Longyuan Mulilo De Aar 2 North Wind Energy Facility Monitoring Report (01/01/2023 – 31/12/2023)

Document Prepared by Ilya Goryashin, Blue World Carbon Asset Management (Pty) Ltd

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Project title	Longyuan Mulilo De Aar 2 North Wind Energy Facility
Project ID	1950
Monitoring period	1-January-2023 to 31-December-2023
Original date of issue	15-April-2024
Most recent date of issue	01-May-2024
Version	02
VCS Standard Version	4.7
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PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

The project comprises only one activity – a single wind farm with the total installed capacity of 144 MW, which was implemented close to the town of De Aar in the Northern Cape Province of the Republic of South Africa (RSA). 96 x UP86 turbines, supplied by United Power, are employed by the project.

The EPC contract was signed on 06/02/2015. The wind farm started commercial operation on 31/10/2017 and continues operating. The project lifetime is 20 years.[1]

The total GHG emission reductions covered in this monitoring report are 490,954 tCO2e.

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	22-February-2021	VCS	Carbon Check (India) Pvt. Ltd.	-
Verification	01-November-2017 -- 31-December-2020	VCS	Carbon Check (India) Pvt. Ltd.	3 years and 2 months
Verification	01-January-2021 -- 31-December-2021	VCS	TÜV SÜD South Asia Pvt. Ltd.	1
Verification	01-January-2022 -- 31-December-2022	VCS	EcoLance Private Limited	1
Verification	01-January-2023 -- 31-December-2023	VCS	EcoLance Private Limited	1
Total	01-November-2017 --31-December-2023	VCS	-	6 years and 2 months

[1] Please refer to the Project Description (version 02, 26/10/2019) for the references to the information provided in Section 1 of this Monitoring Report

1.3 Sectoral Scope and Project Type

Sectoral scope	1. Energy (renewable/non-renewable).	
Project activity type	Renewable energy. Displacement of electricity that would be provided to the grid by more-GHG-intensive means.	

1.4 Project Proponent

Organization name	Blue World Carbon Asset Management (Pty) Ltd (Primary project Proponent)
Contact person	Ilya Goryashin
Title	General Manager
Address	37 Danville Avenue, Durban North, Kwa-Zulu Natal Province, South Africa, 4051
Telephone	+27790908139
Email	Ilya.goryashin@blueworldcarbon.com

Organization name	Longyuan Mulilo De Aar 2 North (RF) (Pty) Ltd
Contact person	Frank Galant
Title	Asset Manager
Address	1st Floor, Mazars house, Rialto road, Grand Moorings Precinct, Century City, 7441
Telephone	+27(0) 21 685 3240
Email	info@mulilo.com

1.5 Other Entities Involved in the Project

Not applicable

1.6 Project Start Date

Project start date	31-October-2017
Justification	Project start date is the day when the wind farm started commercial operation.

1.7 Project Crediting Period

Crediting period	☐ *Seven years, twice renewable* ☒ *Ten years, fixed* ☐ *Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)*
Start and end date of first or fixed crediting period	01 November 2017 (00:00) – 31 October 2027 (24:00)

1.8 Project Location

The project is located on Farm 136 (Portion 1 and Portions 6), 148 (Portions 2, 4 and Remainder), 165 (Portion 1 and Portion 7), 149 (Portion 1), 150 (Portion 4 and Remainder), 151 (Portion 1 and Portion 2) outside of the town of De Aar. De Aar is the main town of the Emthanjeni Local Municipality located in the Northern Cape Province of the RSA (Figure 1.7-1 and Figure 1.7-2).

Geographical latitude: -30.538320. Geographical longitude: 24.262329. Time zone: UTC+2.

Figure 1.7-1: Location of De Aar in the Republic of South Africa

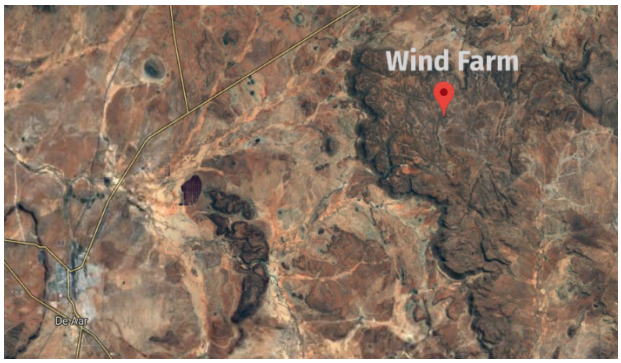


Figure 1.7-2: The wind farm site

The GPS coordinates of wind turbines is specified in Table below:

Item	As Built (Latitude & Longitude)	Item	As Built (Latitude & Longitude)	Item	As Built (Latitude & Longitude)
1	S30°30'39.18" E24°13'41.82"	33	S30°32'0.6" E24°24'34.68"	65	S30°32'19.62" E24°17'59.46"
2	S30°31'30.3" E24°13'58.26"	34	S30°31'45.18" E24°24'16.26"	66	S30°32'41.52" E24°17'14.1"
3	S30°31'39.84" E24°13'30.42"	35	S30°32'52.86" E24°14'50.88"	67	S30°30'56.52" E24°24'20.34"
4	S30°31'22.02" E24°23'10.92"	36	S30°32'35.16" E24°15'15.18"	68	S30°32'45.72" E24°17'40.08"
5	S30°32'24.18" E24°13'50.88"	37	S30°32'21.54" E24°15'17.22"	69	S30°31'26.58" E24°24'1.8"
6	S30°33'1.14" E24°18'51.96"	38	S30°31'48.12" E24°13'51.3"	70	S30°31'57.9" E24°18'26.04"
7	S30°30'32.7" E24°13'50.82"	39	S30°31'11.46" E24°23'34.68"	71	S30°31'29.34" E24°18'22.68"
8	S30°30'52.08" E24°13'38.76"	40	S30°32'25.68" E24°15'51.84"	72	S30°31'11.88" E24°18'22.5"
9	S30°31'22.74" E24°13'37.2"	41	S30°31'10.92" E24°24'4.8"	73	S30°30'54.96" E24°18'30.66"
10	S30°31'29.46" E24°13'26.76"	42	S30°31'53.76" E24°16'22.02"	74	S30°30'53.28" E24°18'48.66"
11	S30°31'54.42" E24°13'25.8"	43	S30°31'41.34" E24°16'32.64"	75	S30°31'10.98" E24°18'37.5"
12	S30°30'58.44" E24°14'0"	44	S30°31'24.84" E24°16'41.28"	76	S30°31'40.2" E24°18'38.28"
13	S30°30'39.96" E24°14'17.76"	45	S30°31'11.28" E24°16'58.62"	77	S30°32'22.32" E24°25'10.44"
14	S30°30'40.38" E24°14'39.18"	46	S30°30'57.24" E24°16'59.22"	78	S30°32'44.04" E24°18'53.46"
15	S30°30'40.68" E24°14'54.9"	47	S30°31'5.58" E24°17'23.58"	79	S30°31'28.8" E24°24'48.18"
16	S30°30'54.6" E24°14'59.1"	48	S30°30'46.8" E24°23'47.82"	80	S30°33'0.12" E24°19'21.24"
17	S30°30'55.8" E24°14'43.14"	49	S30°31'45.18" E24°16'51.54"	81	S30°32'25.08" E24°24'42.3"
18	S30°30'53.16" E24°14'23.88"	50	S30°31'41.52" E24°17'53.28"	82	S30°33'44.7" E24°19'17.52"
19	S30°31'12.42" E24°14'30.18"	51	S30°30'59.82" E24°23'44.04"	83	S30°33'27.72" E24°19'19.62"
20	S30°31'21.66" E24°14'55.38"	52	S30°31'53.76" E24°17'31.44"	84	S30°31'26.58" E24°24'22.56"
21	S30°31'12.24" E24°15'12.24"	53	S30°32'7.98" E24°17'423.6"	85	S30°32'13.44" E24°24'21.42"
22	S30°31'1.26" E24°15'31.68"	54	S30°32'27.36" E24°16'46.02"	86	S30°31'28.44" E24°25'11.4"
23	S30°31'19.5" E24°15'36.36"	55	S30°32'46.98" E24°16'19.8"	87	S30°31'18.72" E24°25'25.2"
24	S30°31'34.68" E24°15'14.76"	56	S30°33'43.98" E24°16'33.72"	88	S30°31'36.84" E24°25'39.9"

Item	As Built (Latitude & Longitude)	Item	As Built (Latitude & Longitude)	Item	As Built (Latitude & Longitude)
25	S30°31'18" E24°23'22.44"	57	S30°33'27.24" E24°15'53.46"	89	S30°32'11.82" E24°23'53.1"
26	S30°32'0.84" E24°15'44.88"	58	S30°33'29.94" E24°16'22.14"	90	S30°32'28.26" E24°23'54.84"
27	S30°31'48.18" E24°15'52.44"	59	S30°33'7.44" E24°16'26.4"	91	S30°32'25.32" E24°25'3.42"
28	S30°31'18.24" E24°16'5.76"	60	S30°30'33.78" E24°23'48.48"	92	S30°31'50.28" E24°25'3.42"
29	S30°31'45.18" E24°24'16.26"	61	S30°32'25.08" E24°17'12.6"	93	S30°32'4.74" E24°25'16.86"
30	S30°32'20.46" E24°14'27.36"	62	S30°30'42.48" E24°24'23.58"	94	S30°32'12.72" E24°25'35.22"
31	S30°32'3" E24°14'28.98"	63	S30°32'0.78" E24°18'2.34"	95	S30°32'8.76" E24°23'30"
32	S30°32'9.84" E24°14'46.08"	64	S30°31'44.34" E24°18'25.02"	96	S30°31'55.8" E24°23'38.4"

1.9 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	ACM0002	Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources	19.0
TOOL	01	Methodological tool: Tool for the demonstration and assessment of additionality	07.0.0
TOOL	05	Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation	03.0
TOOL	24	Methodological tool: Common practice	03.1
TOOL	27	Methodological tool: Investment analysis	09.0

1.10 Double Counting and Participation under Other GHG Programs

1.10.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.10.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

1.11 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.11.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit?

☐ Yes ☒ No

1.11.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system*?*

☐ Yes ☒ No

1.11.3 Supply Chain (Scope 3) Emissions

Do the project activities affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

1.12 Sustainable Development Contributions

The project comprises only one activity – a single wind farm with the total installed capacity of 144 MW, which was implemented close to the town of De Aar in the Northern Cape Province of the Republic of South Africa. 96 x UP86-1.5MW turbines, supplied by Guodian United Power, are employed by the project.

Electricity generated by the project is fed into the electricity grid of the Southern African Power Pool (SAPP), where South Africa is represented by Eskom, displacing energy that would have otherwise be 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 CO_2 emission factor of 0.9871 t CO_2/MWh adopted for the electricity system of the SAPP.

As part of regional development efforts associated with this wind project and the sister registered VCS project 1949, Longyuan Mulilo De Aar 2 North (RF) (Pty) Ltd (Longyuan Mulilo) has:

- Initiated a Longyuan Mulilo Health Project to provide health services, including primary healthcare, dental, eye clinic and COVID-19 related services to students, educators and community members around the project using a Mobile Health Clinic (MHC), which was donated to the Department of Health to screen up to 8 800 learners annually on a permanent base. Areas visited by the MHC to date include St Johns Primary School, Emthanjeni Primary School, Orion High School, Monwabisi High School, Veritas High School, De Aar Town Clinic, Hoerskool Theron School, Montana Clinic, Nonzwakazi Clinic etc.;
- Launched Maths Enrichment Program aiming at improving the results of the subjects in the local schools through resourcing the learners, stimulating interest in the subjects, and creating opportunities to study further in subject related tertiary courses. The enrichment program also aims to encourage more leaners to take Maths and Science to Grade 12 level. Longyuan Mulilo's funding contributions went for salaries, student allowances, student study sponsorship, running cost and management fees;
- Launched a Bursary Programme for tertiary studies to support students, which among others includes covering of tuition fees, institution's registration fees and accommodation fees, as well as book allowance per annum, food stipend (if the student applied and qualified) and laptops. Students are selected based on financial circumstances and targeting those that could not have attended tertiary education without support of the bursary programme. Annual budget of R4 000 000 was allocated to the Bursary Programme;
- Launched a SARETEC Training Program for adults from the De Aar local community. This course is run through the South African Renewable Energy Technology Centre ("SARETEC"), a division of Cape Peninsula University of Technology as a Renewable Energy accredited and world-renowned trainer. The Economic Development Plan and budget allows for 7 adults from the De Aar local community to join a 9-month course through SARETEC(CPUT) that will allow them to graduate as Wind Turbine Service Technicians;
- Renovated the 3 Early Childhood Development (ECD) Centres: Kaalvoet Akademie ECD, Karoo Druppels ECD and Mthuthuzeli Daycare ECD, with the long term impact to provide quality early childhood development programmes and services for the

benefit of young children, their families and the communities and by also improving quality of early childhood development in Emthenjeni and Renosterberg regions of South Africa. Longyuan Mulilo contributes towards salaries, food and other support;

- Upgraded the house and assisted with reparations of the Safe Haven located in Philipstown, which aim is to serve and help the abused women and children of Philipstown;
- Funded the rehabilitation of the water supply system of Philipstown. 5 existing boreholes were cleaned and re-equipped, 1 new borehole was drilled.

Furthermore, Longyuan Mulilo has:

- Increased the share of renewable energy in the energy mix (South African and global);
- Contributed to the development of the resilient grid infrastructure of South Africa by reducing the pressure on the generation capacity of the grid-connected power plants;
- Prevented the release of CO_2 emissions into the atmosphere.

Table 1: Sustainable Development Contributions

Row number	SDG target	SDG indicator	Net impact on SDG indicator	Current project contributions	Contributions over project lifetime
1)	3.8	3.8.1 Coverage of essential health services	Implemented activities to increase	4,359 people have been screened. The total number of services is 17,436 which include 4,359 dental, 4,359 optometry screenings, 4,359 primary healthcare screenings, and 4,359 COVID-19 screenings.	1 mobile health clinic was donated to the Department of Health to screen up to 8,800 learners annually on a permanent base by both this Project 1949 and sister Project 1950. 55,457 people have been screened over the project lifetime due to this Project 1950.
2)	4.1	4.1.1 Proportion of children and young people (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex	Implemented activities to increase	2,272 leaners went through the Math enrichment program in 2023, a further 390 leaners added benefit to in the form of exposure to robotics offerings	Maths enrichment program was launched for learners in the 10 primary schools and 4 high schools by both this Project 1950 and sister Project 1949. 1,158 leaners went through the programme in 2018, 1,416 in 2019, 1,461 in 2020, 5 in 2021, 2,700 in 2022, and 2,272 in 2023 due to this Project 1950.

3)	4.2	The number of children enrolled in early childhood development centers	Implemented activities to increase	No new children were enrolled to Kaalvoet Akademie in 2023. 45 children continued to attend ECD center in 2023. 23 children went to grade R.	3 Early Childhood Development Centers were renovated by both this Project 1950 and sister Project 1949. Longyuan Mulilo contributes towards salaries, food, supporting children between the ages of 2 and 6 years. Over 172 underprivileged children attended the ECD from the community due to this Project 1950.
4)	4.3	4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex	Implemented activities to increase	Bursary Programme supported 25 students (including 7 new) in 2023.	72 students were supported by the Bursary programme due to this Project 1950.
5)	4.4	By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	Implemented activities to increase	2 adults went through SARETEC Training Program	2 adults from the De Aar local community went through SARETEC Training Program

6)	4.b	4.b.1 Volume of official development assistance flows for scholarships	Implemented activities to increase	Bursary Programme budget was R 4,165,597 in 2023	Bursary programme has spent a total of R 13,503,947.16 to the end of 2023 due to this Project 1950.
7)	6.1	6.1.1 Proportion of population using safely managed drinking water services	Implemented activities to increase	-	The estimated current water demand for Philipstown is 1,130 kl per day. Previously they could only extract about 580 kl per day which did not meet the demand. When all five new pumps are running the total ground water abstraction amounts to 1,236 kl per day which does meet the demand. The water is provided to 3,251 people due to this Project 1950.
8)	7.2	By 2030, increase substantially the share of renewable energy in the global energy mix	Implemented activities to increase	The project has supplied 497,547 MWh of wind-generated electricity into the grid of South Africa in 2023.	The project has supplied 2,831,440 MWh of wind-generated electricity into the grid of South Africa.

9)	9.1	Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	Implemented activities to increase	The project has supplied 497,547 MWh of wind-generated electricity into the grid of South Africa in 2023	The total installed capacity of the project is 144 MW. The project has supplied 2,831,440 MWh of wind-generated electricity into the grid of South Africa.
10)	13.0	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to decrease	By supplying wind-generated electricity to the grid, the project has prevented the release of 490,954 tCO_2e into the atmosphere during the reporting period	Prevented the release of 2,794,486 t CO_2e into the atmosphere due to this Project 1950

1.13 Commercially Sensitive Information

Not applicable.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	Not applicable, the stakeholder make up has not changed since validation
Legal or customary tenure/access rights	Not applicable
Stakeholder diversity and changes over time	Not applicable
Expected changes in well-being	Not applicable
Location of stakeholders	Not applicable
Location of resources	Not applicable

2.1.2 Stakeholder Consultation and Ongoing Communication

Ongoing consultation	Longyuan Mulilo has a Grievance Procedure in place, which explain how stakeholders can lodge or raise an issue, concern, problem, or claim that an individual or group wants the company, wind farm operator or contractor on site to address and resolve, which is directly and indirectly related to the company's business activities. Please see Section 2.1.4 below for details.

Date(s) of stakeholder consultation	Not applicable
Communication of monitored results	Not applicable
Consultation records	Not applicable
Stakeholder input	No issues, concerns, problems, or claims have been lodged or raised through the Grievance Procedure during the monitoring period.

2.1.3 Free, Prior, and Informed Consent

Consent	Not applicable. No issues, concerns, problems, or claims have been lodged or raised through the Grievance Procedure during the monitoring period. There are no any ongoing or unresolved conflicts.
Outcome of FPIC	Not applicable

2.1.4 Grievance Redress Procedure

Longyuan Mulilo has a Grievance Procedure in place, which is also used for documenting the outcomes of the local stakeholder communication. Grievance Procedure explains the mechanism for on-going communication with local stakeholders.

Stakeholders can submit grievances or complaints using any of the methods made available that they feel comfortable with. A range of submission methods are available given the varying capabilities and access to resources across the diverse stakeholder groups. The submission methods that are available include:

- office telephone line that is available during office hours:
    - De Aar: 021 300 3487;
    - Cape Town: 021 685 3240.
- email to frank@mulilo.com
- formal letter at the following addresses:
    - 20 van der Merwe Street, De Aar, 7000
- in-person to the following personnel; and

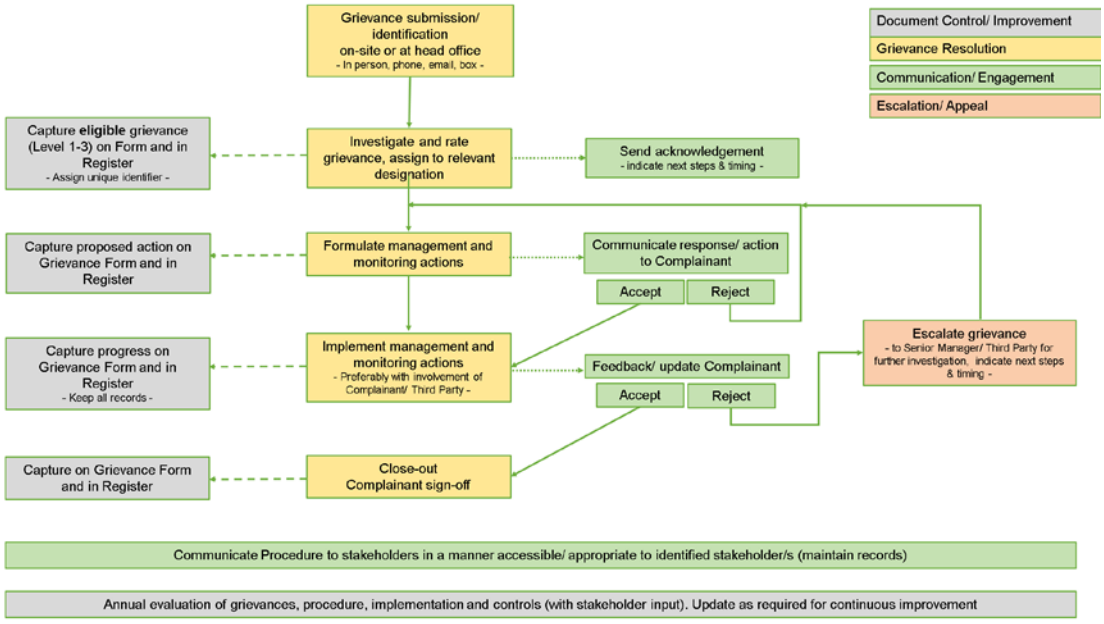
- Beverley Horak (Project Administrator);
- Andrew Doughty (SHEQ Manager).

- self-identification of external grievances by oper community Trust ational personnel/ representatives; this is encouraged as a pro-active approach to identify potential grievances.

Grievances, whether submitted via letter, e-mail or telephonically, must be captured on the Grievance form by the designated operational representatives listed above. Stakeholders will be encouraged to use a Grievance form that are available on request (via telephone call, e-mail) and at the office address specified above.

Anonymous submissions are acceptable.

Grievance Management Process are as follows:



Grievances received	Resolution and outcome
No issues, concerns, problems, or claims have been lodged or raised through the Grievance Procedure **during the monitoring period**.	N/A

2.1.5 Public Comments

Summary of comments received	Actions taken
No comments received	N/A

2.2 Risks to Stakeholders and the Environment

	Risk identified	Mitigation or preventative measure taken
Risks to stakeholder participation	No risk identified	There are no any risks to stakeholder participation. Stakeholders can submit grievances or complaints using any of the methods made available that they feel comfortable with. A range of submission methods are available given the varying capabilities and access to resources across the diverse stakeholder groups. Anonymous submissions are acceptable.
Working conditions	No risk identified	The wind farm management makes every effort to avoid health risks of workers during the operation as well as follows all applicable laws, including Occupational Health and Safety Act, No. 85 of 1993. The access to the site and electrical equipment is restricted for strangers without special training and without following the Health and Safety requirements.
Safety of women and girls	No risk identified	Same as above, the safety is an absolute priority for the wind farm management and the onsite personal.
Safety of minority and marginalized groups, including children	No risk identified	Same as above, the safety is an absolute priority for the wind farm management and the onsite personal.

Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials)	No risk identified	During the operation phase the cumulative contribution of the wind turbines and the transformer substation on the noise environment at the communities around the site is within acceptable levels.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Discrimination and sexual harassment	No discrimination or sexual harassment has occurred during project life cycle.
Management experience	Not applicable. No new entities were introduced to the project.
Gender equity in labor and work	Please refer to South African National Gender Policy Framework. The owner of the wind farm fully supports the South African National Gender Policy Framework and shares its principals to ensure that there is equality of all persons and that non-sexism and non-racism be enshrined in the Constitution of South Africa.
Human trafficking, forced labor, and child labor	Project does not use victims of human trafficking, forced labor, or child labor in any kind. Please refer to South African Human Rights Commission Act 40 of 2013. The wind farm owner respects this Act and other norms of the national legislation.

2.3.2 Human Rights

Please refer to South African Human Rights Commission Act 40 of 2013. The wind farm owner respects this Act and other norms of the national legislation. The project does not lead to violations of human rights in any kind. The wind farm owner supports Human Rights to access clean energy.

2.3.3 Indigenous Peoples and Cultural Heritage

As part of regional development efforts associated with this wind project and the sister registered VCS project 1949, Longyuan Mulilo De Aar 2 North (RF) (Pty) Ltd (Longyuan Mulilo) has:

- Renovated the 3 Early Childhood Development (ECD) Centres: Kaalvoet Akademie ECD, Karoo Druppels ECD and Mthuthuzeli Daycare ECD, with the long term impact to provide quality early childhood development programmes and services for the benefit of young children, their families and the communities and by also improving quality of early childhood development in Emthenjeni and Renosterberg regions of South Africa. Longyuan Mulilo contributes towards salaries, food and other support;
- Upgraded the house and assisted with reparations of the Safe Haven located in Philipstown, which aim is to serve and help the abused women and children of Philipstown.

2.3.4 Property Rights

Disputes over rights to territories and resources	N/A
Respect for property rights	The land rights have been secured through the longterm lease agreement

2.3.5 Benefit Sharing

Summary of the benefit sharing plan	Please refer to Table 2 above for Sustainable Development Contributions. There no additional benefit sharing plans or agreements.
Benefit sharing during the monitoring period	Not applicable

2.4 Ecosystem Health

	Risk identified	Mitigation or preventative measure taken during the monitoring period
Impacts on biodiversity and ecosystems	Reptiles may be forced out of their underground shelters during the construction phase. Birds and bats may be impacted through collision with the blades of the wind turbines as well as collision with the associated power line during the operational phase	All turbines and the substation are located at least 30m from any mapped High sensitively area.
Soil degradation and soil erosion	No risk identified	Most of the current cultivation is possible between the structures
Water consumption and stress	No risk identified	No water consumption or stress
Usage of fertilizers	No risk identified	Fertilizers are not used during project life cycle

2.4.1 Rare, Threatened, and Endangered species

Not applicable.

2.4.2 Introduction of species

Not applicable.

2.4.3 Ecosystem conversion

Not applicable.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project was implemented without any changes comparing with the VCS PD. The wind farm started commercial operation on 31/10/2017 and has being operating without events that could impact the GHG emission reductions or removals and monitoring.

In this monitoring period there no downtimes.

This is not an AFOLU project.

3.2 Deviations

3.2.1 Methodology Deviations

Not applicable, there are no methodology deviations applied during this monitoring period.

3.2.2 Project Description Deviations

Not applicable, there are no project description deviations applied during this monitoring period. There were no project description deviations applied in previous monitoring reports (this is the fourth monitoring report).

3.3 Grouped Projects

Not applicable, this is not a grouped project.

3.4 Baseline Reassessment

Did the project undergo baseline reassessment during the monitoring period?

☐ Yes ☒ No

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined margin CO_2 emission factor for grid connected power generation calculated ex ante
Source of data	ASB0040-2018, Table 1, page 5
Value applied	0.9871
Justification of choice of data or description of measurement methods and procedures applied	Standardized baseline ASB0040-2018 is selected for the project. 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
Purpose of data	Calculation of baseline emissions

Comments	This value was appointed as a constant for the whole crediting period

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{PJ,y}$
Data unit	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	On-site measurement by electricity meters, yielding the net electricity supplied to the grid of the RSA. There are two main meters installed in the De Aar 2 North IPP Substation on 132kV side. Each meter is accompanied with the check meter. Monthly reports with the records for delivered electricity to the Ndhlovu Eskom Substation are submitted by Eskom to PP
Description of measurement methods and procedures to be applied	There are two main meters installed in De Aar 2 North IPP Substation on 132kV side. Each meter measures the grid electricity export and the import from grid. PP calculates the difference between the measured quantities of the grid electricity export and the import from grid. Each meter is accompanied with the check meter for the cross check. The exported and imported electricity is continuously measured and recorded. Data are digitally archived at least on a monthly basis. On the Ndhlovu Eskom Substation measurement of the electricity supplied to the grid is also carried out by Eskom. Monthly reports with the records for delivered electricity to the Ndhlovu Eskom Substation are submitted by Eskom to PP. PP compares and calculates the difference between two measurements. The lowest value shall be used for calculations of the baseline emissions. Longyuan Mulilo's personal, including the plant manager, is responsible for implementation and overall control as well as collection of all data, and submits the data to BWC.

<table>
<tr><td>Frequency of monitoring/recording</td><td>Continuous measurement</td></tr>
<tr><td>Value monitored</td><td>Actual values for the purpose of calculation of GHG emission reductions archived:
<table>
<tr><th>Month</th><th>Month</th><th>Year</th><th>Value</th></tr>
<tr><td>January</td><td>1</td><td>2023</td><td>43,111.968023</td></tr>
<tr><td>February</td><td>2</td><td>2023</td><td>35,362.031984</td></tr>
<tr><td>March</td><td>3</td><td>2023</td><td>42,876.863996</td></tr>
<tr><td>April</td><td>4</td><td>2023</td><td>27,333.648003</td></tr>
<tr><td>May</td><td>5</td><td>2023</td><td>32,368.559969</td></tr>
<tr><td>June</td><td>6</td><td>2023</td><td>44,656.776028</td></tr>
<tr><td>July</td><td>7</td><td>2023</td><td>47,298.144022</td></tr>
<tr><td>August</td><td>8</td><td>2023</td><td>46,029.936009</td></tr>
<tr><td>September</td><td>9</td><td>2023</td><td>46,002.408010</td></tr>
<tr><td>October</td><td>10</td><td>2023</td><td>46,692.815978</td></tr>
<tr><td>November</td><td>11</td><td>2023</td><td>39,239.399985</td></tr>
<tr><td>December</td><td>12</td><td>2023</td><td>46,574.592013</td></tr>
</table></td></tr>
<tr><td>Monitoring equipment</td><td>The meter class is 0.2S.

Landis+Gyr E650 (or similar) electricity meters shall be used.

Serial numbers of currently installed main meters are: 37108386 and 37108384. Meters are installed at the on-site substation.</td></tr>
<tr><td>QA/QC procedures to be applied</td><td>Electricity meters are calibrated as per the requirements of the Power Purchase Agreement, clause 12.6.7, when the difference between measurements at the Ndhlovu Eskom Substation and De Aar 2 North IPP Substation is more than 0.5%. The meters were calibrated in 2017.</td></tr>
<tr><td>Purpose of the data</td><td>Calculation of baseline emissions</td></tr>
<tr><td>Calculation method</td><td>PP compares and calculates the difference between measurements in the De Aar 2 North IPP Substation and measurements in the Ndhlovu Eskom Substation. The lowest value shall be used for calculations of the baseline emissions.</td></tr>
<tr><td>Comments</td><td>-</td></tr>
</table>

4.3 Monitoring Plan

The following monitoring procedures are applied:

1. Monitoring period

This monitoring report covers the following monitoring period: 01-January-2023 to 31-December-2023.

2. Data monitored and sources

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. There are two main meters installed in De Aar 2 North IPP Substation on 132kV side. Each meter is accompanied with the check meter (Figure 4.3-1).

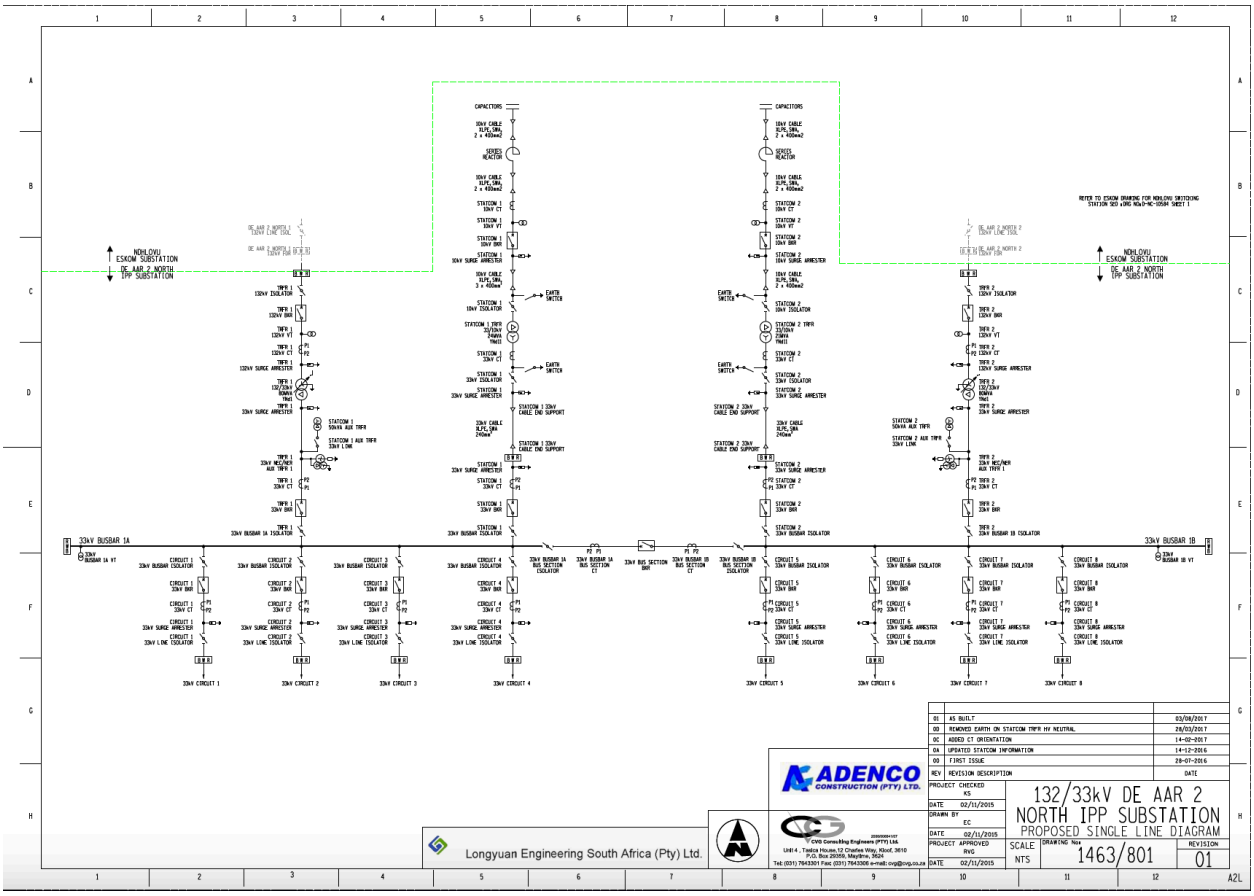


Figure 4.3-1: 132/33kV De Aar 2 North IPP Substation. Single Line Diagram

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.

The emission reductions are calculated using the formulas in Section 3.2 of the VCS-PD.

3. The monitoring team

The wind farm staff underwent the necessary training related to operation and maintenance of the wind farm. The maintenance personnel of the wind farm are responsible for daily control over the monitoring plan implementation.

The Plant Manager of the wind farm is responsible for timely calibration of all instrumentation in accordance with the requirements of the power purchase agreement. Longyuan Mulilo's personal are responsible for implementation and overall control as well as collection and submission of all data to BWC.

Specialists of BWC calculate GHG emission reductions with data that are provided by Longyuan Mulilo.

In case of any doubts as to the accuracy of the data, the specialists of Longyuan Mulilo check and correct the data. The preliminary version of the monitoring report is submitted to the specialists of Longyuan Mulilo for review. In case any mistakes are found in the calculations of GHG emission reductions, the specialists of BWC correct these calculations accordingly.

4. Data storage

All data collected as part of monitoring plan are archived electronically and kept at least for 2 years after the end of the crediting period.

5. Instrumentation calibration

The instrumentation calibration and check-out are carried out in accordance with the requirements of the power purchase agreement. Longyuan Mulilo is responsible for the calibration or replacement of the meters.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

The baseline emissions are calculated as follows:

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

Where:

BE_y = Baseline emissions in year *y* (tCO_2)

$EG_{PJ,y}$ = 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 CO_2 emission factor for grid connected power generation in year *y* (tCO_2/MWh)

Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the project

The following Tariff Meters are installed in the De Aar 2 NorthIPP Substation on 132kV side:

Tariff Meter	Serial Number
132/33KV TRFR1_(Main)	37108384
132/33KV TRFR1_(Check)	37108385
132/33KV TRFR2_(Main)	37108386
132/33KV TRFR2_(Check)	37108387

The tariff meters are equipped with the check meters.

The measured data from Tariff Meter 1 (main and check):

Month	Month	Year	Net electricity generation from the on-site meters (kWh)		
			TRFR1 (main) (37108384)	TRFR1 (check) (37108385)	BWC's Check 1
January	1	2023	22,174,392	22,151,560	0.103%
February	2	2023	17,919,047	17,411,475	2.833%
March	3	2023	21,910,872	21,926,585	-0.072%
April	4	2023	14,468,184	14,501,810	-0.232%
May	5	2023	16,493,279	16,497,490	-0.026%
June	6	2023	23,428,560	23,437,620	-0.039%
July	7	2023	24,581,064	23,920,600	2.687%
August	8	2023	23,893,175	23,904,705	-0.048%
September	9	2023	24,179,327	24,184,135	-0.020%
October	10	2023	24,738,503	24,761,875	-0.094%
November	11	2023	20,283,983	20,281,405	0.013%
December	12	2023	25,517,520	24,804,805	2.793%

The difference in meter readings does not exceed 0.5%, except the readings for February, July, and December 2023. This is due to the fact that the upload of electricity generation data from the check meter for the last days of the specified months (28/02/2023, 31/07/2023, and 31/12/2023) is not working. The difference in meter readings for the remaining days of February, July, and December does not exceed 0.5%.

The measured data from Tariff Meter 2 (main and check):

Month	Month	Year	Net electricity generation from the on-site meters (kWh)		
			TRFR2 (main) (37108386)	TRFR2 (check) (37108387)	BWC's Check 2
January	1	2023	20,937,576	20,900,735	0.176%
February	2	2023	17,442,984	17,436,090	0.040%
March	3	2023	20,965,992	20,978,025	-0.057%
April	4	2023	12,865,464	12,893,015	-0.214%
May	5	2023	15,875,280	15,867,260	0.051%
June	6	2023	21,228,216	21,223,950	0.020%
July	7	2023	22,717,080	22,126,805	2.598%
August	8	2023	22,136,760	22,135,385	0.006%
September	9	2023	21,823,080	20,711,030	5.096%
October	10	2023	21,954,312	21,964,090	-0.045%
November	11	2023	18,955,416	18943410	0.063%
December	12	2023	21,057,072	21,053,665	0.016%

The difference in meter readings does not exceed 0.5%, except the readings for July and September 2023. This is due to the fact that the upload of electricity generation data from the check meter for the last days of the specified months (31/07/2023 and 31/12/2023) is not working. The difference in meter readings for the remaining days of July and September does not exceed 0.5%.

On the Ndhlovu Eskom Substation measurement of the electricity supplied to the grid is also carried out by Eskom and captured on the Eskom's Payment Certificates:

Month	Month	Year	Eskom Payment Certificates		BWC's Check 3
			Metered	Commercial Energy	
January	1	2023	43,057,968.026	43,057,968.030	0.000%

Month	Month	Year	Eskom Payment Certificates		BWC's Check 3
			Metered	Commercial Energy	
February	2	2023	35,355,671.984	35,355,671.980	0.000%
March	3	2023	42,887,663.994	42,887,663.990	0.000%
April	4	2023	27,380,568.003	27,380,568.000	0.000%
May	5	2023	32,348,471.975	32,348,471.980	0.000%
June	6	2023	44,653,800.030	44,653,800.030	0.000%
July	7	2023	47,255,880.018	47,255,880.020	0.000%
August	8	2023	46,028,952.009	46,028,952.010	0.000%
September	9	2023	45,964,368.014	45,964,368.010	0.000%
October	10	2023	46,711,079.978	46,711,079.980	0.000%
November	11	2023	39,238,199.985	39,238,199.990	0.000%
December	12	2023	46,568,712.015	46,568,712.020	0.000%

The lowest values between the measured by Eskom and the on-site measured by Tariff Meters are used for the calculations of the baseline emissions:

Month	Month	Year	KWh used to calculate the baseline emissions		
			Total TRFR1 (main) + TRFR2 (main)	Metered by Eskom	Minimum value
January	1	2023	43,111,968	43,057,968	43,057,968.026
February	2	2023	35,362,032	35,355,672	35,355,671.984
March	3	2023	42,876,864	42,887,664	42,876,863.996
April	4	2023	27,333,648	27,380,568	27,333,648.003
May	5	2023	32,368,560	32,348,472	32,348,471.975
June	6	2023	44,656,776	44,653,800	44,653,800.030
July	7	2023	47,298,144	47,255,880	47,255,880.018
August	8	2023	46,029,936	46,028,952	46,028,952.009
September	9	2023	46,002,408	45,964,368	45,964,368.014
October	10	2023	46,692,816	46,711,080	46,692,815.978
November	11	2023	39,239,400	39,238,200	39,238,199.985
December	12	2023	46,574,592	46,568,712	46,568,712.015

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):

Month	Month	Year	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)
January	1	2023	43,111,968.023
February	2	2023	35,362,031.984
March	3	2023	42,876,863.996
April	4	2023	27,333,648.003
May	5	2023	32,368,559.969
June	6	2023	44,656,776.028
July	7	2023	47,298,144.022
August	8	2023	46,029,936.009
September	9	2023	46,002,408.010
October	10	2023	46,692,815.978
November	11	2023	39,239,399.985
December	12	2023	46,574,592.013

Combined margin CO_2 emission factor for grid connected power generation

Standardized baseline ASB0040-2018 is selected for the project. 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 is 0.9871 t CO_2/MWh.

Baseline emissions

Baseline emissions in year *y* (tCO_2):

Month	Month	Year	Baseline emissions in year *y* (tCO_2)
January	1	2023	42,502
February	2	2023	34,899
March	3	2023	42,323
April	4	2023	26,981
May	5	2023	31,931
June	6	2023	44,077
July	7	2023	46,646
August	8	2023	45,435

Month	Month	Year	Baseline emissions in year *y* (tCO_2)
September	9	2023	45,371
October	10	2023	46,090
November	11	2023	38,732
December	12	2023	45,967
		Total for 2023:	490,954

5.2 Project Emissions

Since the project activity uses wind energy to generate electricity the project emissions are equal to zero: $PE_y = 0$.

5.3 Leakage Emissions

No leakage emissions are considered. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing and transport). These emissions sources are neglected: $LE_y = 0$.

5.4 GHG Emission Reductions and Carbon Dioxide Removals

Vintage period	Baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Leakage emissions (tCO_2e)	Reduction VCUs (tCO_2e)	Removal VCUs (tCO_2e)	Total VCUs (tCO_2e)
2023 (01-January-2023 - 31-December-2023)	490,954	0,000	0,000	490,954	0,000	490,954
Total	**490,954**	**0,000**	**0,000**	**490,954**	**0,000**	**490,954**

Vintage period	Ex-ante estimated reductions/ removals	Achieved reductions/ removals	Percent difference	Explanation for the difference
2023 (01-January-2023 - 31-December-2023)	433,929	490,954	13.15%	The achieved emission reductions are 13.15% more. This is mostly due to favorable wind conditions

Total	**433,929**	**490,954**		

APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION

Not applicable.