM Validation and Verification Standard, version 09.0 CDM Project Standard, version 09.0
/B05/	Standardized baseline ASB0040-2018

2.3 Interviews

The key personnel interviewed and the main topics of the interviews are summarized in the table below:

	Date	Name and Role	Organization	Topic
/a/	25/03/2021	Ilya Goryashin	Blue World Carbon Asset Management (Pty) Ltd	Monitoring report, emission reduction calculations, records of monitoring parameters, VCS rules,

				application of methodology etc.
/b/	25/03/2021	Joost Van Lier		Monitoring report, emission reduction calculations, records of monitoring parameters, VCS rules, application of methodology etc.
/c/	25/03/2021	Regardt	Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd (Longyuan Mulilo)	Technical aspects of the project activity. Operational life, environmental aspects etc.
/d/	25/03/2021	Frank Galant		Operational details of the project, management structure, legal compliance, health, safety and environmental aspects, data monitoring and recording procedure, safety practices, production controls, internal audits etc.
/e/	25/03/2021	Tatbrha copr		
/f/	25/03/2021	David Dai		

2.4 Site Inspections

Site visit for the subject project activity was avoided due to travel restrictions imposed due to COVID-19 impact. The verification body noted VERRA guideline on travel due to COVID-19 (<https://verra.org/covid-19-travel-guidance/>) and e-mail communication between verification body and VERRA clarifies that VERRA standard do not mandate site visit to be conducted in person. VVB also noted CDM Executive Board's decision to relax mandatory site visits by DOEs until 31 December 2020 because of COVID-19. The alternative means used for the purpose of verification are demonstrated as follow.

The audit team has carried out off site interviews (over phone call and video call) to assess the information included in the project documentation and to gain additional information regarding the compliance of the project with the relevant criteria applicable for the verification. During the desk review, the relevant documents, including the registered VCS-PD and corresponding validation report, the picture of nameplate of the main equipment (WTGs), the picture of monitoring meters and other relevant background documents were provided and assessed. The audit team can confirm the project operation and monitoring are consistent with registered monitoring plan, last monitoring report and verification report.

The validation report were checked, comparing the relevant evidence and off-site interview with the PP representative and operation staff through telephone and video call, Carbon Check team has confirmed that the project is implemented in line with the VCS PD and the monitoring system is in line with the latest approved VS-PD and latest MR. Therefore, a reasonable level of assurance was achieved without an in-person site visit.

2.5 Resolution of Findings

The objective of this phase of the verification is to resolve any outstanding issues which need to be clarified for Carbon Check's positive conclusion on the project description. To guarantee transparency a verification protocol has been customized for the project. The protocol shows in a transparent manner the requirements, means of verification and the results from verifying the identified criteria. The verification protocol consists of three tables; the different columns in these tables are described below.

A corrective action request (CAR) is raised if one of the following occurs:

- Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;

- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impair the estimate of emission reductions;
- Issues identified in a FAR during validation to be verified during verification have not been resolved by the project proponent.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

In summary, 2 CAR and 0 CL were raised during this verification which were closed successful and details are given under Appendix B of this report.

2.5.1 Forward Action Requests

Based on the review of the validation report /B01/ it is noted that no FAR raised during validation which need to be addressed during this verification.

2.6 Eligibility for Validation Activities

The project activity is registered under VCS ID 1949 /02/, hence this section is not applicable.

3 VALIDATION FINDINGS

The project was registered under the VCS registration reference N° 1949. The first crediting period is from 31/10/2017 – 30/10/2027. This verification assessment for the monitoring period 01/11/2017 to 30/10/2020 falls under the first crediting period.

3.1 Participation under Other GHG Programs

The project is registered only under VCS and not registered in any other GHG program.

3.2 Methodology Deviations

No methodology deviation has been applied.

3.3 Project Description Deviations

No project deviation has been applied.

3.4 Grouped Project

The project is not a grouped project. Therefore, this section is not applicable.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

Implementation of the project activity has been assessed through document review, off-site interview and video call with project proponent. The project activity involves 100.5 MW wind power plant for electricity generation and export to grid. It involves 67 UP86 sets of 1.5 MW wind turbines. The project owner is Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd (Longyuan Mulilo) /13/. The start date of the project activity is 31/10/2017,/09/ the day when the wind farm started commercial operation. The generated electricity is supplied to the grid of RSA. The project is located on Farm Re/130 and 2/131 outside of the town of De Aar. Total area of the site is approximately 350 hectares. De Aar is the main town of the Emthanjeni Local Municipality located in the Northern Cape Province of the RSA During the monitoring period. it is noted that entire project was fully operational as verified from generation records.

Based on document review, off-site interview and video call, it is confirmed that all the emission sources within the boundary have been considered appropriately. Monitoring of all parameters during the monitoring period is followed as per registered monitoring plan.

Data parameters fixed ex-ante and available at validation are given below:

DATA/PARAMETER Unit	Source of data	Reported value for the project period	Assessment/Observation
Combined margin emission factor for grid ($EF_{grid,CM,y}$) in tCO ₂ e/MWh	Data based on registered PD /02/ and validation report /B01/	0.871	The value is ex-ante and derived from Standardized baseline ASB0040-2018. Table 1 of this standardized baseline provides the value of the combined margin CO ₂ emission factor for the project electricity system applicable to wind and solar power generation for the determination of baseline emissions of 0.9871 t CO ₂ /MWh /B05/

Data parameters monitored

Data/Parameter	Assessment
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Data Unit	EG _{PJ,y} MWh			
Description	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project in year y			
Source of data to be used	As verified during the remote interview and as per the document review On-site measurement by electricity meters, yielding the net electricity supplied to the grid of the RSA./03/./05/./07/ There are two main meters installed in the Maanhaarberg IPP Substation on 132kV side. Each meter is accompanied with the check meter. Monthly reports with the records for delivered electricity to Phiri Eskom 132kV Switching Station are submitted by the Eskom to PP			
Value of monitored parameter for the monitoring period	Monitoring Period	Month	Year	Value
	1	11	2017	27,580.272000
	2	12	2017	29,179.200005
	3	1	2018	28,772.639990
	4	2	2018	23,210.664000
	5	3	2018	24,668.087991
	6	4	2018	16,065.024000
	7	5	2018	18,426.887997
	8	6	2018	18,921.600000
	9	7	2018	23,024.663997
	10	8	2018	24,001.320000
	11	9	2018	20,991.360004
	12	10	2018	27,538.176011
	13	11	2018	28,971.095998
	14	12	2018	30,443.568000
	15	1	2019	32,371.560009
	16	2	2019	23,276.856010
	17	3	2019	25,907.831990

	18	4	2019	19,261.344000
	19	5	2019	17,073.839998
	20	6	2019	20,152.559990
	21	7	2019	25,277.496002
	22	8	2019	17,788.055998
	23	9	2019	23,958.048006
	24	10	2019	30,512.063996
	25	11	2019	29,149.487994
	26	12	2019	30,840.527990
	27	1	2020	29,457.311998
	28	2	2020	22,663.751995
	29	3	2020	18,532.247996
	30	4	2020	20,770.655999
	31	5	2020	12,972.527998
	32	6	2020	16,727.447998
	33	7	2020	21,138.335993
	34	8	2020	28,703.184021
	35	9	2020	22,613.280000
	36	10	2020	29,064.191998
	37	11	2020	28,356.263997
	38	12	2020	29,590.008000
Monitoring equipment			Meter Type	Serial Number
	Main meter 1		Landis+Gyr E650	37108380
	Check meter 1		Landis+Gyr E650	37108381
	Main meter 2		Landis+Gyr E650	37108382
	Check meter 2		Landis+Gyr E650	37108383

Accuracy of the monitoring equipment	The energy meters are of accuracy class of 0.2s /06/ which is consistent with registered VCS-PD./02/ The accuracy of the meters are as per industry standard.
Measuring/Reading/Recording frequency	Continuous monitoring, hourly recording and aggregated monthly basis./05/
Calculation method (if applicable)	Project Proponent compares and calculates the difference between measurements in the Maanhaarberg IPP Substation and measurements in the Eskom 132kV Switching Station. The lowest value is used for calculations of the baseline emissions./05/, /03/
Calibration	
Calibration frequency/interval Is the calibration interval in line with the monitoring plan of the PD?	Based on the review of Power Purchase Agreement,/13/ clause 12.6.7 validation team confirms that Electricity meters are calibrated when the difference between measurements at the Phiri Eskom 132Kv Switching Station and Maanhaarberg IPP Substation is more than 0.5%. This has been checked and compared with the tariff meter data of both the main meters and check meter/ 05/ ,/03/ and found that the difference in meter readings does not exceed 0.05%, except the readings for November 2017 which is due to the fact that the check meter started to record from 6/11/2017. Project proponent has provided the calibration certificate issued by SANAS calibration laboratory dated 08/05/2017 for all four newly installed meters. /06/
Does the calibration cover the monitoring period? Has the calibration frequency been respected?	The monitoring period is from 01/11/2017 to 30/10/2020. The energy meters were initially calibrated on 08/05/2017 and as per the PPA/13/ requirements calibration is not required unless difference between measurements at the Phiri Eskom 132Kv Switching Station and Maanhaarberg IPP Substation is more than 0.5%. Hence, calibration of energy meters covers the monitoring period.
Calibration certificates	All energy meters are calibrated by SANAS calibration laboratory dated 08/05/2017 /06/.
Whether calibration done by an accredited person or institution?	The South African National Accreditation System (SANAS or SANAS Calibration Certificates) is the only national body responsible for carrying out accreditations in respect of conformity assessment, as mandated through the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act (Act 19 of 2006). This includes the accreditation of Calibration laboratories, Proficiency testing service providers & more./06/

4.2 Safeguards

4.2.1 No Net Harm

The project involves power generation from wind energy and supply to grid. Therefore, the project results in avoidance of CO₂ emissions in grid that would otherwise would have been generated from fossil fuel fired power plants. Therefore, there is no negative environmental impact from the project activity. In addition, due to the project activity, jobs are created in local level as verified during off-site interview which has improved socio-economic impacts in the project area. Therefore, there is no net harm from the project activity.

4.2.2 Local Stakeholder Consultation

DJ Environmental Consultants was appointed to undertake the Scoping and Environmental Impact Assessment and associated Public Participation Process as per the NEMA EIA Regulations and VCS requirements. Section 2.2 of the VCS MR describes the local stakeholder's consultation process. Local stakeholder consideration process was reviewed in detailed during the initial registration process. Verification team also confirms that Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd has a Grievance Procedure in place./12/ Carbon Check confirms local stakeholders meeting was conducted as per the VCS requirements.

4.3 AFOLU-Specific Safeguards

The project is a non-AFOLU projects, this section is not required.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

GHG According to the applied methodology "ACM0002", "Consolidated baseline methodology for grid connected electricity generation from renewable sources", version 19 /B02/, the emission reductions have been calculated based on the following formula:

$$ER_y = BE_y - PE_y - L_y$$

Where,

ER_y : Emission reductions in year y (tCO₂e/yr)

BE_y : Baseline emissions in year y (tCO₂e/yr)

PE_y : Project emissions in year y (tCO₂e/yr)

L_y : Leakage in year y (tCO₂e/yr)

The baseline emissions (BE_y) for the project activity are calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y}$$

Where,

Where:

BE_y = Baseline emissions in year y (tCO₂)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project in year y (MWh)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y (tCO₂/MWh)

Combined margin emission factor was fixed ex-ante at the time of validation. The value was cross checked with the registered VCS-PD and found to be consistent.

Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project activity ($EG_{PJ,y}$)

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

During the verification, all relevant documents were checked to assess the correctness and quality of data submitted by the project proponent, which are used to determine emission reductions.

All records needed for monitoring are archived in line with the requirements of the registered monitoring plan. No significant, lack of evidence and missing data were detected during verification. Hence, the verification team confirms that the monitoring system ensures required quality of the monitoring system to ensure the quality of the monitored data. All internal data are subjected to QA/QC measures.

The generated electricity is continuously measured and recorded at least on monthly basis by the wind farm personnel. The quantity of net electricity generation that is produced and fed into the grid in year y is determined on the basis of electricity meters. The metering instruments are installed in accordance with the requirements of the Grid and the Distribution Metering Codes at the point of supply which defines the commercial boundary

between the wind farm owner and the grid. Readings of the electricity meters are cross checked with tax invoices and Eskom's monthly reports. Data on electricity supply are digitally archived and submitted to BWC. The sources of data for calculation of GHG emission reductions in the course of monitoring are the records for delivered electricity to

the RSA grid. Carbon Check is of the opinion that this method of estimation is accurate and results in conservative estimation of emission reduction and is line with the applicable VCS requirements.

4.6 Non-Permanence Risk Analysis

There is no non-permanence risk rating determined by the project proponent.

5 VERIFICATION CONCLUSION

Carbon Check (India) Pvt. Ltd. has performed verification of the emission reductions reported for the project activity "Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility" in RSA, VCS Registry Project ID 1949, for the period 01-38, with regard to the relevant requirements for VCS activities. The project proponent of the "Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility" project are responsible for:

- The preparation of greenhouses gas emissions data and the reported greenhouse gas emission reductions from the project on the basis set out in the monitoring plan contained in the registered VCS PD version 02.1 of 20/11/2019./02/
- The development and maintenance of records and reporting procedures in accordance with that plan, including the calculation and determination of greenhouse gas emission reductions of the project.

It is the responsibility of Carbon Check to express an independent verification opinion about the project's conformity with the requirements of VCS Standard version 4 and GHG program applied, on the reported greenhouse gas emission reductions from the project.

Based on documented evidence and corroborated by an off-site assessment, Carbon Check can confirm that:

- the project has been implemented and operated as per the registered VCS-PD; /02/
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS Standard version 4 requirements; /B03/
- the monitoring is in place as per the applied baseline and monitoring methodology;
- the monitoring plan in the registered VCS-PD is as per the applied baseline and monitoring methodology.

It is Carbon Check's opinion that the GHG emission reduction stated in the monitoring report version 1.1 of 29/07/2020 for the "Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility" in RSA for the period 01-38 are fairly stated. The GHG emission reductions are calculated on the basis of approved methodology ACM0002 version 19 and the monitoring plan included in the registered VCS PD, version 2.1 dated 20/11/2019./ /02/

Hence Carbon Check is able to certify that the emission reduction from the project during the monitoring period 01/11/2017 to 31/12/2020 is amount to 906,090 tCO₂.

Verification period: From 01/11/2017 to 31/12/2020

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)
01/11/2017 to 30/11/2017	27,224	0	0	27,224
01/12/2017 to 31/12/2017	28,802	0	0	28,802
01/01/2018 to 31/01/2018	28,401	0	0	28,401
01/02/2018 to 28/02/2018	22,911	0	0	22,911
01/03/2018 to 31/03/2018	24,349	0	0	24,349
01/04/2018 to 30/04/2018	15,857	0	0	15,857
01/05/2018 to 31/05/2018	18,189	0	0	18,189
01/06/2018 to 30/06/2018	18,677	0	0	18,677
01/07/2018 to 31/07/2018	22,727	0	0	22,727

01/08/2018 to 31/08/2018	23,691	0	0	23,691
01/09/2018 to 30/09/2018	20,720	0	0	20,720
01/10/2018 to 31/10/2018	27,182	0	0	27,182
01/11/2018 to 30/11/2018	28,597	0	0	28,597
01/12/2018 to 31/12/2018	30,050	0	0	30,050
01/01/2019 to 31/01/2019	31,953	0	0	31,953
01/02/2019 to 28/02/2019	22,976	0	0	22,976
01/03/2019 to 31/03/2019	25,573	0	0	25,573
01/04/2019 to 30/04/2019	19,012	0	0	19,012
01/05/2019 to 31/05/2019	16,853	0	0	16,853
01/06/2019 to 30/06/2019	19,892	0	0	19,892
01/07/2019 to 31/07/2019	24,951	0	0	24,951
01/08/2019 to 31/08/2019	17,558	0	0	17,558
01/09/2019 to 30/09/2019	23,648	0	0	23,648

01/10/2019 to 31/10/2019	30,118	0	0	30,118
01/11/2019 to 30/11/2019	28,773	0	0	28,773
01/12/2019 to 31/12/2019	30,442	0	0	30,442
01/01/2020 to 31/01/2020	29,077	0	0	29,077
01/02/2020 to 29/02/2020	22,371	0	0	22,371
01/03/2020 to 31/03/2020	18,293	0	0	18,293
01/04/2020 to 30/04/2020	20,502	0	0	20,502
01/05/2020 to 31/05/2020	12,805	0	0	12,805
01/06/2020 to 30/06/2020	16,511	0	0	16,511
01/07/2020 to 31/07/2020	20,865	0	0	20,865
01/08/2020 to 31/08/2020	28,332	0	0	28,332
01/09/2020 to 30/09/2020	22,321	0	0	22,321
01/10/2020 to 31/10/2020	28,689	0	0	28,689
01/11/2020 to 30/11/2020	27,990	0	0	27,990

01/12/2020 to 31/12/2020	29,208	0	0	29,208
Total	906,090	0	0	906,090

APPENDIX A: ABBREVIATIONS

Abbreviations	Full texts
BE	Baseline Emissions
CAR	Corrective Action Request
CC IPL	Carbon Check India Pvt. Ltd.
CDM	Clean Development Mechanism
CDM M&P	Modalities and Procedures CDM
CEA	Clean Energy Asia LLC
CER(s)	Certified Emission Reduction(s)
CH ₄	Methane
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
EB	Executive Board
EF	Emission Factor
ER	Emission Reductions
FAR	Forward Action Request
GHG(s)	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change

LoA	Letter of Approval
MoV	Means of Verification
MWh	Mega Watt Hour
MR	Monitoring Report
NGO	Non-governmental Organization
NTPG	National Power Transmission Grid
ODA	Official Development Assistance
VCS PD	Project description
PE	Project Emission
PP(s)	Project proponent (s)
Ref.	Document Reference
SS(s)	Sectoral Scope(s)
TA(s)	Technical Area(s)
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit
VER	Voluntary Emission Reductions
VVB	Validation and verification body
VVS	Validation and Verification Standard
WTG	Wind Turbine Generator

APPENDIX B: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUEST

Table 1. CL from this verification

CL ID		Section no.		Date:
Description of CL				
Project proponent response				Date:
Documentation provided by project proponent				
VVB assessment				Date:

Table2: CAR for this verification:

CAR ID	01	Section no.		Date: 26/03/2021
Description of CAR				
1. EGfacility,y is calculated difference of gross export and gross import, the monitored value of gross export and gross import are not provide in section 4.2 of the MR in consistent with ER sheet. 2. Section 3 of the VCS MR is found to be altered.				
Project proponent response				Date: 30/03/2021

1. Section 4.2 was corrected accordingly. Please refer to the updated monitoring report version 02 2. Section 3 of the VCS MR was corrected as per the VCS MR form. Please refer to the updated monitoring report version 02	
Documentation provided by project proponent	
Revised MR version 02; dated 30/03/2021	
VVB assessment	Date: 06/04/2021
Based on the review of revised MR, the verification team confirms following; 1. Project Proponent has revised section 4.2 of the MR and provided monitored value of gross export and gross import which is consistent with the ER sheet. The verification team confirms that project proponent has applied conservative approach for the calculation of net electricity generation which is acceptable. CAR is closed 2. Section 3 of the VCS MR has been corrected as per the VCS MR form. CAR is closed	

CAR ID	02	Section no.		Date: 26/03/2021
Description of CAR				
As per the section 2.2 of VCS MR template filling guidelines "How due account of all and any input received during ongoing communication has been taken. Include details on any updates to the project design or justify why updates are not appropriate." Project proponent is requested to provide the information as per the above requirement.				
Project proponent response				Date: 30/03/2021
No issues, concerns, problems, or claims have been lodged or raised through the Grievance Procedure. The statement was inserted into the VCS MR. Please refer to the updated monitoring report version 02				
Documentation provided by project proponent				
Revised MR version 02; dated 30/03/2021				

VVB assessment	Date: 06/04/2021
Section 2.2 of VCS MR has been revised and project proponent has confirmed that No issues, concerns, problems, or claims have been lodged or raised during the Grievance Procedure CAR is closed	

Table3: FAR from this verification:

FAR ID		Section no.		Date:
Description of CAR				
Project proponent response				Date:
Documentation provided by project proponent				
VVB assessment				Date:

APPENDIX C: COMPETENCY CERTIFICATE


Carbon
CHECK

Carbon Check (India) Private Ltd.

Vikash Kumar Singh

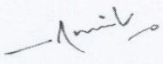
has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Assessor 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
 24/12/2020

Valid Till
 24/12/2021

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision
01/03/2020	Interim Revision for office address change
01/09/2020	Interim Revision for CCIPL logo change
24/12/2020	Annual Revision

¹ India, South Africa

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Carbon Check (India) Private Ltd.

Amit Anand

has been qualified as per CCIPL's internal qualification procedures, in accordance with requirements of Accreditation Standard (version 07.0):

For following functions:

Validator	☒	Team Leader	☒	Technical reviewer	☒
Verifier	☒	Technical Expert	☒	Local Assessor 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

Date of Approval
24/12/2020

Valid Till
24/12/2021

Revision History of the Document

26/12/2014	Initial Adoption
24/12/2015	Annual Revision
20/01/2016	Interim Revision for office address change
23/12/2017	Annual Revision
24/12/2017	Annual Revision
24/12/2018	Annual Revision
24/12/2019	Annual Revision
01/03/2020	Interim Revision for office address change
01/09/2020	Interim Revision for CCIPL logo change
24/12/2020	Annual Revision

¹ India and South Africa

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