



## 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.)*

<b>Title of proposed standardized baseline:</b>	Rwanda Grid Emission Factor
<b>Reference of proposed standardized baseline:</b>	PSB0018
<b>Name(s) of the Party or Parties to which the proposed standardized baseline applies:</b>	Rwanda
<b>Name(s) of the proponent(s) of the proposed standardized baseline:</b>	Rwanda designated national authority (DNA)
<b>History of the submission &amp; assessment:</b>	<ol style="list-style-type: none"> <li>1) 26/5/2014: first submission was received <ul style="list-style-type: none"> <li>• 24/06/2014: initial assessment was finalized and the proposed standardized baseline (PSB) was uploaded on the UNFCCC website.</li> <li>• 19/8/2014: its assessment was finalized for data quality aspects, and quality assurance/quality control (QA/QC) findings were raised in accordance with the requirements of "Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines" (version 2.0) (QA/QC guideline).</li> </ul> </li> <li>2) 23/10/2014: second submission was received <ul style="list-style-type: none"> <li>• 18/12/2014: its assessment was finalized for data quality aspects and the submission was considered to be compliant with the QA/QC guideline, and therefore all QA/QC findings were closed.</li> <li>• 12/02/2015: further inputs from the DNA were requested for preparing a recommendation.</li> </ul> </li> <li>3) 03/06/2015 and 18/06/2015: third and fourth submissions were received <ul style="list-style-type: none"> <li>• 21/06/2015: additional submissions were considered to be compliant with the approach used to develop the PSB ("Tool to calculate the emission factor for an electricity system" (version 04.0.0)). Except for one minor editorial issue in the PSB, the submission was sufficient to prepare a final recommendation.</li> </ul> </li> <li>4) 03/08/2015: the updated PSB was received <ul style="list-style-type: none"> <li>• 04/08/2015: The draft standardized baseline (DSB) was sent to the DNA, which agreed to recommend the DSB to the Board for approval.</li> </ul> </li> </ol>

<p><b>Conclusion:</b></p> <p>(a) <b>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”</b></p> <p>(b) <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”:</b></p>	<p><input checked="" type="checkbox"/> Yes</p> <p><input type="checkbox"/> No</p> <p><input type="checkbox"/> N/A</p> <p><input checked="" type="checkbox"/> Yes</p> <p><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 “Tool to calculate the emission factor for an electricity system” (version 04.0.0);</p> <p><input type="checkbox"/> The “Guideline: Establishment of standardized baselines for afforestation and reforestation project activities under the CDM”.</p>
<p><b>Date when the assessment report is completed:</b></p>	<p>17/08/2015</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. This PSB applies to the energy industries sector, which includes electricity generation/ consumption in Rwanda.
3. Projects shall use the standardized baseline together with the approved methodologies where the “Tool to calculate the emission factor for an electricity system” (version 04.0.0) (hereinafter referred to as “the tool”) is referenced.

**A.2. Description of the proposed standardized baseline**

4. Key data parameters and data sources:

Key data parameters	Data sources
Net calorific values (NCV) of fuel	Carbon Trust (2013) "Conversion factors"
Fuel consumption	each power plant
Electricity generation in the national grid	each power plant
Electricity imports/exports	Energy Water and Sanitation Authority (EWSA) in Rwanda

5. The scope and coverage of the data:

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

- (i) 13 hydropower plants
- (ii) 1 solar power plant
- (iii) 1 methane powered plant
- (iv) 4 diesel powered plants
- (v) Points of import and export of electricity

(b) The data include key information of each facility (name, technology, electricity generation, fuel type/consumption)

(c) The data represent all regions in the country

(d) The data represent three years (2011, 2012 and 2013).

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

7. The PSB includes both grid and off-grid power plants assuming 10% of the total electricity is produced off-grid. The PSB uses a default emission factor of 0.8 tCO<sub>2</sub>/MWh for off-grid power generation in accordance with the provisions of option II.b of step 2 of the baseline methodology procedure of the tool.

8. The PSB also takes into account electricity import by applying a conservative emission factor of 0 tCO<sub>2</sub>/MWh.

9. As the total low-cost/must-run (LCMR) average from 2009 to 2013 is 44% (i.e. below 50%), simple OM method is applied.

10. In addition to the information on identification of the power plants, the commissioning data of these power plants are provided.

11. For information not obtained against a specific parameter for individual plants, the value was determined by the use of a conservative approach as per the "Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines". This refers to the NCV of the used fuels, which was obtained referring to "Carbon Trust 2013" conversion values, which are deemed relevant.

## SECTION B. Summary of Assessment

### B.1. Assessment process

12. 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); and ii) to ensure that the PSB complies with the requirements of the tool.
13. 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.
14. A desk review was performed on the following data/information submitted as part of the PSB:
  - (a) First submission dated 26/05/2014 which was successful in the initial assessment included:
    - (i) Rwanda grid emission factor standardized baseline report;
    - (ii) Proposed standardized baseline form (F-CDM-PSB v1.0);
    - (iii) Quality assessment report;
    - (iv) Calculation sheet;
  - (b) Assessment findings were communicated to the DNA on 19/08/2014, in response to which the DNA submitted the revised calculation and additional relevant documents;
  - (c) Second submission, addressing the secretariat’s finding, dated 23/10/2014 included:
    - (i) Carbon Trust report based on 2013 data;
    - (ii) ESWA organogram of 2012;
    - (iii) ESWA structure of 2012;
    - (iv) Energy sector working paper;
    - (v) PSB finding and resolutions;
    - (vi) A Journal article “A review of energy in Rwanda” published on “Renewable and Sustainable Energy Reviews” 14 (2010) 524~529;
    - (vii) Calculation sheet;

- (d) The second submission was considered to be compliant with the QA/QC guideline, and therefore all QA/QC findings were closed. During preparation of the recommendation, further inputs were required and additional information was submitted through third and fourth submissions;
- (e) Third submission, addressing the secretariat's finding, dated 03/06/2015 included:
  - (i) Rwanda grid emission factor standardized baseline report;
  - (ii) Proposed standardized baseline form (F-CDM-PSB v1.0);
  - (iii) Calculation sheet;
- (f) Fourth submission, addressing the secretariat's finding, dated 18/06/2015 included:
  - (i) Rwanda grid emission factor standardized baseline report;
  - (ii) Proposed standardized baseline form (F-CDM-PSB v1.0);
  - (iii) Calculation sheet;
- (g) Except for one minor editorial issue in the PSB, the additional submissions were sufficient to prepare a final recommendation;
- (h) Fifth submission, addressing the editorial issue, dated 03/08/2015 included:
  - (i) Proposed standardized baseline form (F-CDM-PSB v1.0).

**B.2. Assessment opinion:**

15. In accordance with the QA/QC guidelines, the secretariat concluded that the all the following requirements were met by this PSB:
- (a) QC system (resource/procedure) was implemented to check the data quality before/during/or after data collection. All primary data come directly from EWSA, which is the official source of electricity-related data in Rwanda. EWSA utilizes a supervisory control and data acquisition (SCADA) system to allow for constant monitoring of power plants; all data are recorded at the National Control Center. Data are cross-checked with power plant records, where several meters are used for quality checks. Fuel consumption data are gathered through fuel delivery measurements and cross-checked with receipts. Meters are calibrated by the Rwanda Bureau of Standards;
  - (b) QC activities were clearly documented in the QC report. The report was submitted for consultation with the DNA steering committee, a heterogeneous objective group of individuals from government agencies, the private sector, civil society and academic institutions;
  - (c) All relevant documents and data were available for assessment;
  - (d) The data key sources were EWSA and the power plant operators, which collected credible data in accordance with their national standards and procedures. Further information sources for fuel properties are the International Panel on Climate Change (IPCC) and the Carbon Trust;
  - (e) The data scope was comprehensive enough to produce a "true and fair" representative standardized baseline in the particular sector;
  - (f) The key data and information are consistently presented;

- (g) The data vintage (three years) was met as per the provisions of the “Tool to calculate the emission factor for an electricity system” (version 04.0.0);
  - (h) The assumptions and conservative approaches for data processing and calculations were justified. The lower confidence interval range of the emission factors of the fuels was used and no emissions attributed to the electricity imports, as the tool requires. The fuel NCVs taken from Carbon Trust are a relevant assumption;
  - (i) There were no confidential data but the data file would be presented in an anonymous form.
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.
17. The secretariat concluded that the PSB complied with the approach of the tool.

## 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>As per paragraph 37 (f) of the QA/QC Guidelines regarding the documentation requirements, whenever a data source is used as reference or raw data for the establishment of standardized baseline, the data sources and all the issues related to data quality should be documented.</p> <p>Footnote 1 of the Rwanda Grid emission factor standardized baseline provides the following link <a href="http://www.lake-kivu.org/methane_extraction">http://www.lake-kivu.org/methane_extraction</a> which is used as reference to information on lake Kivu, however the link does not include information on why the source is considered to be renewable energy source. The information source for the statement in footnote 1 should be corrected by providing concrete reference.</p>	Documentation provisions, data quality for use of secondary data, data traceability paragraph 15 (k) of the QA/QC Guidelines	As seen in the attached Safari (2010) article “A review of energy in Rwanda” and in the “Energy sector working paper” (GoR 2011) for the “National strategy on climate change and low carbon development for Rwanda”, the methane from Lake Kivu is considered a low carbon, renewable energy which is generated via the “anaerobic bio-degradation of sediment” (pg 28 of the “Energy sector working paper”).	Closed
2	The fuel density provided in the excel document cannot be traced	Documentation provisions, data quality for use of secondary data, data	The relevant document is attached. The incorrect heading “litre/ton” was corrected to	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)
	back to the given data source, (Defra/ DECC 2013), thus it is required to provide a precise reference.	traceability paragraph 15 (k) of the QA/QC Guidelines	“litre/tonne”. The reference in the SB report was also correct to reflect that the document was actually produced by The Carbon Trust (2013), based on Defra/DECC data.	
3	The data for power generation and fuel consumption in the two on-site units of Aggreko Mukungwa plant seems to be derived by dividing the aggregated data for the whole plant by two(J23:K24 in sheet Generation2009_2013). Taking into account that the units are with the same capacity, but they have different commissioning dates which may be relevant for estimating build margin and may have different load factors, the approach for estimating the power generation and fuel consumption for the two on-site units should be justified.	DConservativeness paragraph 15 (h) of the QA/QC Guidelines	It was clarified with the electricity utility, EWSA <sup>1</sup> , in fact, the original 5MW plant was not recommissioned. The original plant operated from 2006 – June 2009 when it was then decommissioned and removed. In Oct 2012, a completely new plant of 10MW was commissioned. Therefore, the generation and fuel data should not be separated and the entire 10MW plant is included in the BM.	Closed
4	As per paragraph 16 of the “Guidelines for QA/QC of data used in the establishment of standardized baseline”, the DNAs should develop a QA/QC system that outlines QA/QC activities, processes, schedule and	Data quality objectives of “Guidelines for QA/QC of data used in the establishment of standardized baseline”	The data used in the SB was provided directly by EWSA, the sole provider of official electricity generation and fuel consumption for the Rwanda national grid. EWSA has in place quality assurance procedures to ensure that the data they provide is accurate.	Closed

<sup>1</sup> EWSA was re-organized into the Rwanda Energy Company in 2014 but as the GEF is for 2013, the 2013 EWSA structure will be used.



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)
	<p>responsibilities. The Quality Control report does not elaborate QA/QC activities undertaken; therefore the DNA should provide information on the QA/QC system that was implemented to assure itself of the quality of data and information included in the proposed standardized baseline with respect to this submission.</p>		<p>For the energy and power data: the EWSA electricity network system is equipped with SCADA system on its generation and transmission systems; automatic data collection occurs using the SCADA system. In addition, all of the power plants are equipped with at least two outgoing energy meters (one being the main meter, another one being the check meter) to ensure power generation data is accurate. This system applies to both EWSA plants and Independent Power Producer (IPP) plants. Any difference in energy metering of 0.2% leads to the recalibration of the metering system. The generation reports come from the power plants and are validated against the SCADA system data where available. Additional to that, the inputs to substations are taken as reference when needed for further data verification.</p> <p>For the fuel data: EWSA is structured in a way that the generation unit is not the manager of the fuel. In fact, the fuel is delivered by Independent Fuel Suppliers to Fuel Management Unit. Each off-loading area is equipped with two fuel flow meters (main fuel flow meter and back up fuel flow meter). The fuel is stored in the main tanks and generators are fed from the daily tanks. Between the main storage tanks and the daily</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)
			<p>tanks, again two fuel flow meters are installed with the same purpose as the dual off-loading area meters.</p> <p>The Fuel Management Unit reports the received fuel quantities from the fuel suppliers and from the fuel meters on the daily tanks. The power plants report the fuel consumed by the generators to produce power/energy. Any difference in fuel measurements leads to meters checks and recalibrations or to the data reconciliation if needed.</p> <p>The unit in charge of the fuel reports to Deputy Director General- Corporate Services while the Power Generation Unit reports to Electricity Utility Division which, in turn, reports to the Deputy Director General in Charge of Energy. The attached organogram (EWSA 2012a) provides further details about the operational structure. The attached organogram (EWSA 2012b) provides details about the Electricity Utility Division structure.</p> <p>Following the provision of the data to the DNA and the calculation of the GEF SB, the energy expert group of the DNA Steering</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)
			<p>Committee met and conducted a QC check of the data. Included in the expert group were representatives from EWSA (Head of Generation), the Ministry of Infrastructure, the Rwanda Bureau of Standards and a private sector representative.</p> <p>To ensure the quality of the data and SB, the expert group systematically checked all of the data. The expert group checked the data to ensure that all figures were reasonable. The emission factor of each thermal power plant, measured in tCO<sub>2</sub>/MWh was checked to ensure that the power plants' emissions factors were in a similar range with no anomalies. It was noticed that the EF of Jabana I was unusually high in 2012. This was cross-checked by the participant from the Rwanda Electricity, Water and Sanitation Authority (EWSA), Ing. Donath Harerimana who is the Head of Electricity Generation Unit. It was found that there was a discrepancy between the value of the fuel consumption in the raw and processed data. This discrepancy was corrected and the resulting EF was found to be consistent with other years. It was noticed that the EF of Aggreko Gikondo decreased in 2012; this was explained by the EWSA representative as a result of either maintenance or not running at maximum capacity.</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)
			Following the data check, the Steering Committee expert group discussed all of the components of a QC system: the process of data collection, credibility, accuracy, consistency, correctness, completeness, transparency, conservativeness, if there were any major issues and, if so, how the issues were to be resolved. The DNA Steering Committee deemed that the data was of high quality and approved the data use for the GEF SB.	

---

**Document information**

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

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