Longyuan Mulilo De Aar 2 North Wind Energy Facility Monitoring Report (01/11/2017 – 31/12/2020)

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1 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 1,428,835 tCO_2e.

1.2 Sectoral Scope and Project Type

This project falls under sectorial scope: Energy (renewable/non-renewable).

Project type is Renewable energy. Displacement of electricity that would be provided to the grid by more-GHG-intensive means.

This is not a grouped project.

1.3 Project Proponent

Organization name	Blue World Carbon Asset Management (Pty) Ltd (Primary project Proponent)
Contact person	Ilya Goryashin
Title	General Manager
Address	http://www.blueworldcarbon.com
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[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

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 82 898 9886
Email	frank@mulilo.com

1.4 Other Entities Involved in the Project

Longyuan Mulilo De Aar 2 North (RF) (Pty) Ltd (Longyuan Mulilo) is the wind farm developer. Blue World Carbon Asset Management (Pty) Ltd (BWC) is a carbon consultant employed to develop all necessary VCS documentation, facilitate VCS registration, monitor the present project (monitoring plan), facilitate verification and request of VCUs issuance from VERRA. BWC receives a fee for its services.

Organization name	Longyuan Mulilo De Aar 2 North (RF) (Pty) Ltd (Longyuan Mulilo)
Role in the Project	The project owner and the wind farm developer
Contact person	Frank Galant
Title	Asset Manager
Address	1st Floor, Mazars house, Rialto road, Grand Moorings Precinct, Century City, 7441
Telephone	+27 82 898 9886
Email	frank@mulilo.com

1.5 Project Start Date

31/10/2017, the day when the wind farm started commercial operation.

1.6 Project Crediting Period

01 November 2017 (00:00) – 31 October 2027 (24:00); 10-year total period.

1.7 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

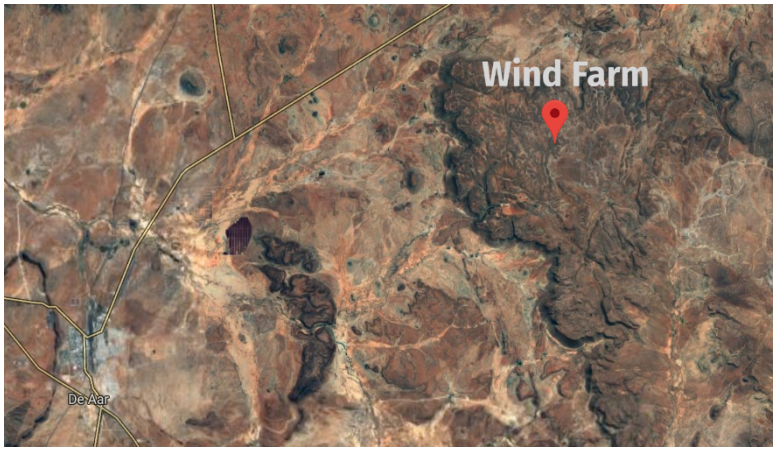

Figure 1.7-2: The wind farm site

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"

1.8 Title and Reference of Methodology

ACM0002: "Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources" (Version 19.0)[2]

TOOL01: "Methodological tool: Tool for the demonstration and assessment of additionality" (Version 07.0.0)[3]

TOOL05: "Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (Version 03.0)[4]

TOOL24: "Methodological tool: Common practice" (Version 03.1)[5]

TOOL27: "Methodological tool: Investment analysis" (Version 09.0)[6]

1.9 Participation under other GHG Programs

The project was not seeking registration under Other GHG Programs.

[2] https://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD
(this version of the methodology will be applied throughout the whole document)

[3] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf
(this version of the tool will be applied throughout the whole document)

[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf
(this version of the tool will be applied throughout the whole document)

[5] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-24-v1.pdf
(this version of the tool will be applied throughout the whole document)

[6] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v9.0.pdf
(this version of the tool will be applied throughout the whole document)

1.10 Other Forms of Credit

The project has never been included in an emissions trading program or any other Binding Limits.

The project has nether sought or received other Forms of Environmental Credit.

The project is eligible under the CDM and might seek CDM registration after the end of GHG Accounting Period with VCS programme.

1.11 Sustainable Development

This project satisfies all sustainable development goals of Host Party (DNA). The main benefits of the implementation of the present project are:

1. Social and economic: Promotion and development of wind power technology in the RSA which in turn will lead to the creation of new job opportunities both during the construction and operation phases and to growth in tax revenues. The project implementation led to creation of 8,987.3 person-month during the construction phase and 14,076 person-month during the operation phase. Sales of carbon credits generated by the project will result in increased foreign direct investment;
2. Environmental: Mitigation of the negative environmental impact. Combustion of fossil fuels (mostly coal) at Eskom's power plants and hereby emissions of the harmful substances into the atmosphere, such as flue gas, coal ash, oxides of sulphur and nitrogen will be reduced due to the implementation of the project; and
3. Other: Contribution to achievement of the national Government goal to generate 10,000 GWh of electricity from renewable energy by 2013 and the objective to reduce RSA's GHG emissions by approximately 34.00% below the current emissions baseline by 2020.

Reports on Enterprise and Social Economic Developments are quarterly submitted to the Department of Mineral Resources and Energy.

2 SAFEGUARDS

2.1 No Net Harm

The wind power is one of the cleanest sources of renewable energy, with no associated emissions and waste products. Socio-economic impact is positive. Possible negative impacts are discussed in the ensuing paragraphs below:

1) Impact 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.

Proposed mitigation measures: Length of road and cable trenches shall be reduced; relocation of facility to a lower sensitivity area; adjusting the schedule of operational turbines according to the results of ongoing monitoring of the bird and bat numbers and movement in the area; minimising the length of any new power lines.

2) Noise impact

The noise from construction machines has some impact on the surrounding area during the construction phase, which will only have a localized effect and is not expected to increase the ambient noise levels in nearest towns.

Proposed mitigation measures: all equipment should be maintained regularly and have appropriately filled silencers; personal should be specially trained. When working near to potentially sensitive receptor, coordinate the working time with periods when the receptors are not at home where possible.

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 will be within acceptable levels.

3) Impact on natural resources

The impact on the natural resources is the loss of arable land due to the construction of the turbines and associated infrastructure. However, most of the current cultivation or grazing practices will still be possible between the structures.

Proposed mitigation measures: Monitoring of the noise level

4) Impact on the atmosphere

The main impact is related to formation of dust during the construction period from land excavation and transportation vehicles. It should be mentioned that combustion of fossil fuels (mostly coal) at the Eskom power stations and hereby emissions of the harmful substances into the atmosphere, such as flue ash, oxides of sulphur and nitrogen will be reduced due to the project implementation.

Proposed mitigation measures: Dust pollution monitoring and following procedures for dealing with dust pollution

2.2 Local Stakeholder Consultation

The project owner appointed Aurecon South Africa (Pty) Ltd to undertake the Scoping and Environmental Impact Assessment and associated Public Participation Process (PPP) in terms of the NEMA EIA Regulations and VCS requirement.

Public Advertisements were placed in Local newspapers, the Echo and Die Volksblad, notifying the broader public of the initiation of the EIA and inviting them to register as Interested and Affected Parties (I&APs) from 4 November 2011.

Holding a public meeting on Wednesday, 30 November 2011 to present and discuss the findings of the DSR at the De Aar Civic Hall from 16:00-18:00. Notes of the public meeting were sent to all those who attended on 8 November 2011.

I&APs had 40 days, until the 5 January 2012 to submit their written comments on the DSR, however due to a mailing error the period was extended to 9 January 2012. Cognisance was taken of all comments when compiling the final report, and the comments, together with the project team and proponent's responses thereto, were included in final report.

The Final Scoping Report (FSR) was made available to the public for review and comments until 7 February 2012 at the same locations as the DSC from 18 January 2012. All registered I&APs were informed of the lodging of the FSR by means of a letter posted on 17 January 2012. The FSR outlined the full range of potential environmental impacts and feasible project alternatives and how these were derived. Moreover, it included a Plan of Study for EIA, which outlined the proposed approach to the EIA phase, including the requisite specialist investigations to be undertaken.

The further details are given in the final EIA report.

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

No issues, concerns, problems, or claims have been lodged or raised through the Grievance Procedure.

2.3 AFOLU-Specific Safeguards

Not applicable, this is not an AFOLU project.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

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.

3.2 Deviations

2.3.1 Methodology Deviations

Not applicable, there are no methodology deviations applied during these monitoring periods.

2.3.2 Project Description Deviations

The project crediting period was voluntary updated by the Project Proponents from 31 October 2017 (00:00) – 30 October 2027 (24:00) to 01 November 2017 (00:00) – 31 October 2027 (24:00).

The deviation does not in any way impact the applicability of the methodology, additionality and the appropriateness of the baseline scenario. There were no project description deviations applied in previous monitoring reports (this is the first monitoring report).

3.3 Grouped Projects

Not applicable, this is not a grouped project.

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.
Frequency of monitoring/recording	Continuous measurement
Value monitored	Actual values for the purpose of calculation of GHG emission reductions archived:

Period	Month	Year	Value
1	11	2017	41,388.791997
2	12	2017	42,054.144031
3	1	2018	44,680.344018
4	2	2018	34,201.223991
5	3	2018	35,727.143980
6	4	2018	26,535.959970
7	5	2018	31,180.991985
8	6	2018	36,057.624001
9	7	2018	42,677.760015
10	8	2018	38,316.936010
11	9	2018	35,306.279994
12	10	2018	39,853.775984
13	11	2018	42,956.255981
14	12	2018	46,169.520051
15	1	2019	46,437.624010
16	2	2019	32,215.368000
17	3	2019	36,470.543984
18	4	2019	31,309.848000
19	5	2019	30,777.024000
20	6	2019	38,147.423962
21	7	2019	46,044.312024
22	8	2019	30,952.511989
23	9	2019	38,472.288009
24	10	2019	46,370.471995
25	11	2019	40,388.544000
26	12	2019	45,855.432019
27	1	2020	43,686.335978
28	2	2020	35,623.968020
29	3	2020	34,519.751998
30	4	2020	34,871.615967
31	5	2020	20,868.408000
32	6	2020	30,097.655998
33	7	2020	36,438.791997
34	8	2020	45,801.216019
35	9	2020	33,736.176000
36	10	2020	44,313.959995
37	11	2020	45,177.984014

	38 | 12 | 2020 | 41,844.551978
Monitoring equipment	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.
QA/QC procedures to be applied	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%
Purpose of the data	Calculation of baseline emissions
Calculation method	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.
Comments	-

4.3 Monitoring Plan

The following monitoring procedures are applied:

1. Monitoring period 1-November-2017 to 31-December-2020

This monitoring report covers the following vintage periods:

- Vintage Period 1: 1-November-2017 to 31-December-2017
- Vintage Period 2: 1-January-2018 to 31-December-2018
- Vintage Period 3: 1-January-2019 to 31-December-2019
- Vintage Period 4: 1-January-2020 to 31-December-2020

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. 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):

Vintage Period	Month	Year	Net electricity generation from the on-site meters (kWh)		
			TRFR1 (main) (37108384)	TRFR1 (check) (37108385)	BWC's Check 1
1	11	2017	20,650,128	18,924,934	8.354%
2	12	2017	20,982,576	20,979,308	0.016%
3	1	2018	22,291,920	22,289,506	0.011%
4	2	2018	17,062,176	17,060,690	0.009%
5	3	2018	17,771,352	17,770,051	0.007%
6	4	2018	14,975,544	14,974,550	0.007%
7	5	2018	15,558,504	15,557,981	0.003%
8	6	2018	18,125,376	18,125,370	0.000%
9	7	2018	21,795,816	21,796,991	-0.005%
10	8	2018	19,923,840	19,926,340	-0.013%
11	9	2018	18,700,344	18,703,469	-0.017%
12	10	2018	20,953,032	20,952,308	0.003%
13	11	2018	22,689,552	22,692,330	-0.012%
14	12	2018	23,876,760	23,877,025	-0.001%
15	1	2019	23,886,192	23,886,794	-0.003%
16	2	2019	15,653,448	15,653,030	0.003%
17	3	2019	18,411,024	18,412,261	-0.007%

Vintage Period	Month	Year	Net electricity generation from the on-site meters (kWh)		
			TRFR1 (main) (37108384)	TRFR1 (check) (37108385)	BWC's Check 1
18	4	2019	16,028,904	16,029,740	-0.005%
19	5	2019	15,767,232	15,765,008	0.014%
20	6	2019	19,479,792	19,477,866	0.010%
21	7	2019	24,120,432	24,123,468	-0.013%
22	8	2019	16,098,696	16,100,209	-0.009%
23	9	2019	20,177,088	20,177,256	-0.001%
24	10	2019	24,428,496	24,430,257	-0.007%
25	11	2019	21,353,856	21,356,076	-0.010%
26	12	2019	24,123,264	24,120,605	0.011%
27	1	2020	22,713,408	22,718,027	-0.020%
28	2	2020	18,036,336	18,037,054	-0.004%
29	3	2020	17,879,256	17,883,051	-0.021%
30	4	2020	18,358,368	18,357,870	0.003%
31	5	2020	11,050,416	11,048,556	0.017%
32	6	2020	15,574,824	15,574,418	0.003%
33	7	2020	19,042,008	19,042,448	-0.002%
34	8	2020	24,007,512	24,004,586	0.012%
35	9	2020	17,749,992	17,751,333	-0.008%
36	10	2020	22,705,368	22,705,958	-0.003%
37	11	2020	23,486,304	23,492,100	-0.025%
38	12	2020	21,680,112	21,678,290	0.008%

The difference in meter readings does not exceed 0.5%, except the readings for November 2017. This is due to the fact that the check meter only started to record as from 6/11/2017.

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

Vintage Period	Month	Year	Net electricity generation from the on-site meters (kWh)		
			TRFR2 (main) (37108386)	TRFR2 (check) (37108387)	BWC's Check 2
1	11	2017	20,743,224	19,014,144	8.336%
2	12	2017	21,075,792	21,069,304	0.031%

Vintage Period	Month	Year	Net electricity generation from the on-site meters (kWh)		
			TRFR2 (main) (37108386)	TRFR2 (check) (37108387)	BWC's Check 2
3	1	2018	22,392,096	22,385,436	0.030%
4	2	2018	17,139,048	17,135,530	0.021%
5	3	2018	17,955,792	17,951,779	0.022%
6	4	2018	11,560,416	11,556,909	0.030%
7	5	2018	15,622,488	15,616,566	0.038%
8	6	2018	17,935,224	17,929,462	0.032%
9	7	2018	20,893,992	20,883,154	0.052%
10	8	2018	18,394,488	18,388,710	0.031%
11	9	2018	16,607,352	16,604,478	0.017%
12	10	2018	18,922,272	18,915,576	0.035%
13	11	2018	20,273,112	20,288,375	-0.075%
14	12	2018	22,292,904	22,289,715	0.014%
15	1	2019	22,552,032	22,548,142	0.017%
16	2	2019	16,561,920	16,556,760	0.031%
17	3	2019	18,059,520	18,056,561	0.016%
18	4	2019	15,280,944	15,277,040	0.026%
19	5	2019	15,009,792	15,003,291	0.043%
20	6	2019	18,671,040	18,662,241	0.047%
21	7	2019	21,930,504	21,921,668	0.040%
22	8	2019	14,853,816	14,847,133	0.045%
23	9	2019	18,305,640	18,297,677	0.043%
24	10	2019	21,957,888	21,949,159	0.040%
25	11	2019	19,034,688	19,027,520	0.038%
26	12	2019	21,745,944	21,734,805	0.051%
27	1	2020	20,975,016	20,973,886	0.005%
28	2	2020	17,589,528	17,583,778	0.033%
29	3	2020	16,640,976	16,639,602	0.008%
30	4	2020	16,513,248	16,506,824	0.039%
31	5	2020	9,823,032	9,813,277	0.099%
32	6	2020	14,528,256	14,521,618	0.046%
33	7	2020	17,417,520	17,411,431	0.035%
34	8	2020	21,794,880	21,784,872	0.046%
35	9	2020	15,986,184	15,980,501	0.036%

Vintage Period	Month	Year	Net electricity generation from the on-site meters (kWh)		
			TRFR2 (main) (37108386)	TRFR2 (check) (37108387)	BWC's Check 2
36	10	2020	21,608,592	21,599,123	0.044%
37	11	2020	21,694,344	21,686,560	0.036%
38	12	2020	20,164,440	20,142,495	0.109%

The difference in meter readings does not exceed 0.5%, except the readings for November 2017. This is due to the fact that the check meter only started to record as from 6/11/2017.

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:

Vintage Period	Month	Year	Eskom Payment Certificates (kWh)		BWC's Check 3
			Metered	Commercial Energy	
1	11	2017	41,388,791.997	41,388,792.000	0.000%
2	12	2017	42,054,144.031	42,054,144.030	0.000%
3	1	2018	44,680,344.018	44,680,344.020	0.000%
4	2	2018	34,201,223.991	34,201,223.990	0.000%
5	3	2018	35,727,143.980	35,727,143.980	0.000%
6	4	2018	26,535,959.970	26,535,959.970	0.000%
7	5	2018	31,180,991.985	31,180,991.990	0.000%
8	6	2018	36,057,624.001	36,057,624.000	0.000%
9	7	2018	42,677,760.015	42,677,760.020	0.000%
10	8	2018	38,316,936.010	38,316,936.010	0.000%
11	9	2018	35,306,279.994	35,306,279.990	0.000%
12	10	2018	39,853,775.984	39,853,775.980	0.000%
13	11	2018	42,956,255.981	42,956,255.980	0.000%
14	12	2018	46,169,520.051	46,169,520.050	0.000%
15	1	2019	46,437,624.010	46,437,624.010	0.000%
16	2	2019	32,215,368.023	32,215,368.020	0.000%
17	3	2019	36,470,543.984	36,470,543.980	0.000%
18	4	2019	31,309,848.010	31,309,848.010	0.000%
19	5	2019	30,777,024.001	30,777,024.000	0.000%
20	6	2019	38,147,423.962	38,147,423.960	0.000%
21	7	2019	46,044,312.024	46,044,312.020	0.000%

Vintage Period	Month	Year	Eskom Payment Certificates (kWh)		BWC's Check 3
			Metered	Commercial Energy	
22	8	2019	30,952,511.989	30,952,511.990	0.000%
23	9	2019	38,472,288.009	38,472,288.010	0.000%
24	10	2019	46,370,471.995	46,370,472.000	0.000%
25	11	2019	40,388,544.012	40,388,544.010	0.000%
26	12	2019	45,855,432.019	45,855,432.020	0.000%
27	1	2020	43,686,335.978	43,686,335.980	0.000%
28	2	2020	35,623,968.020	35,623,968.020	0.000%
29	3	2020	34,519,751.998	34,519,752.000	0.000%
30	4	2020	34,871,615.967	34,871,615.970	0.000%
31	5	2020	20,868,408.000	20,868,408.000	0.000%
32	6	2020	30,097,655.998	30,097,656.000	0.000%
33	7	2020	36,438,791.997	36,438,792.000	0.000%
34	8	2020	45,801,216.019	45,801,216.020	0.000%
35	9	2020	33,736,176.013	33,736,176.010	0.000%
36	10	2020	44,313,959.995	44,313,960.000	0.000%
37	11	2020	45,177,984.014	45,177,984.010	0.000%
38	12	2020	41,844,551.978	41,844,551.980	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:

Vintage Period	Month	Year	KWh used to calculate the baseline emissions (kWh)		
			Total TRFR1 (main) + TRFR2 (main)	Metered by Eskom	Minimum value
1	11	2017	41,393,352	41,388,791.997	41,388,791.997
2	12	2017	42,058,368	42,054,144.031	42,054,144.031
3	1	2018	44,684,016	44,680,344.018	44,680,344.018
4	2	2018	34,201,224	34,201,223.991	34,201,223.991
5	3	2018	35,727,144	35,727,143.980	35,727,143.980
6	4	2018	26,535,960	26,535,959.970	26,535,959.970
7	5	2018	31,180,992	31,180,991.985	31,180,991.985
8	6	2018	36,060,600	36,057,624.001	36,057,624.001
9	7	2018	42,689,808	42,677,760.015	42,677,760.015
10	8	2018	38,318,328	38,316,936.010	38,316,936.010

Vintage Period	Month	Year	KWh used to calculate the baseline emissions (kWh)		
			Total TRFR1 (main) + TRFR2 (main)	Metered by Eskom	Minimum value
11	9	2018	35,307,696	35,306,279.994	35,306,279.994
12	10	2018	39,875,304	39,853,775.984	39,853,775.984
13	11	2018	42,962,664	42,956,255.981	42,956,255.981
14	12	2018	46,169,664	46,169,520.051	46,169,520.051
15	1	2019	46,438,224	46,437,624.010	46,437,624.010
16	2	2019	32,215,368	32,215,368.023	32,215,368.000
17	3	2019	36,470,544	36,470,543.984	36,470,543.984
18	4	2019	31,309,848	31,309,848.010	31,309,848.000
19	5	2019	30,777,024	30,777,024.001	30,777,024.000
20	6	2019	38,150,832	38,147,423.962	38,147,423.962
21	7	2019	46,050,936	46,044,312.024	46,044,312.024
22	8	2019	30,952,512	30,952,511.989	30,952,511.989
23	9	2019	38,482,728	38,472,288.009	38,472,288.009
24	10	2019	46,386,384	46,370,471.995	46,370,471.995
25	11	2019	40,388,544	40,388,544.012	40,388,544.000
26	12	2019	45,869,208	45,855,432.019	45,855,432.019
27	1	2020	43,688,424	43,686,335.978	43,686,335.978
28	2	2020	35,625,864	35,623,968.020	35,623,968.020
29	3	2020	34,520,232	34,519,751.998	34,519,751.998
30	4	2020	34,871,616	34,871,615.967	34,871,615.967
31	5	2020	20,873,448	20,868,408.000	20,868,408.000
32	6	2020	30,103,080	30,097,655.998	30,097,655.998
33	7	2020	36,459,528	36,438,791.997	36,438,791.997
34	8	2020	45,802,392	45,801,216.019	45,801,216.019
35	9	2020	33,736,176	33,736,176.013	33,736,176.000
36	10	2020	44,313,960	44,313,959.995	44,313,959.995
37	11	2020	45,180,648	45,177,984.014	45,177,984.014
38	12	2020	41,844,552	41,844,551.978	41,844,551.978

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):

Vintage Period	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)
1	11	2017	41,388.791997
2	12	2017	42,054.144031
3	1	2018	44,680.344018
4	2	2018	34,201.223991
5	3	2018	35,727.143980
6	4	2018	26,535.959970
7	5	2018	31,180.991985
8	6	2018	36,057.624001
9	7	2018	42,677.760015
10	8	2018	38,316.936010
11	9	2018	35,306.279994
12	10	2018	39,853.775984
13	11	2018	42,956.255981
14	12	2018	46,169.520051
15	1	2019	46,437.624010
16	2	2019	32,215.368000
17	3	2019	36,470.543984
18	4	2019	31,309.848000
19	5	2019	30,777.024000
20	6	2019	38,147.423962
21	7	2019	46,044.312024
22	8	2019	30,952.511989
23	9	2019	38,472.288009
24	10	2019	46,370.471995
25	11	2019	40,388.544000
26	12	2019	45,855.432019
27	1	2020	43,686.335978
28	2	2020	35,623.968020
29	3	2020	34,519.751998
30	4	2020	34,871.615967
31	5	2020	20,868.408000
32	6	2020	30,097.655998
33	7	2020	36,438.791997
34	8	2020	45,801.216019
35	9	2020	33,736.176000
36	10	2020	44,313.959995

Vintage Period	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)
37	11	2020	45,177.984014
38	12	2020	41,844.551978

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.

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

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 Net GHG Emission Reductions and Removals

There are 4 vintage periods covered in this monitoring report.

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)
Vintage Period 1: 1-November-2017 to 31-December-2017				**82 365**
01/11/2017 - 30/11/2017	*40,854*	*0*	*0*	*40,854*
01/12/2017 - 31/12/2017	*41,511*	*0*	*0*	*41,511*
Vintage Period 2: 1-January-2018 to 31-December-2018				**447 805**

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)
01/01/2018 - 31/01/2018	*44,103*	*0*	*0*	*44,103*
01/02/2018 - 28/02/2018	*33,760*	*0*	*0*	*33,760*
01/03/2018 - 31/03/2018	*35,266*	*0*	*0*	*35,266*
01/04/2018 - 30/04/2018	*26,193*	*0*	*0*	*26,193*
01/05/2018 - 31/05/2018	*30,778*	*0*	*0*	*30,778*
01/06/2018 - 30/06/2018	*35,592*	*0*	*0*	*35,592*
01/07/2018 - 31/07/2018	*42,127*	*0*	*0*	*42,127*
01/08/2018 - 31/08/2018	*37,822*	*0*	*0*	*37,822*
01/09/2018 - 30/09/2018	*34,850*	*0*	*0*	*34,850*
01/10/2018 - 31/10/2018	*39,339*	*0*	*0*	*39,339*
01/11/2018 - 30/11/2018	*42,402*	*0*	*0*	*42,402*
01/12/2018 - 31/12/2018	*45,573*	*0*	*0*	*45,573*

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)
Vintage Period 3: 1-January-2019 to 31-December-2019				**457 457**
01/01/2019 - 31/01/2019	*45,838*	*0*	*0*	*45,838*
01/02/2019 - 28/02/2019	*31,799*	*0*	*0*	*31,799*
01/03/2019 - 31/03/2019	*36,000*	*0*	*0*	*36,000*
01/04/2019 - 30/04/2019	*30,905*	*0*	*0*	*30,905*
01/05/2019 - 31/05/2019	*30,380*	*0*	*0*	*30,380*
01/06/2019 - 30/06/2019	*37,655*	*0*	*0*	*37,655*
01/07/2019 - 31/07/2019	*45,450*	*0*	*0*	*45,450*
01/08/2019 - 31/08/2019	*30,553*	*0*	*0*	*30,553*
01/09/2019 - 30/09/2019	*37,975*	*0*	*0*	*37,975*
01/10/2019 - 31/10/2019	*45,772*	*0*	*0*	*45,772*
01/11/2019 - 30/11/2019	*39,867*	*0*	*0*	*39,867*

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)
01/12/2019 - 31/12/2019	*45,263*	*0*	*0*	*45,263*
Vintage Period 4: 1-January-2020 to 31-December-2020				**441 208**
01/01/2020 - 31/01/2020	*43,122*	*0*	*0*	*43,122*
01/02/2020 - 29/02/2020	*35,164*	*0*	*0*	*35,164*
01/03/2020 - 31/03/2020	*34,074*	*0*	*0*	*34,074*
01/04/2020 - 30/04/2020	*34,421*	*0*	*0*	*34,421*
01/05/2020 - 31/05/2020	*20,599*	*0*	*0*	*20,599*
01/06/2020 - 30/06/2020	*29,709*	*0*	*0*	*29,709*
01/07/2020 - 31/07/2020	*35,968*	*0*	*0*	*35,968*
01/08/2020 - 31/08/2020	*45,210*	*0*	*0*	*45,210*
01/09/2020 - 30/09/2020	*33,300*	*0*	*0*	*33,300*
01/10/2020 - 31/10/2020	*43,742*	*0*	*0*	*43,742*

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)
01/11/2020 - 30/11/2020	*44,595*	*0*	*0*	*44,595*
01/12/2020 - 31/12/2020	*41,304*	*0*	*0*	*41,304*
Total	**1,428,835**	**0**	**0**	**1,428,835**