Monitoring report form
(Version 05.1)

MONITORING REPORT		
Title of the project activity	Bundled wind power project Cape Verde	
UNFCCC reference number of the project activity	Ref. 9570	
Version number of the monitoring report	Version 02	
Completion date of the monitoring report	19/05/2015	
Monitoring period number and duration of this monitoring period	1st monitoring period from 01/04/2013 to 31/12/2014 both days included.	
Project participant(s)	Cabeólica S.A Swedish Energy Agency	
Host Party	Cape Verde Sweden	
Sectoral scope(s)	Sectoral Scope 1: Energy industries	
Selected methodology(ies)	Methodology: ACM0002.: "Consolidated baseline methodology for grid-connected electricity generation from renewable sources"-Version 13	
Selected standardized baseline(s)	Not applicable.	
Estimated amount of GHG emission reductions or net GHG removals by sinks for this monitoring period in the registered PDD	118,258	
Total amount of GHG emission reductions or net GHG removals by sinks achieved in this monitoring period	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0	92,313

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

The project activity is a group of four wind farms (total of 25.5 MW), which contribute to the reduction of fossil fuel dependence and consequently help to decrease the GHG emissions to the atmosphere by introducing an amount of electrical energy that is from a renewable source: wind power. Using the high wind potential of Cape Verde, this wind power plant aims to generate electrical power to supply Cape Verde and provide an alternative source of electricity generation, which fulfils the necessary requirements of the project activity. The project activity contains the following four wind farms:

- *Santiago* with 9.35 MW of nominal capacity;
- *Sal* with 7.65 MW of nominal capacity;
- *São Vicente* with 5.95 MW of nominal capacity;
- *Boa Vista* with 2.55 MW of nominal capacity.

The purpose of the proposed project is to generate renewable electricity to the grid. Each plant provides electricity to the system of the island where the plant is located. Thus the four plants generate electricity for four different systems.

The project activity were developed by *Cabeólica S.A*. (hereafter *Cabeólica*), a private limited company registered in the Republic of Cape Verde. The Company was set up in September 2009 in order to develop and operate the four Wind Farms.

The project provides reliable and efficient power to the Cape Verdean electrical market through the Power Purchase Agreement (PPA) signed between *Cabeólica* and Electra. *Electra*[1] *(Empresa Pública de Electricidade e Água* – Electricity and Water Public Company) was created in year 1982 and is the operator of Cape Verde*'s* electricity system and is responsible for the generation and distribution of energy in the country.

For the wind farms the company adopted 30 (for all four wind farms) *Vestas* wind turbines. The wind turbines model is V52-850 kW, which is a turbine with a pitch regulated upwind turbine with active yaw and a three-blade rotor. The Vestas V52-850 kW has a rotor diameter of 52 meter and operates using the OptiSpeed concept. This feature enables the rotor to operate with variable speed of rotation (RPM). Below are some characteristics of the wind farms:

[1] *More details can be found at* ELECTRA*'s website:* http://www.electra.cv

Technical Data	Santiago	Sal	Boa Vista	São Vicente
Installed Capacity (MW)	9.35	7.65	2.55	5.95
Load Factor (%)	40.3	43.2	42.5	51.5
Net Energy ($MW_{average}$)	3.77	3.3	1.083	3.06
Wind Turbines (units)	11	9	3	7
Wind Turbines Rated Capacity (kW)	850	850	850	850
Model	V52-850	V52-850	V52-850	V52-850
Hub's height (meters)	55	55	55	55
Net Energy (MWh/year)	33,008.12	28,950.05	9,493.65	26,842.83

Table 01 – Technical data of the wind farm

The table below summarizes the relevant dates for the project activity:

Date (dd/mm/y)	Key Events	Contents/Comments
22/12/2009	Signature of the Engineering, Procurement and Construction Agreement between Cabeólica and *Vestas Portugal Serviços de Tecnologia Lda*	Defines the terms and conditions for the design, supply, installation, construction, commissioning and testing of the Wind farms.
03/11/2010	Commencement of civil works on wind farm *São Vicente.*	*Vestas* start the civil works on wind farm *São Vicente.*
10/11/2010	Commencement of civil works on wind farm *Santiago.*	*Vestas* start the civil works on wind farm *Santiago.*
13/04/2011	Commencement of civil works on wind farm *Boa Vista.*	*Vestas* start the civil works on wind farm *Boa Vista.*
18/05/2011	Commencement of civil works on wind farm *Sal.*	*Vestas* start the civil works on wind farm *Sal.*
10/08/2011	Wind farm *Santiago* connected to the grid.	At this date the wind farm *Santiago* was connected to the grid and the tests were started.
07/09/2011	Wind farm *São Vicente* connected to the grid.	At this date the wind farm *São Vicente* was connected to the grid and the tests were started.
27/09/2011	Wind farm *Boa Vista* connected to the grid.	At this date the wind farm *Boa Vista* was connected to the grid and the tests were started.
14/11/2011	Wind farm *Sal* connected to the grid.	At this date the wind farm *Sal* was connected to the grid and the tests were started.

Table 1: Important dates for the project activity.

This monitoring report presents information related to the first verification of project activity which covers the period from April, 1st 2013 to December, 31st 2014, both days included. The total emission reductions by the project activity over the monitored period are **92,313 tCO_2e**.

A.2. Location of project activity

The project activities are located in the *Santiago, Sal, São Vicente* and *Boa Vista* islands in Cape Verde. The exact location and the unique identification of the four wind farms are identified by their coordinates, as follow:

- *Boa Vista* Wind Farm

Latitude: 16º13.2 N

Longitude: 22º54.7 W

- *Sal* Wind Farm

Latitude: 16º42.1 N

Longitude: 22º54.1W

- *Santiago* Wind Farm

Latitude: 14º58.2 N

Longitude: 23º30.7 W

- *São Vicente* Wind Farm

Latitude: 16º50.3 N

Longitude: 25º01.4 W

A.3. Parties and project participant(s)

Party involved ((host) indicates a host Party)	Private and/or public entity(ies) project participants (as applicable)	Indicate whether the Party involved wishes to be considered as project participant (yes/no)
Cape Verde (host)	Cabeolica S.A	No
Sweden	Swedish Energy Agency	No

A.4. Reference of applied methodology and standardized baseline

The methodology applied to the project is ACM0002 – "Consolidated methodology for grid-connected electricity generation from renewable sources" (version 13) [2], the "Tool for the

[2] Accessed on March, 18th 2015. Available at:

demonstration and assessment of additionality" (version 06.1)[3] and Tool to calculate the emission factor for an electricity system (ver. 02.2.1)[4].

A.5. Crediting period of project activity

The project employs the renewable crediting period (7 years). The crediting period of the project activity is from 01/04/2013 (DD/MM/YYYY) to 31/03/2020 (DD/MM/YYYY).

A.6. Contact information of responsible persons/entities

Project participant and/or responsible person/ entity	☐ Project participant **x** Responsible person/ entity for completing the CDM-MR-FORM
Organization name	GSS Sustentabilidade
Street/P.O. Box	Iguaçu 2820
City	Curitiba
State/Region	Paraná
Postcode	80.240-030
Country	Brazil
Telephone	+55 41 3091-9732
E-mail	info@gssconsult.com
Website	www.gssconsult.com
Contact person	Mr. Paulo A. Zanardi Jr.
Title	Mr.
Last name	Zanardi
Middle name	Augusto
First name	Paulo
Department	Climate Change
Direct tel.	+55 41 9970-3737
Personal e-mail	zanardi@gssconsult.com

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity

The project activity comprehends the generation of electricity through renewable sources (wind) from the *Santiago, Sal, Boa Vista* and *São Vicente* wind farms, consisting in production of renewable energy to the Cape Verde's islands grids. During this monitoring period all wind farms were operating and the energy has being dispatched to their respective grids.

https://cdm.unfccc.int/filestorage/D/Y/P/DYPFI935XBG274NWH6O8CM1KEZR0VU/EB67_repan13_ACM0002_ver13.0.0.pdf?t=UTJ8bmxmOGRvfDC-D2HiK5xIEYrkILjb0LWs

[3] Accessed on March, 18th 2015. Available at: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v6.1.0.pdf

[4] Accessed on March, 18th 2015. Available at: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.2.1.pdf

The technology employed by the project is the exploitation of wind energy to generate electricity; wind power is used to move the blades, which power the turbines to produce electricity. This type of power plant has great advantages. A wind farm project is compatible with other land uses such as agriculture and livestock, generating investment in disadvantaged areas, the fuel is endless and the turbines do not require fuel supply.

The technology used is environmentally safe and sound; do not emit greenhouse gases to operate. Also is a renewable energy source with a low environmental impact. The impacts of the wind farm regarding fauna and flora are incomparably small compared to hydroelectric plants, per example, where areas need to be flood for the construction of the reservoirs. Regarding land use, the property does not lose its productive function, because the base of each turbine occupies a small area.

Regarding the generation of waste it is practically non-existent, on comparison to nuclear and biomass. And the emission of greenhouse gases is zero, since it uses wind, a renewable energy, to generate electricity.

Regarding the transfer of know-how the host party, *Cabeólica* signed a contract with *Vestas* responsible to provide and commissioning of the technology. All equipments were produced outside *Cape Verde*, but *Vestas* was also responsible to transfer the know-how at the time of the construction and to operate the wind farms. Thus contributing to transfer the know-how acquired and create new workers and specialists in the host country. The V52 generator has the following characteristics:

Generator V52-850 kW	
Manufacturer	*Vestas*
Description	Asynchronous with wound rotor, slip rings and VCS
Rated Power	850 kW
Speed	1,620 RPM (50Hz) and 1,944 RPM (60Hz)
Frequency	50/60 Hz
Voltage	690 VAC

Table 03 – Technical data of the generator.

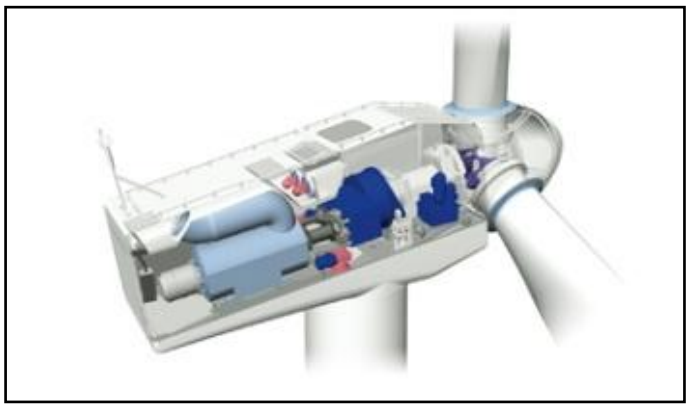


Figure 01 – Illustration of a *Vestas* wind turbine model V52-850 kW.

B.2. Post-registration changes

B.2.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

Not applicable.

B.2.2. Corrections

Not applicable.

B.2.3. Changes to start date of crediting period

Not applicable.

B.2.4. Inclusion of a monitoring plan to the registered PDD that was not included at registration

Not applicable.

B.2.5. Permanent changes from registered monitoring plan, applied methodology or applied standardized baseline

The project participant is requiring a permanent change in the registered monitoring plan based on the following arguments: In the monitoring plan registered, the calibrations of the meters were forecasted to take place on an annual frequency. As described in the registered monitoring plan "The frequency of calibration of the meters is in accordance with Electra and Cabeólica, where the frequency for preventive maintenance and calibration of meters is annually. Calibration should be performed in the field or in the laboratory with proven traceability".
As discussed and demonstrated in the verification visit the frequency of the calibration registered in the monitoring plan is impracticable and found to be unnecessary due to the high precision of the meters in use. Notwithstanding, Cabeólica sought a specialized company in the country to perform the calibration of their meters in order to comply with the monitoring plan, but was unsuccessful. There are no companies in the country that are certified to perform calibration on energy meters. This project is the first and sole CDM project in the country, and as so there are no historical references by which the company can base on.

Cape Verde is an African country, which consists of 10 islands (9 inhabited) and 13 islets, situated in the Atlantic Ocean, approximately 455 km off the coast of Senegal. To perform the calibration of the meters Cabeólica would have to remove and send them to a certified company in Europe. Moreover, according to the manufacturer, among other specifications, the meters can only be removed and reinstalled by an accredited technician, of which there are none in Cape Verde, in order to prevent voiding the warranty. Therefore there are high accumulated costs for carrying out the calibration annually making it exceedingly unviable for the company.

The Instituto de *Gestão da Qualidade e da Propriedade Intelectual de Cabo Verde* – IGQPI (The Cape Verdean Institute of Quality Management and Intellectual Property) emitted a declaration (in appendix 3 of this document) stating that national or local specifications for the calibration of the meters have not yet been created in the Republic of Cape Verde and that companies are required

to follow relevant specifications set by the equipment manufactures. Landis+Gyr, the meter system manufacturer, conducted the calibration of the meters according to the IEC standard requirements prior to their installations within the corresponding power plants' substations. As per the manufacturers' manual (available to DOE), for the type of meters installed, the calibrations or accuracy check need to be conducted following 8 years of use.

Cabeólica, has no obligation for an annual calibration of the meters, except in order to comply with the registered CDM monitoring plan. As specified in the CDM Project Standard, version 07, paragraph 64, item (f):

"*Specifications of the calibration frequency for the measuring equipments. In cases where neither the selected methodology and, where applicable, the selected standardized baseline, nor the Board's guidance specify any requirements for calibration frequency for measuring equipments, project participants shall ensure that the equipments are calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used."*

As declared by the local relevant entity, IGQPI, there are no local or national standards in Cape Verde, and therefore Cabeólica should use the manufacturer's specifications. For this reason the project participant requests the change of the calibration frequency from annually to eight years following installation, as specified by the manufacturer.

B.2.6. Changes to project design of registered project activity

Not applicable.

B.2.7. Types of changes specific to afforestation or reforestation project activity

Not applicable.

SECTION C. Description of monitoring system

The energy generated by the wind farms is measured by a meter system installed in each power plant substation, the delivery point. The meter is responsible to read the gross energy generated by the wind farm. The gross energy is measured automatically by the meter. The energy measured by this meter is used to elaborate the energy invoice. Also the same meter reads the electricity consumed by the power plant. The readings of the meter are performed always by a representative of *Cabeolica* and Electra, as specified below.

The meter used by the project activity is the electricity meters IEC, Landis+Gyr Qualigrid, model ZMQ – 202, class 0.2 measurement accuracy. As presented in section B.2.3, there is no national standard for the calibration. The type, model, precision class and calibration of these equipments are in accordance with the requirements set by the manufacture. Table presents the meters used during the monitoring period and the calibration certificates number of each meter, location, the dates in which these meters were last calibrated and calibration validity.

Description	Location	Serial Number	Date of the Last Calibration (DD/MM/YY)	Calibration Certificate Number	Calibration Validity (DD/MM/YY)	Calibration delayed at the period (Yes/No)
Santiago Wind Farm	Santiago Wind Farm Substation	97736766	13/06/2011	VEZQ1118.xls. 5/10/	13/06/2019	No
Sal Wind Farm	Sal Wind Farm Substation	97703467	24/05/2011	VEZQ1115.xls. 14 /11/	24/05/2019	No

São Vicente Wind Farm	São Vicente Wind Farm Substation	97736768	13/06/2011	VEZQ1118.xls. 7/13/	13/06/2019	No
Boa Vista Wind Farm	Boa Vista Wind Farm Substation	97703468	24/05/2011	VEZQ1115.xls. 15/15/	24/05/2019	No

Table 4: Calibration certificates of the energy meters.

Accordingly to the CDM Project Standard, version 07, paragraph 64, item (f): *"Specifications of the calibration frequency for the measuring equipments. In cases where neither the selected methodology and, where applicable, the selected standardized baseline, nor the Board's guidance specify any requirements for calibration frequency for measuring equipments, project participants shall ensure that the equipments are calibrated either in accordance with the local/national standards, or as per the manufacturer's specifications. If local/national standards or the manufacturer's specifications are not available, international standards may be used"*.

As there is no National or local standards, the manufacture specifications states that the meters should be calibrated every eight years. As it can be seen from data presented in Table above, all the meters are calibrated and no delays were found. All calibrations reports were available to DOE at the time of verification.

The meters are located on the medium voltage side of the transformer at 20 KV. The control team of each power plant is responsible for monitoring the gross energy to be dispatched to the grid and this information will recorded by *Cabeólica*. At the last business day of the month a reading must be done in a presence of *Cabeólica* and Electra team.

Cabeólica must give Electra a 48 hours notice of the time that is intended to take the readings. After the readings if the metering system is found to be inaccurate by more than 1% or the acceptable accuracy from manufacture, whichever is the lower, or is unavailable or malfunctioning, the measurement method will be determined jointly with Electra. The information contained in the electronic data recording system will be verified by checking that the sum of the hourly readings in the electronic data recording system over a specified period are consistent with the local totalized readings for the metering system over the same period (determined by subtracting the local totalized reading at the end of the period). If a purchaser representative is present at such reading, then such reading will be jointly taken and recorded, otherwise, the project company representative will take and record such reading and make a photographic record thereof.

In the event where the meter at the wind farm presents malfunctions, SCADA (Supervisory Control and Data Acquisition) readings can be used as backup readings. Meters are sealed for safety after calibration to guarantee the inviolability of the data. As the meter reads the gross energy generated and the energy consumed by the power plant, the net energy is calculated reducing the energy consumed by the plant of the gross energy generated. The net energy dispatched will be used presented at the monitoring reports and will be used to calculate the emissions reductions.

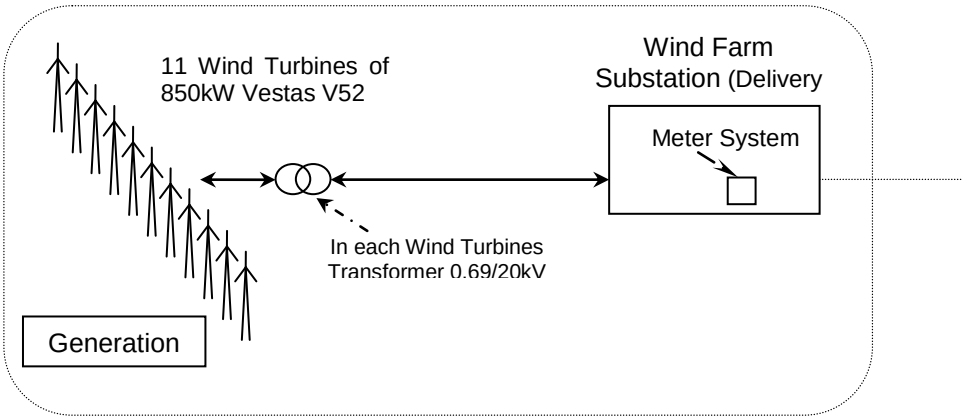


Figure 02 – Wind farm *Santiago* simplified wiring diagram.

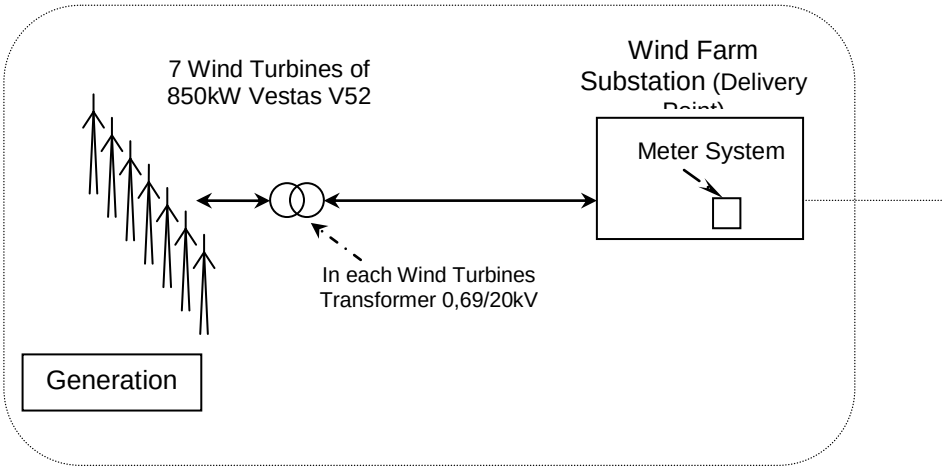


Figure 03 – Wind farm *São Vicente* simplified wiring diagram.

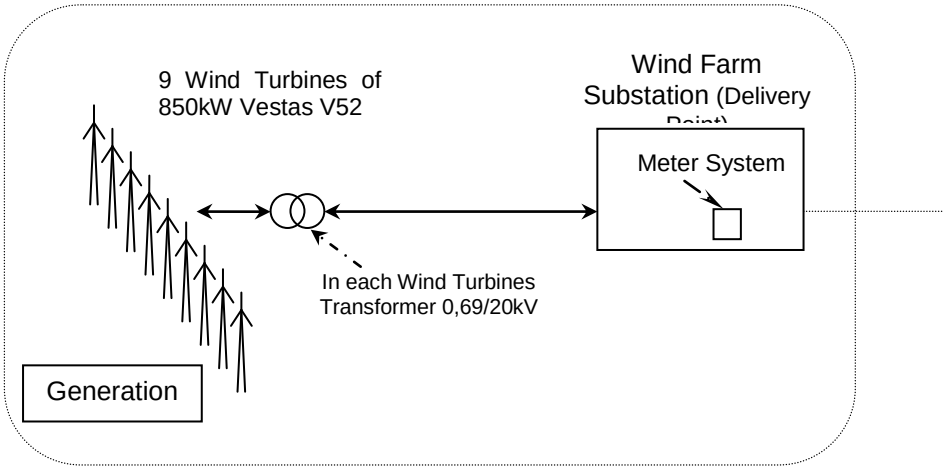


Figure 04 – Wind farm *Sal* simplified wiring diagram.

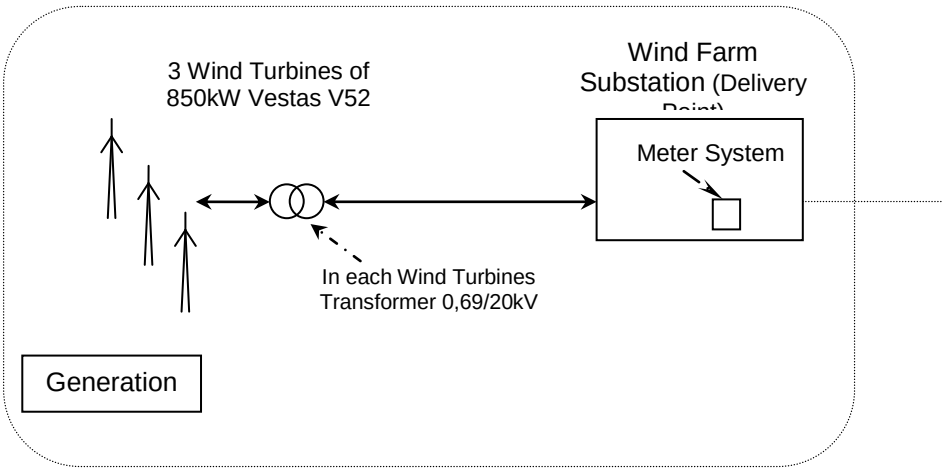


Figure 05 – Wind farm *Boa Vista* simplified wiring diagram.

The operator, through its technical team (which is also responsible for day-to-day operation of the electric power production by the wind farm) is responsible for the gathering of data and for filling in

registration forms for data storage. The project manager is the only responsible for the monitoring plan. The staff involved with the monitoring of data will participate in capacity building seminars in order to be able to correctly undertake the monitoring plan as described in the PDD.

The wind power plant operator, with help from the equipment manufacturers, is responsible for training of his monitoring and operation staff. After training activities, the technical team manage monitoring activities, quality control and the quality assessment procedures.

All monitoring data is being stored during the lifetime of the project by the project manager. In this case it means seven years (credit period) and more two years after its closure in accordance with the methodology. If the project can be renewed for more two periods, the data will be stored for 21 years (credit period renewed) and more two years, giving a total of 23 years of archival information.

All the training necessary for the plant operational team (eventually remote and local operators) was provided during the plant construction and during the plant commercial operation. The objectives of the course was to train the engineers and others technicians to understand the applicable safety procedures and practices associated with the technology installed, to operate the operational system of control panel, manuals and others documentation, identify alarm notifications, monitor and operate wind farm using the online SCADA system and the maintenance of the wind farm. The training procedures were held by *Vestas* specialist team in each wind farm. The flowchart monitoring information is presented in appendix 2.

SECTION D. Data and parameters

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Data / Parameter:	$EF_{grid, CM,y}$
Unit:	tCO_{2e}/MWh
Description:	Combined margin CO_2 emission factor of the grid
Source of data:	Calculated
Value(s) applied):	Santiago: 0.6655 Sal: 0.6746 São Vicente: 0.7381 Boa Vista: 0.6464
Choice of data or measurement methods and procedures	As per the “Tool to calculate the emission factor for an electricity system”
Purpose of data:	This parameter is used to calculate the baseline emissions.
Additional comment:	Calculated as a weighted average of the OM and BM emission factors.

Data / Parameter:	$EF_{grid, OM,y}$
Unit:	tCO_{2e}/MWh
Description:	CO_2 Operating Margin emission factor of the grid.
Source of data:	Factor calculated with data from Electra.
Value(s) applied):	Santiago: 0.6665 Sal: 0.6742 São Vicente: 0.7496 Boa Vista: 0.6505

Choice of data or measurement methods and procedures	As per the "Tool to calculate the emission factor for an electricity system"
Purpose of data:	This parameter is used to calculate the baseline emissions.
Additional comment:	Calculated *ex-ante* (2008-2010) as indicated in section B.6.1 of the registered PDD.

Data / Parameter:	$EF_{grid,BM,y}$
Unit:	tCO_{2e}/MWh
Description:	CO_2 Build Margin emission factor of the grid.
Source of data:	Factor calculated with data from Electra.
Value(s) applied):	Santiago: 0.6622 Sal: 0.6755 São Vicente: 0.7036 Boa Vista: 0.6340
Choice of data or measurement methods and procedures	As per the "Tool to calculate the emission factor for an electricity system"
Purpose of data:	This parameter is used to calculate the baseline emissions.
Additional comment:	Calculated *ex-ante* (2010) as indicated in section B.6.1 of the registered PDD.

Data / Parameter:	$FC_{i,y}$
Unit:	liters
Description:	Amount of fossil fuel type *i* consumed in the project electricity system per year y.
Source of data:	Data provided by official publications – Electra Reports
Value(s) applied):	

	2008		2009		2010	
	$Fc_{i,y}$ (Liters)		$Fc_{i,y}$ (Liters)		$Fc_{i,y}$ (Liters)	
	Diesel	Fuel Oil	Diesel	Fuel Oil	Diesel	Fuel Oil
S.VICENTE	888,688	12,302,082	996,033	12,784,248	1,507,881	13,639,341
SAL	272,654	8,549,010	421,047	7,976,353	472,292	7,702,079
SANTIAGO	4,665.294	25,662,633	1,445,548	29,357,880	5,568,602	28,972,204
Boa Vista	1,629,403	0	1,666,734	0	1,651,230.48	0

Choice of data or measurement methods and procedures	Data available at IPCC Guidelines on National GHG Inventories.
Purpose of data:	This parameter is used to calculate the emissions factors.
Additional comment:	Uncertainty level of data is low.

Data / Parameter:	$NCV_{i,y}$
Unit:	TJ/Gg
Description:	Net calorific value (energy content) of fossil fuel type i.
Source of data:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value(s) applied):	Diesel Oil: 41.4 Fuel Oil: 39.8
Choice of data or measurement methods and procedures	Data available at IPCC Guidelines on National GHG Inventories.
Purpose of data:	This parameter is used to calculate the emissions factors.
Additional comment:	Uncertainty level of data is low.

Data / Parameter:	$EF_{CO2,i,y}$
Unit:	$kgCO_2/TJ$
Description:	CO_2 emission factor of fossil fuel type *i* consumed in the project electricity system per year y.
Source of data:	IPCC default values at the lower limit of the uncertainty at a 95% confidence interval as provided in Table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories.
Value(s) applied):	Diesel Oil: 72,600 Fuel Oil: 75,500
Choice of data or measurement methods and procedures	Default value of IPCC.
Purpose of data:	This parameter is used to calculate the emissions factors.
Additional comment:	Uncertainty level of data is low.

D.2. Data and parameters monitored

(Copy this table for each piece of data and parameter)

Data/parameter:	$\boldsymbol{EG_y}$
Unit	MWh
Description	Electricity supplied to the grid by the project.
Measured/calculated/default	Measured.
Source of data	Energy Meters
Value(s) of monitored parameter	Santiago: 55,790.94 Sal: 28,770.35 São Vicente: 37,969.04 Boa Vista: 11,990.62

Monitoring equipment	**Santiago wind farm** **Meter:** Landis Gyr **Model:** ZMQ202CTSAT **Active energy:** 0.2S **Reactive Energy:** 0.5S **Serial number:** 97736766 Factory calibration certificate dated 13/06/2011,reference nº VEZQ1118.xls.5 **Sal wind farm** **Meter** Landis Gyr **Model:** ZMQ202CTSAT **Active energy:** 0.2S **Reactive Energy:** 0.5S **Serial number:** 97703467 and 97703466 (connected to the transmission line backup, not used in the monitoring period) Factory calibration certificate dated 24/05/2011, reference nº VEZQ1115.xls.14 and nº VEZQ1115.xls.13 **São Vicente wind farm** **Meter:** Landis Gyr **Model:** ZMQ202CTSATActive energy: 0.2S **Reactive Energy:** 0.5S **Serial number:** 97736768 and 97736767(connected to the transmission line backup, not used in the monitoring period) Factory calibration certificate dated 13/06/2011, reference nº VEZQ1118.xls.7 and nº VEZQ1118.xls.6 **Boa Vista wind farm** **Meter:** Landys Gyr **Model:** ZMQ202CTSAT **Active energy:** 0.2S **Reactive Energy:** 0.5S **Serial number:** 97703468 Factory calibration certificate dated 24/05/2011,reference nº VEZQ1115.xls.15 All energy meters are bi-directional and located in the substation of each wind farm. All meters are sealed. As recommended by the manufacture the calibration validity is 8 years.
Measuring/reading/recording frequency:	The following parameters shall be measured: (i) The quantity of electricity supplied by the project plant/unit to the grid; and (ii) The quantity of electricity delivered to the project plant/unit from the grid. The net electricity of the project will be calculated as the sum of the net electricity generation of the four power plants and for the individual EG_{grid}, that the net electricity production is obtained by operation the electricity exports – the electricity imports.
Calculation method (if applicable):	Not applicable.
QA/QC procedures:	The procedure is described in section B.7.2 of the registered PDD.
Purpose of data:	This parameter is used to calculate the baseline and project emissions.
Additional comments:	The data will be archived in electronic way. Archived data kept during the crediting period and two years after.

D.3. Implementation of sampling plan

Not applicable.

SECTION E. Calculation of emission reductions or GHG removals by sinks

E.1. Calculation of baseline emissions or baseline net GHG removals by sinks

According to the methodology, baseline emissions (BE_y) are the product of the baseline emissions factor (EF_y) times the electricity supplied by the project activity to the grid (EG_y), calculated as follows:

$$BE_y = EF_{grid,CM,y} \times EG_{pj,y} \qquad \textbf{Equation 01}$$

Where:

BE_y = Baseline emissions, in tCO_2/yr;

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

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh)

The Monitoring Report applies the ex-ante validated emission factor for project activities connected to each interconnected grid islands. These factors were calculated based on parameters that were justified during the validation as stated in the registered PDD.

System	$EF_{grid,CM}$(tCO2/MWh)
São Vicente	0.7381
Sal	0.6746
Santiago	0.6655
Boa Vista	0.6464

Table 05: Emission factor of each island interconnected grid (tCO2/MWh).

As mentioned above, electricity supplied to the grid by the project (EG_y) is monitored by Cabeólica and Electra. The amount of electricity generated during the monitored period by the plants comprised by this CDM project activity and the baseline emissions are presented in table 5 and 6, respectively:

Year	Months	Wind Power Plants			
		Boa Vista WPP (MWh)	Sal WPP (MWh)	Santiago WPP (MWh)	São Vicente WPP (MWh)
2013	April	431.38	1,355.23	3,121.39	1,921.63
	May	488.58	1,547.83	4,075.35	2,280.44

	June	471.13	1,428.59	2,614.70	2,353.44
	July	310.90	1,150.65	1,177.49	1,506.14
	August	206.57	758.17	752.01	856.12
	September	289.19	1,125.58	1,450.76	1,326.10
	October	448.02	1,481.22	2,148.60	1,996.37
	November	448.19	1,659.62	2,855.25	1,746.11
	December	771.66	1,637.17	3,742.11	1,785.19
Sub-Total 2013		**3,865.62**	**12,144.06**	**21,937.66**	**15,771.54**
2014	January	865.25	1,942.34	4,341.42	2,137.20
	February	924.84	1,787.45	4,942.93	2,252.27
	March	837.87	1,537.68	3,928.58	2,176.66
	April	776.52	1,673.24	3,314.52	1,967.48
	May	806.68	1,531.24	3,478.13	2,029.58
	June	884.08	1,047.77	3,432.08	2,219.79
	July	491.61	1,099.02	1,559.99	1,718.28
	August	295.79	753.02	661.44	1,233.22
	September	411.75	938.09	1,299.04	1,271.31
	October	502.73	1,335.37	1,650.06	1,874.51
	November	623.00	1,392.03	2,299.61	1,788.21
	December	704.88	1,589.04	2,945.48	1,528.99
Sub-Total 2014		**8,125.00**	**16,626.29**	**33,853.28**	**22,197.50**
TOTAL		**11,990.62**	**28,770.35**	**55,790.94**	**37,969.04**

Table 06: Electricity dispatched to the grid by the project activity.

Year	Months	Baseline Emissions (tCO_2e)			
		Boa Vista WPP	**Sal WPP**	**Santiago WPP**	**São Vicente WPP**
2013	April	278.84	914.24	2,077.29	1,418.36
	May	315.82	1,044.17	2,712.15	1,683.19
	June	304.54	963.73	1,740.08	1,737.07
	July	200.97	776.23	783.62	1,111.68
	August	133.53	511.46	500.46	631.90
	September	186.93	759.32	965.48	978.79
	October	289.60	999.23	1,429.89	1,473.52
	November	289.71	1,119.58	1,900.17	1,288.80
	December	498.80	1,104.43	2,490.37	1,317.65
Sub-Total 2013		**2,498.74**	**8,192.38**	**14,599.51**	**11,640.97**
2014	January	559.30	1,310.30	2,889.22	1,577.47

	February	597.82	1,205.81	3,289.52	1,662.40
	March	541.60	1,037.32	2,614.47	1,606.59
	April	501.94	1,128.77	2,205.81	1,452.20
	May	521.44	1,032.97	2,314.70	1,498.03
	June	571.47	706.83	2,284.05	1,638.43
	July	317.78	741.40	1,038.17	1,268.26
	August	191.20	507.99	440.19	910.24
	September	266.16	632.84	864.51	938.35
	October	324.96	900.84	1,098.11	1,383.58
	November	402.71	939.06	1,530.39	1,319.88
	December	455.63	1,071.97	1,960.22	1,128.55
Sub-Total 2014		**5,252.00**	**11,216.10**	**22,529.36**	**16,383.97**
TOTAL		**7,750.74**	**19,408.47**	**37,128.87**	**28,024.95**

Table 07: Baseline emissions over the monitored period.

A spreadsheet with all calculations will be available to the DOE at the time of the verification.

E.2. Calculation of project emissions or actual net GHG removals by sinks

According to the applicable methodology, project emissions are zero.

E.3. Calculation of leakage

According to the applicable methodology, leakage emissions by the project activity are zero.

E.4. Summary of calculation of emission reductions or net GHG removals by sinks

Item		Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	GHG emission reductions or net GHG removals by sinks (t CO_2e) achieved in the monitoring period		
					Up to 31/12/2012	From 01/01/2013	Total amount
2013	April	4,689	0	0	0	4,689	4,689
	May	5,755	0	0	0	5,755	5,755
	June	4,745	0	0	0	4,745	4,745
	July	2,872	0	0	0	2,872	2,872
	August	1,777	0	0	0	1,777	1,777
	September	2,891	0	0	0	2,891	2,891
	October	4,192	0	0	0	4,192	4,192
	November	4,598	0	0	0	4,598	4,598
	December	5,411	0	0	0	5,411	5,411

Item		Baseline emissions or baseline net GHG removals by sinks (t CO_2e)	Project emissions or actual net GHG removals by sinks (t CO_2e)	Leakage (t CO_2e)	GHG emission reductions or net GHG removals by sinks (t CO_2e) achieved in the monitoring period		
					Up to 31/12/2012	From 01/01/2013	Total amount
2014	January	6,336	0	0	0	6,336	6,336
	February	6,756	0	0	0	6,756	6,756
	March	5,800	0	0	0	5,800	5,800
	April	5,289	0	0	0	5,289	5,289
	May	5,367	0	0	0	5,367	5,367
	June	5,201	0	0	0	5,201	5,201
	July	3,366	0	0	0	3,366	3,366
	August	2,050	0	0	0	2,050	2,050
	September	2,702	0	0	0	2,702	2,702
	October	3,707	0	0	0	3,707	3,707
	November	4,192	0	0	0	4,192	4,192
	December	4,616	0	0	0	4,616	4,616
Total		**92,313**	0	0	0	**92,313**	**92,313**

Table 08: Emission Reductions over the monitored period.

A spreadsheet with all calculations will be available to the DOE at the time of the verification.

E.5. Comparison of actual emission reductions or net GHG removals by sinks with estimates in registered PDD

Item	Values estimated in ex ante calculation of registered PDD	Actual values achieved during this monitoring period
Emission reductions or GHG removals by sinks (t CO_2e)	118,258	92,313

E.6. Remarks on difference from estimated value in registered PDD

Cabeólica generated less emission reductions in the past years than forecasted in the PDD due to lower intake of the project wind energy by the local utility company than expected. During these initial years of production by the company, the demand for electricity, by which the company's forecasted production was based on, did not reached expected levels.

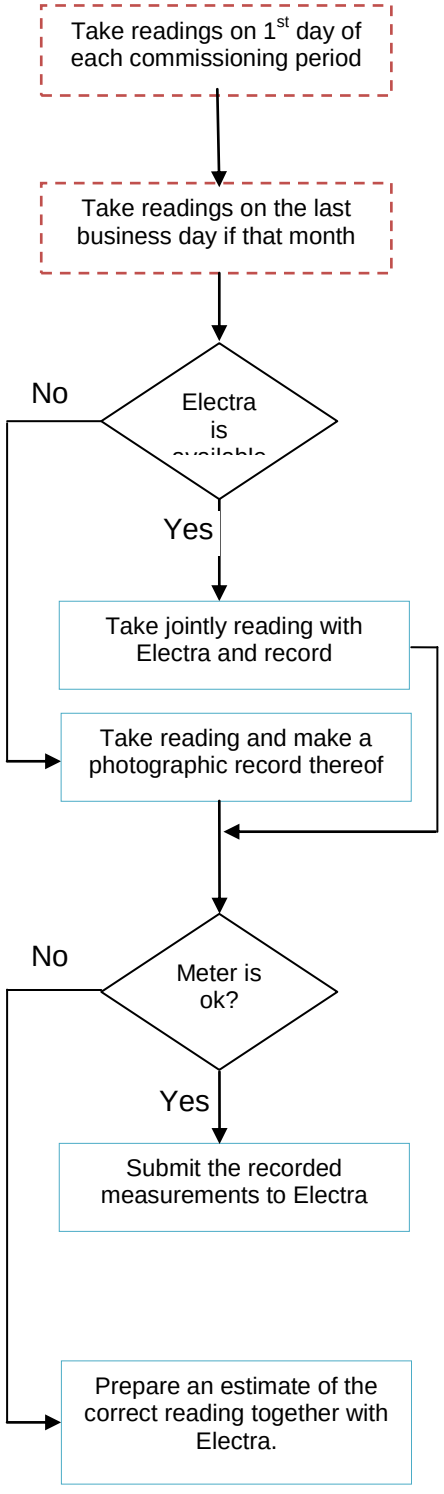
Appendix 1. Contact information of project participants and responsible persons/entities

Project participant and/or responsible person/ entity	**x** Project participant ☐ Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Cabeolica S.A
Street/P.O. Box	C.P 128/C
City	Santiago
State/Region	-
Postcode	-
Country	Cape Verde
Telephone	+ 238 2602260
Fax	+ 238 2602260
E-mail	ana.monteiro@cabeolica.com
Website	www.cabeolica.com
Contact person	Ana Monteiro
Title	Ms.
Last name	Monteiro
Middle name	-
First name	Ana
Department	Environmental, Social and Administrative
Direct tel.	+ 238 2602260
Personal e-mail	ana.monteiro@cabeolica.com

Project participant and/or responsible person/ entity	**x** Project participant ☐ Responsible person/ entity for completing the CDM-MR-FORM
Organization name	Swedish Energy Agency
Street/P.O. Box	Kungsgatan 43 P.O. Box 310 SE-631 04
City	Eskilstuna
State/Region	-
Postcode	-
Country	Sweden
Telephone	+ 46 16 544 2099
Fax	+ 46 16 544 2099
E-mail	backoffice@energimyndigheten.se
Website	www.energimyndigheten.se
Contact person	Ola Hansen
Title	Mr.
Last name	Ola
Middle name	-
First name	Hansen
Department	International Carbon Market Unit

Direct tel.	+ 46 16 544 2099
Personal e-mail	backoffice@energimyndigheten.se
Project participant and/or responsible person/ entity	☐ Project participant x Responsible person/ entity for completing the CDM-MR-FORM
Organization name	GSS Sustentabilidade
Street/P.O. Box	Iguaçu 2820
City	Curitiba
State/Region	Paraná
Postcode	80.240-030
Country	Brazil
Telephone	+55 41 3091-9732
E-mail	info@gssconsult.com
Website	www.gssconsult.com
Contact person	Mr. Paulo A. Zanardi Jr.
Title	Mr.
Last name	Zanardi
Middle name	Augusto
First name	Paulo
Department	Climate Change
Direct tel.	+55 41 9970-3737
Personal e-mail	zanardi@gssconsult.com

Appendix 2. Monitoring Information Flowchart

Flowchart	Procedure	Responsible
	This reading shall be performed together with Electra. This reading must be recorded by Cabeólica and presented in a document.	Site Operator of each wind farm
	Take the reading on the last business day of that month. This reading must be done together with Electra and shall be notified with 48h in advance to Electra.	Site Operator of each wind farm
	Cabeólica must give Electra 48h of notice of the time Cabeólica intends to take the reading	Site Operator of each wind farm
	Cabeólica will keep a record of these readings.	Project Manager and Electra Representative of each wind farm
	If the metering system is found to be inaccurate by more than 1% or the acceptable accuracy from manufacture, whichever is the lower, or is unavailable or malfunctioning, the measurement will be determined jointly with Electra.	
	These recorded measurements will be submitted no later than 2 business days to Electra.	Project Manager of each wind farm or CTO?
	Based in all available information including the telemeter data have been agreed between parties.	Project Manager Manager and Electra Representative of each wind farm

Appendix 3. IGQPI Declaration

INSTITUTO DE GESTÃO DA QUALIDADE E DA PROPRIEDADE INTELECTUAL
Qualidade e Confiança

Declaration

The *Instituto de Gestão da Qualidade e da Propriedade Intelectual de Cabo Verde* - IGQPI (The Cape Verdean Institute of Quality Management and Intellectual Property) was established in 2014 and the Statutes were approved by the Regulatory Decree of the Council of Ministers No. 35/2014 of 5 December 2014. IGQPI acts under the supervision of the Cape Verdean Ministry of Tourism, Industry and Energy.

IGQPI hereby declare that conditions have not yet been created in the Republic of Cape Verde to allow for the calibration of high precision electricity metering systems using methodologies in accordance with international standards, and companies are therefore expected to follow relevant specifications set by equipment manufacturers. IGQPI further declares that it is currently working towards creating the conditions necessary which will serve to support the future implementation of adequate regulations regarding calibration of electricity meter reading systems.

Praia, April 16th 2015

O Presidente do IGQPI

Abraão Lopes

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Document information

Version	*Date*	*Description*
05.1	4 May 2015	Editorial revision to correct version numbering.
05.0	1 April 2015	Revisions to: • Include provisions related to delayed submission of a monitoring plan; • Provisions related to the Host Party; • Remove reference to programme of activities; • Overall editorial improvement.
04.0	25 June 2014	Revisions to: • Include the Attachment: Instructions for filling out the monitoring report form (these instructions supersede the "Guideline: Completing the monitoring report form" (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for completing the CDM-MR-FORM in A.6 and Appendix 1; • Change the reference number from *F-CDM-MR* to *CDM-MR-FORM*; • Editorial improvement.
03.2	5 November 2013	Editorial revision to correct table in page 1.
03.1	2 January 2013	Editorial revision to correct table in section E.5.
03.0	3 December 2012	Revision required to introduce a provision on reporting actual emission reductions or net GHG removals by sinks for the period up to 31 December 2012 and the period from 1 January 2013 onwards (EB70, Annex 11).
02.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the monitoring report form" (EB 66, Annex 20).
01	28 May 2010	EB 54, Annex 34. Initial adoption.

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