

## QUALITY CONTROL REPORT

<b>Sector</b>	<b>Power</b>
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<b>Implementation Dates of QC Procedures</b>	15/04/2020 (Validity Extension Date) to 15/12/2020 (Standardized Baseline Update Package Submission Date)
<b>Please describe how your QC procedures were implemented</b>	
<p><b>Institutional setup:</b></p> <ol style="list-style-type: none"> <li>The QC was not implemented by the DNA; but by the West African Power Pool (WAPP). WAPP was created in 1999 through Decision A/DEC.5/12/99 of the Authority of the ECOWAS Heads of State and Government and established in 2006 through Decisions A/DEC.18/01/06 and A/DEC.20/01/06 as a Specialized Institution of ECOWAS. The WAPP integrates the national power systems into a unified regional electricity market and promotes trade of electricity among the ECOWAS member States. Currently nine (9#) countries (Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal and Togo) are interconnected and construction is ongoing to interconnect the remaining mainland ECOWAS countries namely Sierra Leone, Liberia, Guinea, Guinea Bissau and The Gambia.</li> </ol> <p><b>Pre-submission QC:</b></p> <ol style="list-style-type: none"> <li>The WAPP Secretariat organised a virtual meeting to review steps to complete and documents to prepare for the SBL update process on August 17, 2020. The SPEC members and experts from the UNFCCC, RCC of UNFCCC and the World Bank participated in the meeting. (The Annex 1: Meeting Report refers).</li> <li>During the inception phase, the WAPP Secretariat organized from September 17 to 18, 2020 a meeting of the SPEC and EC members (covering the 9 interconnected countries), DNAs, World Bank and RCC of UNFCCC to kick-off the assignment. During the Kick-off Meeting, presentations were made, and discussions held on among others the (i) Methodology (i) Requirements for Data Collection and Delivery Schedule (iii) Data Collection Templates and (iv) Data collection Approach. Before the meeting came to an end, a bilateral meeting timetable was agreed with each utility's representatives as to provide more clarity on the how to fill the data collection template. The outcome of the meeting was adopted by all participants including the DNAs that also participated in the Meeting (Meeting reports refers).</li> <li>Data collection protocols were developed based on the IGES tool on a country level, i.e. one Excel template per country. The templates were developed in the language of the country of the utility. Each utility maintains a regular data collection system that collects data directly on the Plants including the generation and fuel consumption data. The data are checked and validated for anomalies and errors by the utilities before it is added to the data collection system.</li> <li>Following the Kick-off Meeting with the utilities, DNAs and UNFCCC-RCC, the validated data collection templates were sent to all utilities with an official letter. Bilateral meetings and data acquisition calls were conducted with all WAPP member utilities. During the calls, the utilities learned about the data collection process and how the template must be filled. The outcome notes of individual consultations including the schedule of stakeholder consultations and names / functions of stakeholders who participated in the calls will be provided.</li> <li>During a kick-off-meeting the participants made recommendations that resulted in the calculation of the grid emission factor based on the most recent version of UNFCCC's 'Tool to calculate the emission factor for an electricity system' (Version 7.0, hereafter referred to as the "tool"), and it was decided to use an excel template for the calculation of the GEF which was developed by the Institute for Global Environmental Strategies (IGES). The work team followed the guidance of the CDM Standard 'Determining coverage of data and validity of standardized baselines' (Version 1.0, CDM EB77, Annex 5).</li> <li>Based on the IGES tool, the team produced country specific data collection templates. These templates were prefilled with existing information from the initial SB submission, where applicable (i.e. power plants, commissioning dates, installed capacity, fuel type).</li> </ol>	



8. Following the resolutions of EOC the kick-off meeting, individual bilateral meetings and data acquisition calls were conducted with all WAPP member utilities. Outcome notes of individual consultations may be provided upon request. During the calls, the utilities learned about the data collection process. The schedule of stakeholder consultations and names / functions of stakeholders interviewed may be provided upon request.
9. In West Africa, key data for estimating the emissions of the electricity sector is generated and stored by two categories of stakeholders:
  - **The Power Utilities** generate, transport and/or distribute electricity and hence record and store all data related to, inter alia, the net electricity generation, primary and secondary fuel consumption, net caloric values of primary and secondary fuels, as well as relevant data on generation assets;
  - **The Power Utilities Regulatory Authorities** receive data on power plants from powerall utilities (WAPP members and utilities that are not WAPP members) as part of utilities licensing conditions.

The WAPP Member Utilities were the primary data source for the assignment. The data from utilities that are not WAPP members but operating in the concerned countries were also requested from the Regulatory Authorities, which were the secondary data source. The data collection and verification was further supported through meetings and calls with the representatives of the utilities and Regulators.
10. All historic period data for 2019, 2018, and 2017 obtained, were treated and also validated in a virtual meeting of the WAPP SPEC organised by the WAPP Secretariat from October 27 to 28, 2020, during the review and adoption meeting of the draft WAPP GEF Feasibility Study Report. The report presented the data, the methodology used in calculating the preliminary GEF values based on the data collected. The meeting was attended by the WAPP SPEC and EOC members that were not represented on the SPEC as well as experts from the World Bank, UNFCCC RCC and some of the DNAs of the concerned countries (Meeting reports refers).
11. All data were compiled and aggregated consistently based on same data units, scopes, definitions and calculations. Within the framework of this QC, two WAPP committees (SPEC and EOC) consisting of utilities of the concerned countries oversaw the work of the WAPP SBL update. As result, all collected and cross-checked data are consolidated into a comprehensive Excel spreadsheet and electronically archived together with contacts of the responsible persons to ensure the *Traceability*.

Please specify how the credibility of the data sources was checked.

12. In order to ensure the credibility of the data, an official letter with the adopted data collection template was sent to utilities and national utility regulatory bodies for data request. The concerned utilities and government bodies then appointed persons in charge of data to furnish the WAPP Secretariat with the requested data. The credibility and accuracy of the received data were certain because the data were received officially just and these are the same information the utilities would have made public. The received data were also checked with and by the representatives of the utilities on the SPEC and EOC Committees as well as the meeting participants.
13. Additional information that were crosschecked by internet include among others, the commissioning dates.
14. The list of WAPP member utilities and Stakeholders are provided as attachment to the Meeting Reports and to the Feasibility Study report of the GEF SBL update. The data received from Government bodies and Regulators are audited data, in line with national rules and requirements.

Please specify how the accuracy of the data was checked.

15. The data verification was done through bilateral meetings/calls and interviews with all the representatives of the utilities. This process permitted the identification of data inconsistencies and reduce errors due to manual data inputs in the excel templates.
16. In general, the GEF SBL update team undertook efforts to ensure the most accurate estimate of the GEF. As standard procedure, the team exchange with the data providers who to fill the templates. The templates requires information on the primary and secondary fuel consumption, as well as NCVs of primary and secondary fuel consumption *Data Types*. This process allowed to collect:
  - Fuel consumption data on 209 out of 226 fossil fuel-based power plants (92.5%);

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- NCVs for primary fuels on 48 power units
- Secondary fuel consumption on 24 power units (the majority were not secondary fuel consumption)
- NCVs on secondary fuel consumption for 11 power units

17. The GEF SBL update team also (i) discussed and assessed whether the data on renewable energy power plants resulted in zero emissions (ii) whether the data on fossil fuel-based power plants resulted in emissions (iii) checked whether the fossil fuel-based power plants resulted in emissions, and the resulting emission factors were compared with international default values (using the A2 approach) and default efficiencies as provided by UNFCCC, 2009, CDM EB55, Annex 14.

Please specify how the consistency was achieved in particular where multiple secondary data sources were used.

18. Consistency was achieved by the use of a simple Excel data format, by providing clear instruction on how to fill the data form with the power plant data and the import/export electricity data.
19. The data received on the same power plants from the WAPP member utilities and that from the Regulators was compared and cross-checked. For consistency, the data on the power plants received from the utility was considered based on the assumption that the data was provided directly by the source is more consistent than data obtained from a secondary source data, which is provided by the Regulators.
20. The corresponding data including decisions on data sources was provided back to the utilities for validation and confirmation during the WAPP GEF SB Feasibility Study Report validation meeting.

Please specify how the "Standard for data coverage and validity of standardized baselines" was complied with.

21. The WAPP GEF SBL value calculation has been based on historic data from 2019 to 2017 and use the most recent version of UNFCCC's 'Tool to calculate the emission factor for an electricity system' (Version 7.0)

#### Currentness:

22. Considering that the data was compiled between September, 2020 and November, 2020 and the due to the fact that the SBL uses historic data including that of the year 2019, the SBL is based on the most current data.

#### Validity:

23. The Standard 'Determining coverage of data and validity of standardized baselines' Version 2 suggests the consideration of parameters specified in §25 a-f to determine the validity of the SB.
24. Following §25.a currentness is a parameter to increase validity. As discussed under §22 above, the SB uses most current data.
25. Following §25.b a slow evolution of technologies is a parameter to increase validity. The table below presents the electricity generation share by technology, based on the most recent submission of the initial submission (i.e. 2013) and the most recent submission of the update (2019). The data indicates that the share of natural gas decreased, however was compensated to some extent by increase in Diesel and heavy fuel oil based generation. During a decade of drastically decreasing generation costs from PV and Wind, these technologies achieved only a minor increase in the generation share.

WAPP Electricity Generation by Fuel type		
Data Vintage	2013	2019
Coal	0.0%	0.2%
Natural Gas	70.2%	50.0%
Diesel	8.2%	12.4%
Hydro	21.0%	24.0%
Oil	0.5%	5.5%
Solar	0.0%	7.5%
Wind	0.0%	0.4%

26. Following §25.f, a low variability of the emissions is a parameter to increase validity. The initial WAPP SB

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submission, based on 2010-12 data amounts to 0.563 tCO<sub>2</sub>/MWh (based on 0.5 weights for OM and BM).

27. The current data results in a GEF of 0.6104 tCO<sub>2</sub>/MWh with the BM being slightly higher than the OM (0.5991 vs 0.6217 tCO<sub>2</sub>/MWh). This indicates that the increase in the accuracy, results in an increase of OM emissions, but also that recent capacity additions slightly increase the overall emission intensity of the power system.
28. In summary, the GEF increased by 8.4% over a period of 7 years, where a major part of that increase may be related to the increased accuracy (i.e. consideration of secondary fuel consumption and actual NCVs). Overall, the GEF including its BM component is comparably stable. Against this background, we suggest a validity period of 5 years. Considering the BM being larger than the OM, this is conservative.

Please specify how the completeness was achieved.

29. The calculation process and approach follows the latest approved version of the methodological tool "Tool to calculate the emission factor of an electricity system, Version 07". The methodology asks for specific parameters, data and information for the calculation of the emission factor. These data and information were all available through the above-mentioned official sources in West Africa (i.e. utilities, transmission companies and regulators).
30. After the submission of the data by stakeholders, a regional database was developed using the IGES format. For this dataset, completeness check was conducted, by comparing the initial generation data (i.e. from the initial SB) with the current data. The initial SB mapped 97 power plants/units, while the current SB maps 281 power plants/units. Most of this increase is linked to mapping power units instead of power plants, but the new data set also includes 41 new power plants and power plants which have been omitted in the initial submission. This comparison underlines, that the data quality has improved and the new data set is more complete than the initial submission.
31. The regional database and a WAPP GEF Feasibility Report was shared with all WAPP members approximately 2 weeks prior to the SPEC and EOC meeting to solicit comments and review. During that meeting the findings and gaps were discussed. In the follow up, WAPP members provided additional data closing data gaps.

Please specify how the transparency was achieved.

32. The transparency was achieved by engaging a wide range of stakeholders. The stakeholders include the WAPP member utilities that is represented on the SPEC and EOC committees as well as the UNFCCC-RCC, DNAs in the region.
33. The WAPP committees conducted a kick-off meeting from 17<sup>th</sup> to 18<sup>th</sup> September 2020. The meeting was attended by SPEC and EoC members (covering the interconnected countries), DNAs, World Bank, and RCC of UNFCCC to discuss on among others the (i) Methodology (i) Data Collection and Delivery Schedule (iii) Data Collection Templates and (iv) Data collection and QC Approach. The outcome of the meeting was adopted by all participants including the DNAs that also participated in the Meeting (Meeting reports refers).
34. The GEF SBL update team also conducted interviews/calls with all WAPP member utilities, operating on the regional grid. The Memos/Minutes as well as the call schedule will be provided.
35. The WAPP SPEC and EOC conducted a GEF Feasibility Study validation meeting. The meeting was conducted on the 27<sup>th</sup> and 28<sup>th</sup> October 2020 (Meeting reports refers).
36. The GEF Feasibility Report with DNAs and conducted a series of individual calls with all the DNAs of the concerned countries to inform them on among others the GEF SBL update application process, the associated opportunities to have the SBL updated.
37. The GEF Feasibility Study was shared with with all CDM stakeholders in the region and asked for their comments, if any.



38. All the supplied data and information will be listed and made publicly available through the SBL submission on the UNFCCC website.

Please specify major issues and uncertainties identified during the QC procedures.

39. During data compilation, it became clear that not all utilities reported the data in the metrics suggested by the data collection template. In future, this point shall be discussed early enough with WAPP members, and before the template is sent out.

Please specify major corrective actions taken during the QC procedures.

N.A.

Please justify the conservativeness of the approaches taken during the QC procedures.

40. If not provided as tier 1 data, we used the conservative (i.e. lower) limits of the 95% confidence intervals of Tier 3 default parameters applied. Please refer to the excel file, tab 'DV'.

41. SENELEC provided ranges of NCVs. We used the lower boundary of that range, which is conservative.

42. The proposed validity for the SB is conservative (please see §23-28 above).

43. Since the calculation approach follows an approved UNFCCC tool "Tool to calculate grid emission factor of an electricity system", all conservative measures are already taken into account in the development of the applied tool/methodology.

Please summarize key findings and present a plan to improve the data quality in the future.

44. The current data management system implemented is sufficient to renew the GEF SB for the WAPP.

45. The following may be considered to strengthen the current approach and streamline data collection and processing:

- It is being discussed whether, the data collection and analysis process may be further formalized and automated. That process may be defined in Standard Operating Procedures for the data collection, calculation, and publication of the emission factor for the WAPP.

46. WAPP may systematically / annually update the GEF calculation and publish results by 30 June of each year.

47. The IGES tool allows an automated analysis of the GEF, provided the right data is input into the tool.

48. WAPP may decide to invite its members to systematically provide the corresponding data by 31<sup>st</sup> April of the previous calendar year.

49. Please note that §46-50 have been discussed and the WAPP will decide on appropriate next steps during the first quarter of 2021.

Date of finalization of QC  
DNA

Signature of

11-4 DEC 2020

