



Assessment Report for CDM proposed standardized baseline (Version 02.0)

(To be **used** by the **UNFCCC secretariat** in assessing the quality of a proposed standardized baseline only when requested by eligible DNAs.)

Title of proposed standardized baseline:	Cape Verde Standardized baseline for the Power Sector
Reference of proposed standardized baseline:	PSB0052
Name(s) of the Party or Parties to which the proposed standardized baseline applies:	Republic of Cape Verde
Name(s) of the proponent(s) of the proposed standardized baseline:	<p>Ministério da Agricultura e Ambiente (Ministry of Agriculture and Environment) Cape Verde</p> <p>Developed by - Secretariat of the Ecowas Centre for Renewable Energy and Energy Efficiency (i.e. ECREEE)</p> <p>Under assistance of - UNFCCC CDM Regional Collaboration Centre in Lome, Togo</p> <p>In collaboration with - Cape Verde Ministry of Industry, Trade and Energy, national utility company Electra, AEB, and private renewable companies Cabeolica.</p>
History of the submission & assessment:	<p>1) 01/10/2019: first submission was received 17/10/2019: initial assessment was finalized 21/10/2019: its assessment was finalized</p> <p>2) 18/11/2020: second submission was received 26/01/2021: its assessment was finalized</p> <p>3) 22/02/2021: third submission was received 26/02/2021: its QA/QC assessment was finalized</p>

<p>Conclusion:</p> <p>(a) The quality assurance and quality control system complied with the provisions and data quality objectives of the valid “Guidelines for quality assurance and quality control of data in the establishment of standardized baselines”</p> <p>(b) The approach used by this proposed standardized baseline complied with one of the approaches referred to in the valid “Procedure for development, revision, clarification and update of standardized baselines”:</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>One of the four approved approaches:</p> <p><input type="checkbox"/> The “Guidelines for the establishment of sector specific standardized baselines”;</p> <p><input type="checkbox"/> A methodological approach contained in an approved baseline and monitoring methodology;</p> <p><input checked="" type="checkbox"/> A methodological approach contained in an approved methodological tool;</p> <p><input type="checkbox"/> The “Guideline: Establishment of standardized baselines for afforestation and reforestation project activities under the CDM”.</p>
<p>Date when the assessment report is completed:</p>	<p>26/02/2021</p>

SECTION A. Summary of Proposed Standardized Baseline

A.1. Scope and application of the proposed standardized baseline

1. The proposed standardized baseline (PSB) is developed for
 - (a) Additionality demonstration;
 - (b) Baseline identification;
 - (c) Baseline emission estimation
2. The PSB is applicable to power sector for determination of grid emission factor in all 9 inhabited islands i.e. São Vicente, Sal, Santiago, Boavista, Santo Antão, Maio, Fogo, Brava and São Nicolau of the Republic of Cape Verde.
3. Projects shall use standardized baseline together with the approved methodologies that refer to “TOOL07: Tool to calculate the emission factor for and electricity system, version 07.0” (hereinafter referred as ‘the grid tool’).
4. For São Vicente, Sal, Santiago, Boavista and Santo Antão islands the grid emission factor is calculated using data vintage of 2015 to 2017 and further using the simple operating margin and build margin approach provided in the grid tool.

5. For Maio, Fogo, Brava and São Nicolau islands the grids qualify for as an isolated grid¹ as reviewed from the electra reports from 2013 to 2017. Therefore, the emission factor for Maio, Fogo and Brava island is determined based on a simplified approach provided under paragraph 94(b) and for São Nicolau island it is based on simplified approach provided under paragraph 95(b) of the grid tool.

A.2. Description of the proposed standardized baseline

6. Key data parameters and data sources:

Key data parameters	Data sources
Fuel properties (NCV, emission factor)	<p>The density of Fuel Oil and Diesel is received from the fuel supplier.</p> <p>The density of the fuel is determined based on laboratory test results. The density value is communicated by the utilities to the DNA.</p> <p>While, fuel emission factors are taken from IPCC 2006 guidelines.</p>
Fuel consumption	Directorate of Industry, Trade and Energy (DNICE).
Electricity generation in the national grid	Empresa de Electricidade E Água SARL (Electra, national utility) reports from 2013 to 2017, except for Boavista island where the data is provided by Agencia Reguladora Multisectorial da Economia (energy regulator)

7. The scope and coverage of the data:

- (a) The PSB as part of the relevant electricity system identifies,
- (i) For São Vicente island – One fuel oil/diesel-based power plant with capacity of 18.80 MW and 1 on-shore wind power plant of 5.95 MW. The average of electricity generation from low-cost/must-run (LCMR) plants from 2013 to 2017 is 28.91 per cent, which is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM emission factor (EF).
 - (ii) For Sal island - Two fuel oil/diesel-based power plants with capacity of 13.4 MW and 6.48 MW, 1 on-shore wind power plant of 7.65 MW and 1 solar PV power plant with capacity of 2.50 MW. The average of electricity generation from low-cost/must-run (LCMR) plants from 2013 to 2017 is 28.26 per cent, which is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM emission factor (EF).
 - (iii) For Santiago - One diesel-based power plant with capacity of 72.80 MW, 1 on-shore wind power plants with capacity of 9.35 MW and 1 solar PV power plant of 4.50 MW. The average of electricity generation from low-cost/must-run (LCMR) plants from 2013 to 2017 is 16.83 per cent, which is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM emission factor (EF).

¹ As per the definition of the term ‘Isolated grid system’ as provided in the grid tool, any grid that is located in a small island developing state where at least 65 per cent of the power installed capacity is based on fossil fuel sources (solid, liquid or gaseous) is considered as isolated grid system.

- (iv) For Boavista island - One fuel oil-based power plant with capacity of 13.85 MW and 1 on-shore wind power plant of 2.55 MW. The average of electricity generation from low-cost/must-run (LCMR) plants from 2013 to 2017 is 22.60 per cent, which is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM emission factor (EF).
 - (v) For Santo Antão island - Two diesel-based power plants with capacity of 1.86 MW and 6.00 MW, 1 on-shore wind power plant of 0.50 MW. The average of electricity generation from low-cost/must-run (LCMR) plants from 2013 to 2017 is 10.81 per cent, which is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM emission factor (EF).
 - (b) The data include key information of each power plant (name, technology, electricity generation, fuel type/consumption and commissioning data);
 - (c) The data represents São Vicente, Sal, Santiago, Boavista and Santo Antão island in Cape Verde
 - (d) The data represent three years (2015, 2016 and 2017).
8. The DNA used a data template in accordance with the grid tool.
9. The development of the PSB includes only grid-connected power plants operated by Electra and Independent power producers (IPP) in the respective islands.
10. The data for 2017 is used to calculate built margin (BM) EF.

SECTION B. Summary of Assessment

B.1. Assessment process

11. The purpose of assessment conducted by the secretariat is: i) to ensure that the QA/QC system implemented by the DNA complies with the provisions and data quality objectives of the “Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines” (hereinafter referred to as QA/QC guidelines); ii) to ensure that the PSB complies with one of the approved approaches.
12. The assessment consisted of the following:
- (a) Review of the documents submitted,
 - (b) Identification of issues (assessment findings) and draft of the assessment “findings and resolution” note,
 - (c) Communication of assessment findings with DNA and request for their resolution and response,
 - (d) Direct communication with DNA,
 - (e) Review of the additional documents and/or responses provided by DNA,
 - (f) Closing the findings,
 - (g) Conclusion of the assessment report.
13. A desk review was performed on the following data/information submitted as part of the PSB.
- (a) First submission dated 01/10/2019 which was successful in the initial assessment included:
 - (i) PSB form (F-CDM-PSB), version 1.0 dated 18/09/2019

- (ii) Excel sheet containing calculation of grid emission factor for São Vicente, Sal, Santiago, Boavista and Santo Antão island;
- (iii) QC report dated 15/07/2019;
- (b) Assessment findings were communicated to the DNA on 21/10/2019.
- (c) Second submission dated 18/11/2020 included:
 - (i) Response to the findings;
 - (ii) PSB form (F-CDM-PSB), version 2.0 dated 08/07/2020
 - (iii) Excel sheet containing calculation of grid emission factor for São Vicente, Sal, Santiago, Boavista and Santo Antão island;
 - (iv) Other supporting document including copy of annual reports for year 2013 to 2017 of the national utility, data files from the energy regulator for electricity generation from power plants operated by IPPs for period from 2013 to 2017.
- (d) Assessment findings were communicated to the DNA on 26/01/2021, in response to which the DNA requested a conference call.
- (e) A conference call was held on 28/01/2021. During the call assessment findings were further discussed.
- (f) Third submission dated 22/02/2021 included:
 - (i) Response to the findings;
 - (ii) PSB form (F-CDM-PSB), version 3.0 dated 20/02/2021
 - (iii) Excel sheet containing calculation of grid emission factor for São Vicente, Sal, Santiago, Boavista and Santo Antão island;
- (g) The additional submissions clarified all issues raised by the secretariat.

B.2. Assessment opinion:

14. In accordance with the QA/QC guidelines, the secretariat concluded that the all following requirements were met by this PSB:
- (a) QC system was implemented to check the data quality before/during/or after data collection. All primary data come directly from the respective power plant operator to the national utility and to energy regulator in case of Boavista island. The data is archived and maintained with national utility and energy regulator in such a way that allow for the reproduction of the calculation of the emission factor of the grid;
 - (b) QC activities were clearly documented in the QC report. Data templates were presented to the power sector through which the required data for the grid emission factor calculation is maintained and submitted to the DNA to facilitate further transparency and quality control;
 - (c) All relevant documents and data were available for assessment. The data used in the calculation are available with the Cape Verde DNA;
 - (d) The data scope was comprehensive enough to produce a “true and fair” representative standardized baseline in the particular sector;
 - (e) The key data and information are consistently presented;
 - (f) The data vintage (three years) was met as per the provisions of the grid tool;

- (g) The assumptions and conservative approaches for data processing and calculations were justified;
15. The secretariat concluded that the PSB complied with the approach of the grid tool the detailed assessment can be found in the table below.
 16. The details of issues (assessment findings) identified by the secretariat and the responses provided by the DNA are provided in Appendix 1 to this document.

Table 1: Assessment against grid tool

Step from the Grid Tool	Assessment
Step 1: Identify the relevant electricity systems	<p>The project electric system was determined for each of the island i.e. for São Vicente, Sal, Santiago, Boavista and Santo Antão islands separately by the DNA as the power grid of these islands are not connected to each other. The electricity system for respective island includes power plants providing electricity to that particular island as described under para 7 above. The operating margin (OM) emission factor (EF), build margin (BM) EF and combined margin (CM) EF is calculated separately for each of the above-mentioned islands.</p> <p>For Maio, Fogo, Brava and São Nicolau islands the grids qualify for as an isolated grid as reviewed from the electra reports from 2013 to 2017. Therefore, the emission factor for Maio, Fogo and Brava island is determined based on a simplified approach provided under paragraph 94(b) and for São Nicolau island it is based on simplified approach provided under paragraph 95(b) of the grid tool. Hence these islands are not included in the emission factor (EF) calculations.</p>
Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)	The DNA selected Option I i.e. only grid-connected power plants are included in the calculation.
Step 3: Select a method to determine the operating margin (OM)	As mentioned under para 7 above the average of electricity generation from low-cost/must-run (LCMR) plants from 2013 to 2017 is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM EF for São Vicente, Sal, Santiago, Boavista and Santo Antão islands.
Step 4: Calculate the operating margin emission factor according to the selected method	<p>The calculation of the OM was performed through Option A (Based on the net electricity generation and a CO₂ emission factor of each power unit) and the $EF_{EL,m,y}$ was determined based on option A1 where data on fuel consumed and electricity generated by each power plant is available.</p> <p>The list of power plants, including the capacity, technology, commissioning date, electricity generated, and fuel consumed by each power plant were sourced from respective utilities from the</p>

member countries. The NCV of fuel used for power generation and CO₂ emission factor of the fuel was sourced from the IPCC 2006 guidelines for National Greenhouse Gas Inventories.

The following table provides summary of OM calculated for the period 2015-2017, for São Vicente, Sal, Santiago, Boavista and Santo Antão islands.

Name of the island	OM [tCO₂/MWh]
São Vicente	0.69
Sal	0.72
Santiago	0.65
Boavista	0.76
Santo Antão	0.71

The following table provides summary of OM calculated for Maio, Fogo, Brava and São Nicolau.

Name of the island	OM [tCO₂/MWh]
Maio	0.79
Fogo	0.79
Brava	0.79
São Nicolau	0.79

Step 5: Calculate the build margin (BM) emission factor

The set of power plants that comprises 20% of the generation in 2019 ($SET_{\geq 20 \text{ per cent}}$) include latest power plants commissioned before 2017.

The secretariat confirmed that the calculation of the emission factor was made in line with equation 15 of the grid tool. The following table provides summary of BM calculated for 2017.

Name of the island	BM [tCO2/MWh]
São Vicente	0.51
Sal	0.49
Santiago	0.55
Boavista	0.60
Santo Antão	0.68

The following table provides summary of BM calculated for Maio, Fogo, Brava and São Nicolau.

Name of the island	BM [tCO2/MWh]
Maio	0.58
Fogo	0.58
Brava	0.58
São Nicolau	0.58

Step 6: Calculate the combined margin emissions factor

The combined margin emission factor was determined by applying different weights for OM and BM as follows:

- wind and solar: OM = 0.75; BM = 0.25
- other plants 1st crediting period: OM = 0.5; BM = 0.5
- other plants 2nd and 3rd crediting periods: OM = 0.25; BM = 0.75

Appendix 1. Findings and resolutions

CL No.	Request for Clarification (CL)	Reference to general provisions of guidelines on quality assurance and quality control of data used for sector-specific standardized baselines	Responses and corrective actions of DNA	Conclusion (open/closed)
1	<p>Electricity generation records for 2015, 2016 and 2017</p> <p>a. SAL island - For APP operated plant for reporting years i.e. 2015, 2016 and 2017 it is noted that there is a minor difference between the annual net energy generation as reported under work sheet ‘SAL energy data’ in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xlsx” and the difference between the annual gross energy generation and internal consumption as reported at the same location. For example, for year 2017, gross energy generation is 26,055 MWh and internal consumption is 494 MWh. Hence the net electricity generation should be = $26,055 - 494 = 25,561$ MWh, while the value reported in the excel file is 25,494 MWh. Although there is minor difference in the net electricity generation value, the DNA is requested to confirm whether this difference is resulted due to a calculation error or a drift due to</p>	Para 15 (c) Consistency and para 15 (d) Credibility	The values has been corrected now to 25561 MWh. There was a minor error (calculation error) due to losses that was subtracted. The PSB-FORM has been revised as well with minor change on the results.	<p>The data included in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xlsx” for SAL island for 2015, 2016 and 2017 under sheets ‘SAL energy data’ and ‘SAL Data’ is consistent.</p> <p>Further, it is noted that the emission factor values as reported in the above-mentioned excel file for all the islands are consistent with the one reported in the CDM-PSB-FORM.</p> <p>The CL can be closed.</p>

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	<p>different measurements.</p> <p>In case of any reporting error, the DNA is requested to re-calculate grid emission factor value using revised net electricity generation value and accordingly revise the PSB-FORM.</p>			
2	<p>Boavista island -</p> <p>The DNA need to revise the PSB-FORM reflecting the same value of grid emission factor for operating margin and combined margin, and low-cost must run plant as reported in the excel file, “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xlsx”.</p>	Para 15 (c) Consistency	The PSB-FORM has been now revised to reflect the same values.	<p>It is noted that the emission factor values as reported in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xlsx” for Boavista island are consistent with the one reported in the CDM-PSB-FORM.</p> <p>The CL can be closed.</p>
3	<p>Electricity generation records for 2013 and 2014 for Sal, Sao Vicente, Santo Antao, Santiago island.</p> <p>Upon review of the electra reports for 2013 and 2014 following inconsistencies were noted. The DNA is requested to address these inconsistencies and accordingly revise the submission.</p> <p>a. Mismatch in electricity generation from thermal power plants for 2013 and 2014 - For example, in 2013 electricity generation from Diesel plants in Sal</p>	Para 15 (c) Consistency	<p>There is a slightly adjustments on the generation side but is a minor change, the overall results didn’t change that much.</p> <p>Because at the Electra Report 2013, we have to look is at page 16, because on page 25, if we read the first paragraph those data are just related to the 1st semester. But on page 16 we can find the data from</p>	For Sal island electricity generation for Palmeira plant (36063 MWh) is noted from page 16 of electra report for 2013 and the generation from APP (4918.43 MWh estimated as difference between total generation (5339 MWh) and auxiliary consumption (420.57 MWh)) is noted from the excel file “APP_Indicadores_2013_2014.xlsx”. It is noted that the total electricity generation from diesel power plants on Sal island for 2013 matches with the amount mentioned in the excel file “Grid EF_Tool(Sal_Sao

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	<p>island is reported as 36,385 MWh. It is noted that this includes generation from APP operated plants and thermal plant (Palmeira). From the electra report (Fig,4) it is noted that the thermal generation is 15,389 MWh, while no records of electricity generation from APP operated plants was provided. The DNA is requested to provide data for APP operated plants for 2013 and 2014.</p> <p>Similarly, for Sao Vicente, Santo Antao and Santiago islands the electricity generation for 2013 as reported in electra report (Fig,4 for 2013) for other islands is not matching with the one reported in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xlsx”.</p>		<p>the hole year of 2013. Indeed Electra was requested at that time to complete the Report, but with the change of the board, that completion didn’t happen. That is why there is this perception of mismatch. We are available for a call to help clarify.</p>	<p>Vicente_Santo Antao_Boavista_Santiago)_final.xlsx”</p> <p>Further, for year 2014, the total amount of electricity generation from diesel plants (43782 MWh) on Sal island is cross checked as a sum of the electricity generation from Palmeira (34010 MWh) mentioned in figure 2 of the electra report and the electricity generation from APP plant (9772.1 MWh estimated as difference between total generation (10287.7 MWh) and auxiliary consumption (515.6 MWh)) as noted from the excel file “APP_Indicadores_2013_2014.xlsx”. It is noted that the total electricity generation from diesel power plants on Sal island for 2013 matches with the amount mentioned in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xlsx”.</p> <p>The electricity generation from wind and solar in 2013 for Sal, Santo Antao, Sao Vicente and Santiago island is reviewed against the electricity generation mentioned on page 16 of the electra report for 2013. It is found</p>

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	<p>b. Mismatch in the electricity generation from wind and solar in 2013 – The electricity generation from wind and solar plants in Sal island for year 2013 is reported as 19,028 MWh, while electra report (Fig 4) reports this as 9997 MWh.</p> <p>Similarly, the electricity generation from wind and solar for 2013 as reported in electra report (Fig.4) for other islands is not matching the one reported in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xls”.</p> <p>c. The DNA is requested to confirm how the data included in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xls” for APP operated plant for 2013 and 2014 is verified.</p> <p>The DNA is requested submit revised excel file and revised PSB-FORM addressing the above-mentioned inconsistencies.</p>			<p>consistent with the one reported in the excel file “Grid EF_Tool(Sal_Sao Vicente_Santo Antao_Boavista_Santiago)_final.xls”.</p> <p>As confirmed during the phone call the generation from APP is verified by the Directorate of the Energy, a government entity responsible for developing regulation and policy for IPPs, against the primary report from the APP that is submitted to the Directorate.</p> <p>Further, it is noted that the emission factor values as reported in the above-mentioned excel file for all the islands are consistent with the one reported in the CDM-PSB-FORM.</p> <p>The CL can be closed.</p>

CL No.	Request for Clarification (CL)	Reference to general provisions of guidelines on quality assurance and quality control of data used for sector-specific standardized baselines	Responses and corrective actions of DNA	Conclusion (open/closed)
4.	<p>Grid emission factor values for Maio, Fogo, Brava and Sao Nicolau island – The DNA should provide 3 different emission factors following procedure under section 6.6.1 of the grid emission factor tool for these islands i.e. provide separate grid emission factor value (a) for 1st crediting period of projects other than wind and solar, (b) for 2nd and 3rd crediting period of projects other than wind and solar and (c) for all the crediting periods of wind and solar projects, similar to the grid emission factor values for other islands.</p>	<p>Para 15 (b) Completeness</p>	<p>PSB-FORM revised accordingly.</p>	<p>The CDM-PSB-FORM is revised to include emission factor for 3 different scenarios as suggested, for Maio, Fogo, Brava and Sao Nicolau island. The emission factor values mentioned therein are consistent with the approach provided in the applied version of the grid emission factor tool.</p> <p>The CL can be closed.</p>

Document information

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