

LONGYUAN MULILO DE AAR MAANHAARBERG WIND ENERGY FACILITY



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1 PROJECT DETAILS

1.1 Summary Description of the Project

The purpose of this project (Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility) is to supply the wind-generated electricity to the grid of the Republic of South Africa (RSA).

The project envisages the installation of a new grid connected wind farm at a site where no wind farm was operated prior to the implementation of the activity.¹

The installed capacity of the wind farm is 100.5MW.² The wind farm consists of 67 wind turbines and the associated infrastructure.³

The wind farm is located on the Swartkoppies and Maanhaarberge mountains to the south west of the town of De Aar in the Northern Cape Province of the RSA. Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd is the wind farm developer. An EPC contract was signed on 06/02/2015⁴ and the wind farm started commercial operation on 31/10/2017 and the produced electricity is supplied to the national grid of the RSA.⁵

The energy system of the RSA is dominated by coal-fired power plants and is managed by the state-owned company Eskom which is in charge of generation, transmission and distribution of power to end-users. The energy system of the RSA is integrated into the grid of Southern African Power Pool (SAPP), where South Africa is represented by Eskom.⁶

The greenhouse gas (GHG) emissions from the electricity generation at the wind farm will amount to zero. The reduction of GHG emissions as a result of the project implementation will be achieved due to reduction of CO₂ emissions from combustion of fossil fuel at the existing grid-connected powered plants and plants which would likely be built in the absence of the project.

The total GHG emission reductions at the end of the crediting period are expected to be 506,710 t CO₂e, annual average GHG emission reductions are 243,221 t CO₂e/year.

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.

¹ Final EIA report, November 2010

² Garrad Hassan, Technical Due Diligence of the De Aar Wind Farm in South Africa, 26/07/2013

³ AECOM, De Aar Maanhaarberg Wind Farm, Environmental Exclusion Zones, 13/06/2017

⁴ EPC contract, 06/02/2015

⁵ Eskom, Notice of Commencement of the Facility (Maanhaarberg – 96.48 MW), 30/10/2017

⁶ <http://www.sapp.co.zw>

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
Telephone	+27790908139
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Organization name	Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd
Contact person	Bertus van Niekerk
Title	Project Manager
Address	1 st Floor, Mazars house, Rialto road, Grand Moorings Precinct, Century City, 7441
Telephone	+27715705168
Email	bertus@mulilo.com

1.4 Other Entities Involved in the Project

Longyuan Mulilo De Aar Wind Power (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 Wind Power (RF) (Pty) Ltd (Longyuan Mulilo)
Role in the project	The project owner and the wind farm developer
Contact person	Bertus van Niekerk
Title	Project Manager
Address	1 st Floor, Mazars house, Rialto road, Grand Moorings Precinct, Century City, 7441
Telephone	+27715705168
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Organization name	Blue World Carbon Asset Management (Pty) Ltd
Role in the project	The 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
Contact person	Ilya Goryashin
Title	General Manager
Address	http://www.blueworldcarbon.com
Telephone	+27790908139
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1.5 Project Start Date

31/10/2017, the day when the wind farm started commercial operation⁷

1.6 Project Crediting Period

31 October 2017 (00:00) – 30 November 2019 (24:00); 2.08333-year total period

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	x
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
31/10/2017 – 30/10/2018	243,221
31/10/2018 – 30/10/2019	243,221
31/10/2019 – 30/11/2019	20,268
Total estimated ERs	506,710
Total number of crediting years	2.08333
Average annual ERs	243,221

⁷ Eskom, Notice of Commencement of the Facility (Maanhaarberg – 96.48 MW), 30/10/2017

1.8 Description of the Project Activity

The project activity comprises only one activity. A single wind farm was constructed close to the town of De Aar and falls within the Emthanjeni Local Municipality, in the Northern Cape Province of the RSA and has the total installed capacity of 100.5 MW⁸. The EPC contract was signed on 06/02/2015⁹, and the wind farm started commercial operation on 31/10/2017¹⁰. The supplier of the wind turbines is United Power. 17 x UP82 and 50 x UP86 turbines were employed by the project¹¹. The operation data for UP82 and UP86 are given in the following table¹²:

Parameter	Unit	Value
Rated power	MW	1.5
Cut-in wind speed	m/s	3
Cut-out wind speed	m/s	25
Design lifetime	years	20

The Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility has an installed capacity of 100.5 MW and annually supplies to the grid about 246 400 MWh¹³ of electricity. The generated renewable electricity is transmitted through the national grid of the RSA.

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.

1.9 Project Location

The project is located on Farm Re/130, Re/131, 4/130, 3/131, 2/131, 15/180 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 (Figure 1.9-1 and Figure 1.9-2).

Geographical latitude: - 30.7278. Geographical longitude: 23.8831. Time zone: UTC+2.

⁸ Garrad Hassan, Technical Due Diligence of the De Aar Wind Farm in South Africa, 26/07/2013

⁹ EPC contract, 06/02/2015

¹⁰ Eskom, Notice of Commencement of the Facility (Maanhaarberg – 96.48 MW), 30/10/2017

¹¹ AECOM, De Aar Maanhaarberg Wind Farm, Environmental Exclusion Zones, 13/06/2017

¹² UP 86 Design Certificate and UP 82 Design Certificate

¹³ Garrad Hassan, Technical Due Diligence of the De Aar Wind Farm in South Africa, 26/07/2013, Section 4.2 (value provided to banks and equity financiers while applying the activity for financing)



Figure 1.9-1: Location of De Aar in the Republic of South Africa



Figure 1.9-2: The wind farm site

The GPS coordinates of wind turbines is specified in Table below (UTM coordinates)¹⁴:

¹⁴ United Power, De Aar Wind Farm Suitability report, 10/02/2012

Turbine ID	Easting	Northing	Turbine ID	Easting	Northing	Turbine ID	Easting	Northing
WTG 10	780501.4	6597814	WTG 30	775278.4	6597016	WTG 51	773553.1	6594811
WTG 11	779992.7	6598261	WTG 31	775398.3	6597666	WTG 52A	772901.2	6596051
WTG 12	779515.8	6598101	WTG 32	774881.9	6598302	WTG 53	771957.3	6594353
WTG 13	774322.2	6596904	WTG 33	774571.2	6597922	WTG 54	771217.1	6594390
WTG 14A	778346.3	6597796	WTG 34	774310.7	6597496	WTG 55	771287.2	6593492
WTG 16	777527.9	6596760	WTG 35	773351.2	6598799	WTG 56	772726.5	6593651
WTG 17	777503.1	6596388	WTG 36	773404.9	6598244	WTG 57	771374.1	6593029
WTG 18	777085.4	6595863	WTG 37	773495.9	6597719	WTG 58	772215.2	6593167
WTG 19	776374.1	6595404	WTG 38	773069.9	6597115	WTG 59	772588.2	6592820
WTG 1A	782388.1	6598539	WTG 39	772846.9	6596618	WTG 6	782868.5	6598196
WTG 20	776068.1	6595007	WTG 4B2	783575	6598851	WTG 60	773661.1	6593034
WTG 21	775514.8	6594758	WTG 40	771564.4	6597331	WTG 61	774165.6	6593414
WTG 22	775633.9	6595553	WTG 41	771518.9	6596905	WTG 62	774281.4	6594051
WTG 23	776076.6	6596033	WTG 42	771580.9	6596388	WTG 63	773181.4	6592302
WTG 23A	771964.8	6596006	WTG 43	771473.2	6595652	WTG 64	773419.8	6593675
WTG 24	776860.4	6596549	WTG 44	771721.6	6595217	WTG 65	771735	6593463
WTG 25	776803.9	6597330	WTG 45	772842.4	6595478	WTG 66B2	774759	6593456
WTG 26	776381.1	6597637	WTG 46A	771843.1	6592849	WTG 67B2	774958	6593869
WTG 27	776391.6	6596928	WTG 47	773636.4	6595408	WTG 7	782010.2	6598328
WTG 28	775977.3	6596616	WTG 48	774385	6595888	WTG 8	781531.1	6598162
WTG 29	774984.7	6595727	WTG 49	774480	6595173	WTG 9	781063.8	6597947
WTG 2A	782707.3	6597869	WTG 5	783283.1	6598488			
WTG 3B2	783756	6599119	WTG 50	774368.3	6594754			

1.10 Conditions Prior to Project Initiation

Please refer to Section 2.4 (Baseline Scenario)

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The project is compliant with all relevant laws:

- National Environmental Management Act (No. 107 of 1998)¹⁵;
- The Electricity Regulation Act (No. 4 of 2006)¹⁶ and associated Regulations: New generation capacity (No. R. 721, 2009)¹⁷.

¹⁵ <https://www.gov.za/documents/national-environmental-management-act>

¹⁶ <https://www.gov.za/documents/electricity-regulation-act>

¹⁷ <https://www.gov.za/documents/electricity-regulation-act-regulations-new-generation-capacity>

The Environmental Impact Assessment (EIA) of the proposed project was carried out in accordance with the South African legislation. EIR was submitted to the Department of Environmental Affairs for a decision in November 2010 and finally approved on the 15/08/2011. Later, on 24/10/2011 the Amendment to Environmental authorisation was issued by the Department of Environmental Affairs.

The electricity generation license was granted to the project.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

Longyuan Mulilo De Aar Wind Power (RF) (Pty) Ltd is the wind farm developer and the project owner.

1.12.2 Emissions Trading Programs and Other Binding Limits

The project has never been included in an emissions trading program or any other mechanism that includes GHG allowance trading.

1.12.3 Other Forms of Environmental Credit

The project has never received any forms of GHG-related environmental credits, including renewable energy certificates.

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

1.12.4 Participation under Other GHG Programs

The project was seeking registration under the CDM programme, but has never been registered.

1.12.5 Projects Rejected by Other GHG Programs

The project has never been rejected by any other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

Not applicable

Leakage Management

Not applicable

Commercially Sensitive Information

Not applicable

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 25,601 person-month during the construction phase and 47,886 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 2013¹⁸ and the objective to reduce RSA's GHG emissions by approximately 34.00% below the current emissions baseline by 2020¹⁹.

Further Information

Not applicable

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

ACM0002: "Large-scale Consolidated Methodology: Grid-connected electricity generation from renewable sources" (Version 19.0)²⁰

TOOL01: "Methodological tool: Tool for the demonstration and assessment of additionality" (Version 07.0.0)²¹

TOOL05: "Methodological tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" (Version 03.0)²²

¹⁸ http://www.energy.gov.za/files/renewables_frame.html

¹⁹ <https://www.environment.gov.za/sites/default/files/docs/carbontaxpolicyproposalanupdate.pdf>

²⁰ <https://cdm.unfccc.int/methodologies/DB/VJ19AX539D9MLOPXN2AY9UR1N4IYGD>
(this version of the methodology will be applied throughout the whole document)

²¹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>
(this version of the methodology will be applied throughout the whole document)

²² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf>
(this version of the methodology will be applied throughout the whole document)

TOOL23: “Methodological tool: Additionality of first-of-its-kind project activities” (Version 03.0)²³

2.2 Applicability of Methodology

The ACM0002 methodology is applicable to grid-connected renewable energy power generation project activities that (paragraph 3):

- (a) Install a Greenfield power plant;
- (b) Involve a capacity addition to (an) existing plant(s);
- (c) Involve a retrofit of (an) existing operating plants/units;
- (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or
- (e) Involve a replacement of (an) existing plant(s)/unit(s).

The proposed project activity envisages the construction and operation of the wind farm to produce electricity at the site where no renewable power plant has been previously operated and therefore the project falls under item (a).²⁴ This project is connected to the grid of the Republic of South Africa.²⁵

The project meets all necessary applicability conditions of the ACM0002 to apply (see Table 2-1).

Table 2-1: ACM0002 applicability conditions check

Applicability condition	Applicability	Comment
4(a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit.	Applicable	The project activity is the installation of the wind farm to produce electricity (greenfield plant).

²³ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-23-v1.pdf>
(this version of the tool will be applied throughout the whole document)

²⁴ Final EIA report, November 2010

²⁵ Eskom, Notice of Commencement of the Facility (Maanhaarberg – 96.48 MW), 30/10/2017

Applicability condition	Applicability	Comment
4(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity	Not applicable	The project activity is the installation of a greenfield plant; therefore it does not need to satisfy this applicability condition.
5. In case of hydro power plants, one of the following conditions shall apply: etc.	Not applicable	The project activity is not the installation of a hydro power plant; therefore it does not need to satisfy this applicability condition.
6. In the case of integrated hydro power projects, project proponent shall: etc.	Not applicable	The project activity is not the installation of a hydro power plant, so it does not need to satisfy this applicability condition.
7. The methodology is not applicable to the: Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site. Biomass fired power plants.	Not applicable	This project does not involve switching from fossil fuels to renewable energy sources, it is also not a biomass fired power plant and therefore it satisfies this criterion.
8. In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance"	Not applicable	The project activity is the installation of a greenfield plant; therefore it does not need to satisfy this applicability condition.

ACM0002 refers to the following tools (paragraph 13):

- (a) "TOOL01: Tool for the demonstration and assessment of additionality";
- (b) "TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality";

- (c) "TOOL03: Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion";
- (d) "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation";
- (e) "TOOL07: Tool to calculate the emission factor for an electricity system";
- (f) "TOOL10: Tool to determine the remaining lifetime of equipment";
- (g) "TOOL11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period".

Tool (a) is applicable as per paragraph 8 of the tool itself and section 5.3.2 of ACM0002.

Tool (b) is not used as indicated in reference 2 to paragraph 9 of ACM0002.

Tool (c) is not used since project emissions for the project is zero as described in Section 3.2.2 below.

Tool (d) is applicable as per paragraph 68 of ACM0002 and paragraph 6(a) of the tool.

Tool (e) is not used since ASB0040-2018: Standardized baseline "Grid emission factor for Southern African Power Pool" (Version 01.0) is used to determine the value of the emission factor for an electricity system. The project meets all necessary applicability conditions of ASB0040-2018 to apply (see Table 2-2).

Table 2-2: ASB0040-2018 applicability conditions check

Applicability condition	Applicability	Comment
3 (a) The project activity is implemented in any one of following countries, which are the SAPP member countries, and is connected to the SAPP: (i) Republic of Botswana; (ii) Democratic Republic of Congo; (iii) Kingdom of Lesotho; (iv) Republic of Mozambique; (v) Republic of Namibia; (vi) Republic of South Africa; (vii) Kingdom of Swaziland; (viii) Republic of Zambia, and (ix) Republic of Zimbabwe	Applicable	The project is implemented in the Republic of South Africa ²⁶ and is connected to the grid (item (vi)). ²⁷
3 (b) The CDM approved methodology that is applied to the project activity requires the determination of CO₂ emission factor(s) through the application of the grid tool	Applicable	ACM0002 refers to TOOL07 to calculate the grid emission factors (paragraph 22).

²⁶ Environmental Authorization from the Department of Environmental Affairs, 5/08/2011, and Amendment to Environmental Authorization by the Department of Environmental Affairs, 24/10/2011

²⁷ Eskom, Notice of Commencement of the Facility (Maanhaarberg – 96.48 MW), 30/10/2017

Applicability condition	Applicability	Comment
3 (c) The project activity uses the ex-ante options for both the operating margin and build margin grid emissions factors, as described in the grid tool, and therefore no monitoring or recalculation of the emission factor during the crediting period is required.	Applicable	The project uses the ex-ante options for both the operating margin and build margin grid emissions factors.
4. The latest approved and valid values of this standardized baseline are the only values of the CO ₂ emission factor(s) that shall be applied for the project electricity system in the SAPP member countries listed under sub-para 3(a) above	Applicable	The Standardized Baseline is valid till 06/10/2021. ²⁸

Tool (f) is not used since the project is a greenfield plant.

Tool (g) is not used since this is the first crediting period.

2.3 Project Boundary

The spatial extent of the project boundary includes the proposed renewable energy power plant and all power plants physically connected to the grid of the SAPP (Figure 2-1).

The greenhouse gases and emission sources included in or excluded from the project boundary are shown in table below.

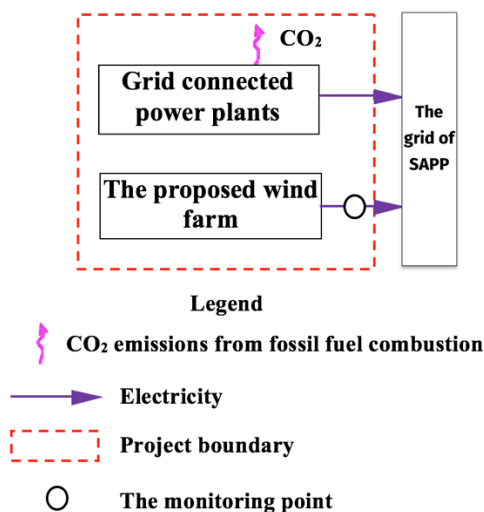


Figure 2-1: Project boundary

²⁸ https://cdm.unfccc.int/methodologies/standard_base/2015/sb4.html

Source		Gas	Included?	Justification/Explanation
Baseline	CO ₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	Not applicable
	Not applicable	CO ₂	No	Not applicable
		CH ₄	No	Not applicable
		N ₂ O	No	Not applicable
		Other	No	Not applicable
Project	GHG emissions from electricity generation in the proposed wind farm	CO ₂	No	GHG emissions for a wind power generation project are equal to zero (no fossil fuel auxiliary consumption)
		CH ₄	No	GHG emissions for a wind power generation project are equal to zero
		N ₂ O	No	GHG emissions for a wind power generation project are equal to zero
		Other	No	GHG emissions for a wind power generation project are equal to zero
	Not applicable	CO ₂	No	Not applicable
		CH ₄	No	Not applicable
		N ₂ O	No	Not applicable
		Other	No	Not applicable

2.4 Baseline Scenario

According to paragraph 22 of ACM0002, if the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would

have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations.

The project is the installation of a new grid-connected wind farm that connects with and delivers electricity to the grid of the SAPP. The baseline scenario of the proposed project is:

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.

2.5 Additionality

The additionality of the project is demonstrated and assessed using TOOL01. This tool provides for the following step-wise approach:

- (a) Step 0 Demonstration whether the proposed project activity is the first-of-its-kind;
- (b) Step 1 Identification of alternatives to the project activity;
- (c) Step 2 Investment analysis;
- (d) Step 3 Barriers analysis; and
- (e) Step 4 Common practice analysis.

The project proponents demonstrate that the proposed project activity is the first-of-its-kind using TOOL23. TOOL23 covers the following four types of measures (paragraph 9):

- (a) Fuel and feedstock switch (example: switch from naphtha to natural gas for energy generation, or switch from limestone to gypsum in cement clinker production);
- (b) Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies (example: energy efficiency improvements, power generation based on renewable energy);
- (c) Methane destruction (example: landfill gas flaring);
- (d) Methane formation avoidance (example: use of biomass that would have been left to decay in a solid waste disposal site resulting in the formation and emission of methane, for energy generation).

The proposed project activity envisages power generation based on renewable energy and hence falls under para 9(b) of TOOL23. As per para 12 of TOOL23: A proposed project activity is the first of its kind in the applicable geographical area if

- (a) The project is the first in the applicable geographical area that applies a technology that is different from technologies that are implemented by any other project, which are able to deliver the same output and have started commercial operation in the applicable

geographical area before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of the proposed project activity, whichever is earlier;

- (b) The project implements one or more of the measures;
- (c) The project participants selected a crediting period for the project activity that is “a maximum of 10 years with no option of renewal”.

The characteristics of the proposed project activity are:

1. Geographical area: The Republic of South Africa
2. Technology: Large scale wind farm.
3. Output: Electricity with the quality to be supplied to the national grid.
4. Date of start of CDM Global Stakeholder Consultation: 25/08/2011
5. CDM project start date: 06/02/2015
6. Crediting Period: less than 10 years

Therefore, activities similar to the proposed project should be a wind farm which supplies electricity to the national grid of the RSA. The project activity should be based in the Republic of South Africa with an installed capacity more than 15 MW, and it needs to have started commercial operation before 25/08/2011.

The list of power plant servicing the grid of the RSA and their capacity is presented in Appendix to Eskom Integrated report as available on 31/03/2012²⁹. As can be seen there is no power plants similar to the proposed project activity which started commercial operation before 31/03/2012. The proposed project is first-of-its-kind.

2.6 Methodology Deviations

Not applicable

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. ACM0002 assumes that electricity delivered to the grid by the wind farm would have otherwise been generated by the operation of

²⁹ Appendix to Eskom Integrated report, Divisional Report, Power station commercial capacities, download file situated under “Excel downloads”, http://financialresults.co.za/2012/eskom_ar2012/integrated-report/popup-downloads.php

grid-connected power plants and by the addition of new generation sources. 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 (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)

Standardized baseline ASB0040-2018 is selected for the project (the applicability of ASB0040-2018 is justified Section 2 above). Table 1 of this standardized baseline provides the value of the combined margin CO₂ emission factor for the project electricity system applicable to wind and solar power generation for the determination of baseline emissions of 0.9871 t CO₂/MWh.

3.2 Project Emissions

Since the project activity uses wind energy to generate electricity the project emissions are equal to zero:

$$PE_y = 0$$

Where:

- PE_y = Project emissions in year y (tCO₂)

3.3 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.

3.4 Net GHG Emission Reductions and Removals

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

- ER_y = Emission reductions in year y (tCO₂)
- BE_y = Baseline emissions in year y (tCO₂)
- PE_y = Project emissions in year y (tCO₂)

The ex-ante calculations are shown below.

$$PE_y = 0 \text{ and } LE_y = 0;$$

The estimated amount of electricity supplied by the wind farm to grid during the crediting period, baseline emissions and emission reductions are presented in Table 3-1.

Table 3-1: Emission reductions, Baseline emissions,
Quantity of net electricity generation supplied by the wind farm to the grid

Year	$EG_{\text{facility},y}$ (MWh/a) ³⁰	BE_y (tCO ₂ /yr)	ER_y (tCO ₂ /yr)
31/10/2017 – 30/10/2018	246,400	243,221	243,221
31/10/2018 – 30/10/2019	246,400	243,221	243,221
31/10/2019 – 30/11/2019	20,533	20,268	20,268

Calculation example:

$$BE_{\text{year 1}} = EG_{\text{PJ, year 1}} \times EF_{\text{grid, CM, year 1}} = 246,400 \text{ MWh} \times 0.9871 \text{ t CO}_2/\text{MWh} = 243,221 \text{ t CO}_2$$

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
31/10/2017 – 30/10/2018	243,221	0	0	243,221
31/10/2018 – 30/10/2019	243,221	0	0	243,221
31/10/2019 – 30/11/2019	20,268	0	0	20,268
Total	506,710	0	0	506,710

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{\text{grid, CM}}$
Data unit	tCO ₂ /MWh
Description	Combined margin CO ₂ emission factor for grid connected power

³⁰ Garrad Hassan, Technical Due Diligence of the De Aar Wind Farm in South Africa, 26/07/2013, Section 4.2 (value provided to banks and equity financiers while applying the activity for financing)

	generation calculated ex ante
Source of data	ASB0040-2018, Table 1
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 (the applicability of ASB0040-2018 is justified Section 3.1.2 above). 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. Readings are cross-checked with records for delivered electricity.
Description of measurement methods and procedures to be applied	Calculated as the difference between the measured quantities of the grid electricity export and the import from grid. The meters are installed at the point of supply which defines the commercial boundary between grid and the wind farm owner. The export electricity meters are equipped with the check meters. The exported and imported electricity is continuously measured and recorded. Data are digitally archived at least on a monthly basis.
Frequency of monitoring/recording	Continuous measurement
Value applied	Estimated values for the purpose of calculating emission reductions: 31/10/2017 – 30/10/2018: 246,400 MWh 31/10/2018 – 30/10/2019: 246,400 MWh 31/10/2019 – 30/11/2018: 20,533 MWh
Monitoring equipment	The meter class is 0.5S.

	Landis+Gyr E650 (or similar) electricity meters shall be used. Serial numbers of currently installed main meters are: 37108380 and 37108382. Meters are installed at the on-site substation.
QA/QC procedures to be applied	Electricity meters will be calibrated once per 5 years according to South African Bureau of Standards (SABS) ³¹ (relevant industry standards in the RSA). Readings are cross-checked with records for sold/purchased electricity
Purpose of data	Calculation of baseline emissions
Calculation method	-
Comments	-

4.3 Monitoring Plan

The monitoring plan of project is devised as per approved consolidated baseline and monitoring methodology ACM0002 and TOOL05.

The following monitoring procedures shall be applied:

1. Monitoring period

The monitoring period starts from the date of commissioning of the project.

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 shall be determined on the basis of electricity meters. The metering instruments shall be 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 shall be cross-checked with delivery records. Data on electricity supply will be digitally archived and submitted to BWC.

The sources of data for calculation of GHG emission reductions in the course of monitoring shall be the internal reports of the wind farms.

The emission reductions shall be calculated using the formulas in Section 3.2.

3. The monitoring team

³¹ According to the SABS the SANS 474 regulation should be followed as per Table 5 on page 22 section 4.7.4.1.

The wind farm staff shall undergo 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 manufacturer's requirements and requirements of the South African Bureau of Standards³². Longyuan Mulilo's personal will be responsible for implementation and overall control as well as collection of all data, and submit the data to BWC.

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

In case of any doubts as to the accuracy of the data, the specialists of Longyuan Mulilo shall check and correct the data. The preliminary version of the monitoring report shall be 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 shall correct these calculations accordingly.

4. Data storage

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

5. Instrumentation calibration

The instrumentation calibration and check-out shall be carried out by contracted specialized organisations that are licensed for this type of activity, according to the requirements of the manufacturing company, and the South African Bureau of Standards (SABS).

6. Emergency situations

If any instrument that is used in the monitoring process fails, Longyuan Mulilo shall remedy the situation as soon as possible and if necessary shall replace the instrument. Electricity meters are equipped with the check meters. In case of failure of main meter, the reading of check meter will be used. In case both meters (main and check) fail net electricity generation will not be accounted for which is conservative. In case of breakdown of any of the wind turbines the electricity generation will go down, and amount of electricity supplied to the grid by the wind farm will be reduced. All accidents that may occur at the wind farm shall be recorded by Longyuan Mulilo. Information on major accidents shall be included in the monitoring report.

5 SAFEGUARDS

5.1 No Net Harm

The proposed project activity has no significant impact on the environment, as the wind power is one of the cleanest sources of renewable energy, with no associated emissions and waste

³² According to the SABS the SANS 474 regulation should be followed.

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.

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.

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.

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.

5.2 Environmental Impact

The Environmental Impact Assessment (EIA) of the proposed project was carried out in accordance with the South African legislation by DJ Environmental Consultants. Draft Environmental Impact Report (EIR) was published for public review and comment for a period of 40 days in October 2010. EIR was submitted to the Department of Environmental Affairs for a decision in November 2010 and finally approved on the 15/08/2011. Later, on 24/10/2011 the Amendment to Environmental authorisation was issued by the Department of Environmental Affairs.

5.3 Local Stakeholder Consultation

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

The activities undertaken to canvass public opinion regarding the proposed project activity are summarised in Table below.

An advertisement announcing the EIA Process and inviting Interested and Affected Parties (I&APs) to register on the project database was placed in The Echo and Die Volksblad.

All I&APs who registered were sent a copy of the Background Information Document.

Two notices were placed on site (Afrikaans and English) advertising the proposed development and inviting I&APs to register on the project database.

The Scoping Report was placed for public review and comment at the De Aar Public Library and Damfontein Farm. E-mails (preferred means of communication) were also sent to all registered I&APs informing them of the release of the Scoping Report for public review and comment.

The Environmental Impact Report was released in the public domain for review and comment in October 2010. Announcement on the release of the report for review and comment were placed in the local newspaper. Copies of the EIA Report were placed at the De Aar Public Library and at Damfontein Farm. The EIA Report was available for public review and comment for 40 days from 8 October 2010 until 16 November 2010.

In addition, letters were also sent out to all registered I&AP, notifying them on the availability of the EIA Report for review and comment.

I&APs were afforded an opportunity to raise their issues and concerns regarding the proposed development during the consultation process. All comment and response was compiled.

Table 5-1: Summary of activities undertaken and proposed during public consultation

Activity	Date
Phase 1: Project initiation	
Submission of Application to Department of Environmental Affairs (DEA)	Application submitted to DEA on: 28 August 2009
DEA Acknowledgement of Application	31 August 2009
Identification of I&APs	October 2009
Advertisement of the process	The application was advertised in The Echo and Die Volksblad on 8 October 2009
Placement of posters on site	Posters indicating the proposed project were placed on the site on 02 October 2009
Phase 2: Initial public consultation process	

Activity	Date
Circulation of Background Information Document to I&APs	From 23 November 2009
End of comment period on BID and registration for I&AP	17 December 2009
Draft Scoping Report was made available for comment on 8 October and circulated to registered I&APs. The DSR was made available in the De Aar Public Library and on Damfontein farm, from 8 October to 16 November 2010	8 October to 16 November 2010
End of official comment period on Draft Scoping Report	02 July 2010
Final Scoping Report submitted to DEA comment	05 July 2010
Phase 4: EIA	
DEA reviewed Scoping Report and Plan of Study for EIA and issued a letter of acceptance and to proceed with the EIA phase	25 August 2010
Appointment of Specialists to undertake studies according to the approved terms of reference	October 2009
EIA Report drafted and released in public domain for review and comment	8 October 2010
Collation of comments and submission of EIA Report and draft EMP to DEA	November 2010

I&APs were afforded an opportunity to raise their issues and concerns regarding the proposed development during the public consultation process of the Scoping Phase. To date, no comments were received from the registered I&AP's. The Organs of State did not provide any comments during the provided comment period.

5.4 Public Comments

No comments were received