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:	Grid emission factor of Mauritius
Reference of proposed standardized baseline:	PSB0047
Name(s) of the Party or Parties to which the proposed standardized baseline applies:	Republic of Mauritius
Name(s) of the proponent(s) of the proposed standardized baseline:	DNA of Mauritius
History of the submission & assessment:	1) 18/10/2018: first submission was received 29/10/2018: initial assessment was finalized 10/12/2018: its QA/QC assessment was finalized 2) 31/01/2019: second submission was received 03/04/2019: its QA/QC assessment was finalized 3) 25/04/2019: third submission was received 06/06/2019: its QA/QC assessment was finalized 4) 16/09/2019: third submission was received 15/10/2019: its QA/QC assessment was finalized
Conclusion: **(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"**	☒ Yes ☐ No ☐ N/A
(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":	☒ One of the four approved approaches: ☐ The "Guidelines for the establishment of sector specific standardized baselines"; ☐ A methodological approach contained in an approved baseline and monitoring methodology; ☒ A methodological approach contained in an approved methodological tool; ☐ The "Guideline: Establishment of standardized baselines for afforestation and reforestation project activities under the CDM".
Date when the assessment report is completed:	15/10/2019

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 sector to which this PSB applies is energy sector, *which includes* determination of grid emission factor.

3. Projects shall use standardized baseline together with the approved methodological tool, Tool to calculate the emission factor for and electricity system, version 06.0 (hereinafter referred as 'the tool').

A.2. Description of the proposed standardized baseline

4. Key data parameters and data sources:

Key data parameters	Data sources
Fuel properties (NCV, emission factor)	For NCV: Local values of NCV as confirmed in the operational reports (OR) by the Central Electricity Board (CEB) are used For EF: IPCC 2006 Guidelines, Vol. 2, Table 1.4
Fuel consumption	Fuel consumption data was recorded at respective plants and reported in the OR to the CEB. This information is submitted to Statistics Mauritius Ltd for their records and publication on the Digest of Statistics on a yearly basis.
Electricity generation in the national grid	The electricity generation data on monthly basis was recorded by respective plants and reported in the Generation Progress Reports (GPR) to the CEB. This information is submitted to Statistics Mauritius Ltd for their records and publication on the Digest of Statistics on a yearly basis.
Electricity imports/exports from Independent power producers, (Generation by IPPs)	The electricity generation data on monthly basis was recorded by respective plants and reported in the Generation Progress Reports (GPR) to the CEB. This information is submitted to Statistics Mauritius Ltd for their records and publication on the Digest of Statistics on a yearly basis.

5. The scope and coverage of the data:

   (a) The PSB identifies, as part of the relevant electricity system:

      (i) 10 hydropower plants, with capacity ranging from 0.35 MW to 28 MW;

      (ii) 10 thermal power plants including 4 operated by CEB while 6 operated by independent power producers. CEB power plants uses HFO, diesel and Kerosene as fuel while IPP uses either coal or bagasse as fuel;

      (iii) 2 cogeneration plants

      (iv) 1 wind power plant;

      (v) 1 landfill gas power plant; and

      (vi) 4 solar PV power plants.

   (b) The data include key information of each power plant (name, technology, electricity generation, fuel type/consumption and commissioning data);

   (c) The data represents island of Mauritius;

   (d) The data represent three years (2015, 2016 and 2017).

6. The DNA used a data template in accordance with the tool.

7. The development of the PSB includes only grid-connected power plants operated by Central Electricity Board (CEB) and Independent power producers.

8. As the total low-cost/must-run (LCMR) average from 2015 to 2017 is 19%, which is below 50 per cent, therefore, Simple OM method is applied.

9. The data for 2017 is used for BM calculation.

SECTION B. Summary of Assessment

B.1. Assessment process

10. 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.

11. 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.

12. A desk review was performed on the following data/information submitted as part of the PSB.

(a) First submission dated 18/10/2018 which was successful in the initial assessment included:

(i) PSB form (CDM-PSB-FORM), version 1.0 dated 18/10/2018;

(ii) Excel sheet containing calculation of grid emission factor of Mauritius grid;

(iii) Letter, dated 13 July 2018, received from CEB confirming that data monitoring at CEB power plants follows a rigorous QA/QC procedure;

(iv) QC report dated 18/10/2018.

(b) Assessment findings were communicated to the DNA on 10/12/2018.

(c) Second submission dated 31/01/2019 included:

(i) Responses to the findings;

(ii) Supporting documents such as GPR and OR that includes electricity generation and fuel consumption records for IPP and CEB owned power plants in the island of Mauritius;

(iii) Revised excel sheet containing emission factor calculations; and

(iv) Revised CDM-PSB-FORM.

(d) Assessment findings were communicated to the DNA on 03/04/2019.

(e) Third submission dated 25/04/2019 included:

(i) Responses to the findings; and

(ii) Missing GPR and OR that includes electricity generation and fuel consumption records for IPP and CEB owned power plants in the island of Mauritius;

(f) Assessment findings were communicated to the DNA on 06/06/2019.

(g) Forth submission dated 16/09/2019 included:

(i) Responses to the findings;

(ii) Corrected supporting documents such as GPR and OR that includes electricity generation and fuel consumption records for IPP and CEB owned power plants in the island of Mauritius;

(iii) Revised excel sheet containing emission factor calculations; and

(iv) Revised CDM-PSB-FORM.

(h) The additional submissions clarified all issues raised by the secretariat and QA/QC assessment was finalized on 15/10/2019.

B.2. Assessment opinion:

13. 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 CEB except the coal consumption records for IPP's power plants that are recorded by the respective power plant team. The information regarding electricity generation and fuel consumption[1] is monitored on a monthly basis by CEB. The data is archived and maintained 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 GEF calculation and renewal may be maintained and submitted to 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 at the Center;

(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 tool;

(g) The assumptions and conservative approaches for data processing and calculations were justified;

14. 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.

15. The secretariat concluded that the PSB complied with the approach of the tool.

[1] CEB monitor the fuel consumption of its power plants and do not have any control on fuel consumption monitoring of power plant operated by IPPs.

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.	**Data source** – Sources of data such as electricity generation in a particular year, type and quantity of fuel used, NCV and emission factor (EF) of fuel used for electricity generation for the development of SB needs to be mentioned under **references section of CDM-PSB-FORM.** Also, DNA need to provide **either a weblink or soft copy of the source information to the secretariat to cross check reported values of above data/parameter against data source**. In absence of the data source, secretariat is not able to validate the values of data/parameter. **If the data source is confidential then the DNA may request secretariat to treat such data source as confidential and not to publish the same on public website.**	Credibility, para 15 (d) and Traceability para 15 (k) of the QA/QC Guidelines version 2.0.	Source of Fuel Consumption and Electricity Generation Data: The Central Electricity Board prepares operational Report (OP) and Generation Progress Report (GPR) on a monthly basis These two report provides information on the fuel consumption and electricity generation on a monthly basis from power plant, including renewables connected to the national grid. These reports are normally considered as confidential. The data from the two reports are then compiled on a yearly basis and recorded in another document known as December Statistics. The December statistics for any given year is prepared in January the following year. A	DNA has submitted the required data sources. CL is closed.

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)
			copy of each is enclosed and reference in the reference section of the GEF Document. NVC and EF has been used from the October 2016 and submitted to the UNFCCC. It is to be noted that the values are compared to the actual data from the suppliers and they are comparable.	
2.	**BM calculation** – a. The names of the power stations (power plants) used for calculation of build margin (BM) does not match with the list of power plants operated by Central Electricity Board (CEB) and Independent Power Producers (IPP) as provided in the excel file 'GEF_Mauritius 2018.xls' in the worksheet 'list of power plants', for example, 'Synnove, L'esperance' power plant used for BM calculation is mentioned as 'Synnove Solar (Mauritius) One Ltd. - L'Esperance', 'MSML (ex Medine)' is mentioned as 'Medine Sugar Milling Company Limited'. The DNA is requested to mention exact names of the power plants across the SB documents.	Consistency, para 15 (c) of the QA/QC Guidelines version 2.0. Para 76 of the 'Tool to calculate the emission factor for an electricity system'	The Names have been corrected in the BM calculation to match those in the excel sheet.	The revised documentation including excel file 'Grid Emission Factor of Mauritius 2018 review.xls' and 'CDM-PSB-FORM' submitted by DNA is reviewed and it is noted that the names of the power stations are consistent. No further inconsistency regarding power plant names is noted in the SB documentation.

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)
	b. Secretariat could not locate power plant 'OTEOLAB (ex CTSav)' in the list of power plants provided in excel file 'GEF_Mauritius 2018.xls', while this power plant is included in the BM calculation in the excel worksheet 'BM'. The DNA is requested to clarify the inconsistency among the excel file and CDM-PSB-FORM.		OEOLAB refers to Omnicane Thermal Energy Operations (La Baraque) Ltd. The correction has been made in the BM Calculation section	
	c. It is noted from the list of power plants operated by CEB as provided in 'GEF_Mauritius 2018.xls' in worksheet ''list of power plants' that year of operation of power plant Saint Louis P.S. is 1954 and Fort Victoria is 1964. It is also noted that these power plants are included in the list of most recent power plants for BM calculation, while Sotravic Ltee power plant having year of operation 2011 is not included in the list of power plants considered for BM calculation. In case only newly commissioned power units within Saint Louis P.S. and Fort Victoria are included for BM calculation, the DNA is requested to provide details of each power unit under the list of power plants operated by CEB in excel file 'GEF_Mauritius 2018.xls' in the worksheet 'list of power plants'. Further, the DNA is requested to confirm that procedure applied to consider power plants for BM calculation is in-line with the requirements as mentioned in applied 'Tool to calculate the emission factor for an electricity system'.		New generation units were installed at both St Louis P.S and Fort Victoria P.S recently as follows: Saint Louis: 4 generation units of total capacity 67.4 MW installed in 2017. Fort Victoria: 4 generation units of total capacity 60 MW in 2012 and two 2 generation units of capacity 30 MW in 2010.	Further information provided by the DNA regarding commissioning of new units installed at St Louis and Fort Victoria power station is noted. Inclusion of these units for BM calculation is therefore justified.

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)
	d. As per list of power plants provided in excel file 'GEF_Mauritius 2018.xls' in the worksheet 'list of power plants' year of operation of Solar Field Ltd, power station is 2016, however, this does not match with the date commissioned as mentioned under excel work sheet 'BM'. The DNA is requested to mention the same date commissioned / year of operation across the SB documents.		The year has been corrected in the BM Calculation table.	The revised documentation including excel file 'Grid Emission Factor of Mauritius 2018 review.xls' and 'CDM-PSB-FORM' submitted by DNA is reviewed and it is noted that the commissioning year is consistent in the documents. CL is closed.
3.	**Minor issues** – a. The DNA developed PSB using a methodological approach contained in an approved methodological tool. Therefore, the DNA need to fill the required information about development of PSB under section C of the CDM-PSB-FORM and not under section B of the form. b. Table number 1.1 is missing in CDM-PSB-FORM. DNA is requested to correct table numbering in the CDM-PSB-FORM.	Consistency, para 15 (c), Credibility, para 15 (d) and Traceability para 15 (k) the QA/QC Guidelines version 2.0.	This has been addressed in the new submission. Section has been used instead of section B. The numbering of the table has been reviewed in the CDM-PSB-FORM	The revised 'CDM-PSB-FORM' submitted by DNA is reviewed and it is noted that DNA has now used section C of the form. The revised 'CDM-PSB-FORM' submitted by DNA is reviewed and it is noted that table numbers and associated references are corrected by the DNA.

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)
	c. The DNA is requested to include separate EF values for all the 3 cases listed above under Table 1.6 of the CDM-PSB-FORM. It is noted that excel file 'GEF_Mauritius 2018.xls' provides GEF for PV and wind projects, and for all other types of projects for their 1st, 2nd and 3rd crediting period.		Separate tables have been included in the revised CDM-PSB-FORM	The revised 'CDM-PSB-FORM' submitted by DNA is reviewed and it is noted that GEF for PV and wind projects, and for all other types of projects for their 1st, 2nd and 3rd crediting period has been provided in separate tables.
	d. Excel file 'GEF_Mauritius 2018.xls' in work sheet 'list of power plants' include power plants operated by CEB and IPP. The DNA is requested to include measurement unit for parameter 'Installed capacity' and 'Effective capacity'.		Unit of MW added to the list of power plant.	The revised 'Grid Emission Factor of Mauritius 2018 review.xls' submitted by DNA is reviewed and it is noted that measurement unit 'MW' is added for parameter 'Installed capacity' and 'Effective capacity'.

<table>
<tr><th>CL No.</th><th>Request for Clarification (CL)</th><th>Reference to general provisions of guidelines on quality assurance and quality control of data used for sector-specific standardized baselines</th><th>Responses and corrective actions of DNA</th><th>Conclusion (open/closed)</th></tr>
<tr><td></td><td>e. Excel file 'GEF_Mauritius 2018.xls' in worksheet 'list of power plants' include power plants operated by Independent Power Producers. Each of the power station mentioned in that table includes a reference to footnote. However, it is noted that these footnotes are neither provided in the same excel file nor in the CDM-PSB-FORM. The DNA is requested to provide footnotes as referred in the table.</td><td></td><td>Footnotes have been defined and included in the list of tables.</td><td>The revised 'Grid Emission Factor of Mauritius 2018 review.xls' submitted by DNA is reviewed and it is noted that each of the footnote included in excel file is defined.

CL is closed.</td></tr>
<tr><td>4.</td><td>Data for fuel (Coal, HFO+Diesel and Kerosene) consumption and electricity generation
1. Coal consumption –
<table>
<tr><th>Reported values as in CDM-PSB-FORM and excel sheet</th><th>Verified values from data submitted by DNA</th><th>Action requested by DNA</th></tr>
<tr><td>For 2015 – 647404
For 2016 – 699077
For 2017 – 746608</td><td>Could not be verified as relevant data was not shared.</td><td>Kindly share the data regarding coal consumption.</td></tr>
</table></td><td>Credibility, para 15 (d) and Traceability para 15 (k) of the QA/QC Guidelines version 2.0.</td><td><u>1. Coal Consumption</u>
The coal consumption values are provided by the Independent Power Producers to the CEB on a monthly basis and the same values are used herein for the calculation of emission factor. CEB currently does not have official documents to certify the quantity of coal used. Electricity generation data is more important for the CEB to pay for electricity exported to the grid.
<u>Corrected Values</u>
For 2015 – 684,348</td><td>Coal consumption - The coal consumption values that were reported to CEB are acceptable in absence of verified values as it is not possible for CEB to verify these values in its current operating structure.</td></tr>
</table>

<table>
<tr><th>CL No.</th><th>Request for Clarification (CL)</th><th>Reference to general provisions of guidelines on quality assurance and quality control of data used for sector-specific standardized baselines</th><th>Responses and corrective actions of DNA</th><th>Conclusion (open/closed)</th></tr>
<tr>
<td></td>
<td>
2. HFO+Diesel consumption –
<table>
<tr><td>For 2015 – 226,211
For 2016 – 221,887
For 2017 – 235,724</td><td>For 2015 – 238,268.5
For 2016 – 233,712.9
For 2017 – 224,599.9</td><td>Data discrepancy is noted for 2015, 2016 and 2017. Kindly check and confirm the reported figures against data provided.</td></tr>
</table>
3. Coal based generation –
<table>
<tr><td>For 2015 – 1,046,766
For 2016 – 1,138,073
For 2017 – 1,176,041</td><td>For 2015 – 1,427,953.5
For 2016 – 1,503,750.1
For 2017 – 1,513,631.0</td><td>Data discrepancy in coal-based generation is noted. Please share the separate generation</td></tr>
</table>
</td>
<td></td>
<td>
For 2016 – 701,225
For 2017 – 726,225

2. <u>HFO+Diesel Consumption</u>
The discrepancy has been reviewed and corrected values inserted. Data used for the calculation is highlighted in the document provided <u>(refer to operational reports)</u>
<u>Corrected Values</u>
For 2015 – 225,197.6
For 2016 – 220,868.0
For 2017 – 234,728.2

3. <u>Coal Based Generation</u>
The data is obtained from respective Generation Progress Report (GPR). These have been highlighted for each year. Electricity generation from coal and bagasse are provided separately.
</td>
<td>
HFO+Diesel consumption - The HFO+Diesel-consumption for 2015 to 2017 was corrected by the DNA and it is verified against the GPR. No mis-match was observed.

Coal-based generation – The coal-based generation values as corrected by the DNA are verified against the GPR and no mis-match was observed.
</td>
</tr>
</table>

<table>
<tr><th>CL No.</th><th>Request for Clarification (CL)</th><th>Reference to general provisions of guidelines on quality assurance and quality control of data used for sector-specific standardized baselines</th><th>Responses and corrective actions of DNA</th><th>Conclusion (open/closed)</th></tr>
<tr>
<td></td>
<td>
<table>
<tr><td></td><td></td><td>details for coal and bagasse.</td></tr>
</table>

4. HFO+Diesel based generation –
<table>
<tr><td>For 2015 – 1,054,508
For 2016 – 1,032,897
For 2017 – 1,103,039</td><td>For 2015 – 1,054,508.8
For 2016 – 1,033,173.6
For 2017 – 994,212.4</td><td>Data discrepancy in HFO+Diesel based generation is noted for year 2017. DNA is requested to confirm the HFO+ diesel-based electricity generation values for 2017.</td></tr>
</table>
No data discrepancy is noted in reporting of Kerosene consumption and electricity generated using Kerosene.
</td>
<td></td>
<td><u>Corrected Values</u>
For 2015 – 1,046,766
For 2016 – 1,135,326
For 2017 – 1,175,979

4. HFO+Diesel Based Generation
The Data has been reviewed accordingly as per the respective GPR for the year 2015 to 2017.
<u>Corrected Values</u>
For 2015 – 1,094,470
For 2016 – 1,032,897
For 2017 – 1,103,039</td>
<td>HFO+Diesel-based generation – The HFO+Diesel-based generation value for 2017 was corrected by the DNA. This is verified against the GPR. No mis-match was observed.
It is also noted that as per revised GPR, value for electricity generation from Kerosene is also updated by the DNA. This is verified against the GPR. No mis-match was observed.

CL is closed.</td>
</tr>
</table>

- - -

Document information

Version	*Date*	*Description*
02.0	01 June 2015	Modified in order to take into account the Board's decision and improve clarity and consistency
01.0	27 May 2013	Initial publication

Decision Class: Regulatory
Document Type: Form, (for Secretariat use only)
Business Function: Methodology
Keywords: Assessment, Standardized baselines, Methodologies