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 for the West African Power Pool
Reference of proposed standardized baseline:	ASU_006: Request for update of ASB0034, ver.1.0
Name(s) of the Party or Parties to which the proposed standardized baseline applies:	Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal and Togo
Name(s) of the proponent(s) of the proposed standardized baseline:	DNA of Togo
History of the submission & assessment:	1) 16/12/2020: first submission was received 18/12/2020: initial assessment was finalized 20/01/2021: Additional information was requested from the DNA via email. 2) 05/02/2021: second submission was received 10/02/2021: its assessment was finalized 10/02/2021: 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":	☒ Yes ☐ No 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 "TOOL07 : Tool to calculate the emission factor for an electricity system" (version 07.0); ☐ The "Guideline: Establishment of standardized baselines for afforestation and reforestation project activities under the CDM".
Date when the assessment report is completed:	10/02/2021

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 update to ASB0034 applies to the power sector for determination of grid emission factor in 9 member countries of West African Power Pool (WAPP) including Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal and Togo.

3. Projects shall use the updated standardized baseline together with the approved methodologies where the "TOOL07: Tool to calculate the emission factor for an electricity system" (version 07.0) (hereinafter referred to as "the grid tool") is referred.

A.2. Description of the proposed standardized baseline

4. Key data parameters and data sources:

Key data parameters	Data sources
The list of power plants, including the capacity, technology, commissioning date, electricity generated, and fuel consumed by each power plant	Respective utilities and Independent Power Producers (IPPs) from WAPP member countries as follows Benin – SBEE, CEB Burkina Faso – SONABEL Côte d'Ivoire – CI-ENERGIES, CIE Ghana – VRA, Karpowership, GRIDCO, ECG, Cenpower, CENIT, NEDCO, Sunon Asogli, Aksa Energy Mali – SOGEM, EDM-SA Niger – NIGELEC Nigeria – TCN, Mainstream Energy, North South Power, Pacific Energy, Sahara Power, Paras Energy, Sapele Power, Transcorp Power, Cummin Power Senegal – Senelec, Apr Energy Togo – Contourglobal, CEET
NCV of fuel used for power generation and CO2 emission factor of the fuel	IPCC 2006 guidelines for National Greenhouse Gas Inventories
Power plant efficiency default values	TOOL09: Determining the baseline efficiency of thermal or electric energy generation systems

5. The scope and coverage of the data:

(a) The updated ASB0034 identifies the WAPP electricity system (WAPP grid) that has installed capacity of 26037 MW and includes nine interconnected countries: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal and Togo. The WAPP grid comprises of following power plants as a part of the relevant electricity system of WAPP:

(i) 156 natural gas-based power plants;

(ii) 65 fuel oil-based power plants;

(iii) 4 coal-based power plants;

(iv) 41 hydropower plants;

(v) 1 wind power plants;

(vi) 13 solar power plants; and

(vii) 1 biogas-based plant.

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

(c) The data represent most recent three years i.e. 2017, 2018 and 2019.

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

7. The development of the updated ASB0034 includes only grid-connected power plants from WAPP.

8. The average of electricity generation from low-cost/must-run (LCMR) plants from 2015 to 2019 is 27.14 per cent, which is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM emission factor (EF).

9. The data for 2019 is used for BM calculation.

SECTION B. Summary of Assessment

B.1. Assessment process

10. The submission did not include a DOE assessment report. There is a level of ambiguity related to the need for a DOE assessment report in regard to this submission. As per "Procedure for development, revision, clarification and update of standardized baselines" for a new submission of proposed standardized baseline (PSB), for up to 3 cases, the DOE assessment report is waived, and the task is taken over by the secretariat, provided the host country(ies) is/are under-represented country(ies) under the CDM. For the case of updates however an equivalent provision is neither explicitly excluded nor included. In this specific case, 8 of the 9 DNAs meet the requirement i.e. less than 3 PSBs are supported so far. On the other hand, WAPP approved standardized baseline (ASB) is a mandatory one and there is no alternative for the project participants if this ASB is not updated.

11. DNA informed that the current submission is an update of an ASB and the assessment report is not prepared as there is almost no modification to the list of utilities engaged in the data collection process, the methodological approach used is same and no changes to the interconnected system were identified, and furthermore, no site visits are involved in updating the ASB which is in accordance with the procedures. The required data was collected and provided directly and officially by utilities, through the WAPP secretariat for the desk review of the information to enable the update.

12. Based on the above and further consideration as below, the secretariat and the two Meth Panel members assessing this submission concluded that the submission can be processed with assessment prepared by the secretariat and reviewed by the MP members:

(a) There was no change in the data points/sources and data collection procedure compared to the previous submission i.e. the total number of utilities involved in the submission remains same;

(b) Total number of countries connected via the WAPP grid remains unchanged since the last submission;

(c) The methodological approach used to update the ASB remained the same in compliance with the methodological tool "Tool to calculate the emission factor for an electricity system" (hereinafter referred to as the "grid tool");

(d) The Executive Board of the clean development mechanism (CDM) (hereinafter referred to as the Board), at EB 106, in response to the DNA's request to extend the

validity of the ASB0034, agreed to extend the validity by 1 year i.e. until 26/02/2021. EB 106 further requested that the DNAs submit information pertaining to plan of actions including timelines that ensure timely submission of the updated standardized baseline. Such a plan submitted by the DNA was brought to the attention of EB 107 and it did not include a step for the preparation of assessment report by a DOE;

(e) The Board at EB 106 has instructed the secretariat to treat the consideration of new vs revised submissions of SBs flexibly, so as to avoid creating gap periods between two approved SBs which may cause difficulties for the PPs;

(f) 8 out of 9 countries (except Senegal) meet the required conditions for waiver if this submission would have been submitted as a new standardized baseline instead of update to the existing standardized baseline;

(g) At EB 108, the Board revised the SB procedures to indicate that it may, upon request from the DNA(s), request the secretariat to provide the technical support to the DNA(s); and

(h) Further, this ASB is a mandatory standardized baseline and if there is no update to this ASB then there is risk that project proponents applying earlier version of it will face a stalemate, as it is unlikely that they can calculate a grid emission factor for the host country of their project that accounts for electricity exchange among 9 countries in the WAPP.

13. The purpose of assessment conducted by the secretariat is: i) to ensure that the QA/QC system implemented by the respective DNAs from WAPP area 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 updated ASB0034 complies with the requirements of the grid tool.

14. 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.

15. A desk review was performed on the following data/information submitted as part of the updated ASB0034.

(a) First submission dated 16/12/2020 which was successful in the initial assessment included:

(i) WAPP SB Update request 2020 form, version 1.0 dated 14/12/2020;

(ii) Update to ASB0034 in track change mode;

(iii) Quality Control report for WAPP GEF SB update 2020-12-11;

(iv) WAPP GEF – Grid Emission Factor Report 2020-12-11;

(v) WAPP GEF Calculation (excel file) 2020-12-06;

(vi) Letter of approval from 9 DNAs from WAPP;

(vii) Meeting reports and interaction letters with the utilities from WAPP.

(b) Additional information and clarification were requested from the DNA on 20/01/2021, in response to which the DNA requested a conference call.

(c) A conference call was held on 27/01/2021. During the call following issues were discussed;

(i) QA/QC aspects of data compilation while transferring data from various utilities into a single spreadsheet;

(ii) Use of option A2 to calculate emission factor of a power plant under operating margin calculation; and

(iii) Higher emission factor for some of the power plants.

(d) After the conference call, the DNA submitted the revised documents and additional relevant documents.

(e) Second submission dated 05/02/2021 contains

(i) Response to the clarification requested;

(ii) WAPP SB Update request 2020 form, version 2.0 dated 03/02/2021;

(iii) Update to ASB0034 in track change mode;

(iv) Data received from Utilities and IPPs from WAPP member countries;

(v) Sample communication files between the consultant and the respective utility and or IPP;

(vi) WAPP GEF – Grid Emission Factor Report 2021-02-02;

(vii) WAPP GEF Calculation (excel file) 2021-02-02; and

(viii) Quality Control report for WAPP GEF SB update 2021-02-03.

(f) The additional submissions clarified all issues raised by the secretariat.

B.2. Assessment opinion:

16. In accordance with the QA/QC guidelines, the secretariat concluded that the all following requirements were met by this update request of ASB0034:

(a) QC system was implemented to check the data quality before/during/or after data collection. All primary data came directly either from the WAPP member utility or an IPP depending on the ownership of the power plant. The information regarding plants performance (electricity generation, fuel consumption) is monitored continuously either by the WAPP member utility or IPP. 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 WAPP secretariat and with the respective WAPP member utility and IPPs;

(d) The data scope was comprehensive enough to produce a “true and fair” representative standardized baseline;

(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.

17. The secretariat concluded that the updated ASB0034 complied with the approach of the grid tool, the detailed assessment can be found in the table below:

Table 1: Assessment against grid tool

Step from the Grid Tool	Assessment
Step 1: Identify the relevant electricity systems	The project electric system was determined by the WAPP secretariat that is responsible for the update of the WAPP standardized baseline. The WAPP electricity system (WAPP grid) includes nine interconnected countries: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger, Nigeria, Senegal and Togo. Currently transmission lines connecting Guinea, Liberia and Sierra Leone are being built and thus these countries were not included in exercise. The WAPP grid is composed by 281 power plants, comprising 56 renewable power plants (41 hydro power plants, 13 solar power plants, 1 wind power plant and 1 biogas-based power plant), 156 natural gas-based power plants, 65 fuel oil (using Diesel oil, Residual fuel oil, LPG, Kerosene) and 4 coal-based power plants. The total installed capacity of WAPP grid in 2019 is 26037 MW. Further, in 2019, the total generation from grid-connected plants is 77,0892.098 TWh and out of this renewable accounted for 27,060.85 TWh (around 34.74% of the total generation).
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)	The average of electricity generation from low-cost/must-run (LCMR) plants from 2015 to 2019 is 32.60 per cent, which is below 50 per cent, hence, simple operating margin (OM) method is applied to calculate OM emission factor (EF).
Step 4: Calculate the operating margin emission factor according to the selected method	The calculation of the OM was performed through Option A (Based on the net electricity generation and a CO_2 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. Wherein such data was not available option A2 is used. There are total 25 power plants for which A2 option was used.

	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 member countries. The NCV of fuel used for power generation and CO_2 emission factor of the fuel was sourced from the IPCC 2006 guidelines for National Greenhouse Gas Inventories, while the power plant efficiency default values were referred from the TOOL09: Determining the baseline efficiency of thermal or electric energy generation systems. The OM calculated for the period 2017-2019 is equal to 0.5781 tCO_2/MWh.
Step 5: Calculate the build margin (BM) emission factor	The set of power plants that comprises 20% of the generation in 2019 ($SET_{\geq 20\ per\ cent}$) include 54 units between 2015 and 2019. The build margin was determined based on the set of power units that started to supply electricity to the WAPP grid during 2015 and 2019. This list does not include the 71 projects that are registered with the CDM. The total generation from this set of units ($AEG_{SET\geq 20\ per\ cent}$) is equal to 15,779,234 MWh. The secretariat confirmed that the calculation of the emission factor was made in line with equation 15 of the grid tool. The value of BM determined for 2019 was equal to 0.5563 tCO_2/MWh.
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

B.3. Validity of the update of ASB

18. It is noted that the DNA has requested that the validity period of the proposed updated standardized baseline should be 5 years. Most of the approved standardized baselines carry a validity period of 3 years, however a handful have been approved with longer validity such as 7 years in the case of "ASB0008-2020: Methane Emissions from Rice Cultivation in the Republic of the Philippines (version 01.0)". When the validity proposed is longer than 3 years it needs to be justified by the DNA as per "Standard: Determining coverage of data and validity of standardized baselines".

19. The DNA justified its proposal for 5 years validity highlighting that;

(a) WAPP has undergone a slow evolution of technologies as confirmed from review of previous submission of ASB0034[1] and current submission the share of natural gas has reduced by 20% with corresponding increase of 11% in the share of renewables (e.g. hydro, solar and wind) and increase of 9% in the share of coal and diesel generation. Refer to following table for further details.

Table 2: WAPP - Electricity generation by fuel type

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

(b) Further, the operating margin emission factor of WAPP grid has increased by 3 per cent and build margin emission factor has decreased by 2 per cent. This has resulted in overall increase in combined margin emission factor by 2 per cent during the past 6 years. Refer following table for further details.

Table 3: WAPP grid emission factor

Parameter	Unit	Description	Applicable values	
			ASB0034	Update request of ASB0034
$EF_{grid, OM, y}$	tCO_2/MWh	Operating margin CO_2 emission factor for the WAPP power system	0.559	0.578
$EF_{grid, BM, y}$	tCO_2/MWh	Build margin CO_2 emission factor for the WAPP power system	0.565	0.556

[1] Refer approval history of ASB0034 at https://cdm.unfccc.int/methodologies/standard_base/2015/sb102.html

Parameter	Unit	Description	Applicable values	
			ASB0034	Update request of ASB0034
$EF_{grid, CM, y}$	tCO_2/MWh	Combined margin CO2 emission factor for the WAPP power system for all projects except wind and solar for 1st crediting period, (WOM = 0.5, WBM = 0.5 for all crediting periods)	0.562	0.567
$EF_{grid, CM, y}$	tCO_2/MWh	Combined margin CO_2 emission factor for the WAPP power system for all projects except wind and solar for 2nd and 3rd crediting period, (WOM = 0.25, WBM = 0.75 for all crediting periods)	0.563	0.562
$EF_{grid, CM, y}$	tCO_2/MWh	Combined margin CO_2 emission factor for the WAPP power system for wind and solar projects, (WOM = 0.75, WBM = 0.25 for all crediting periods)	0.561	0.573

20. The assessment team noted that in 2013 the 5 years average share of low-cost must run power generation (constituting renewable sources) in WAPP grid was 25.24 per cent while in 2019 that has increased to 27.14 per cent. Further, as per "Update of the ECOWAS[2] revised master plan for the generation and transmission of electrical energy, volume 4"[3], the WAPP grid by 2025 is expected to have 33% of its generation from renewable sources and by 2030 it is expected to increase to 38%. In essence, the energy mix in the WAPP region is changing, although barriers persist for rapid penetration of renewable energy, it is seen that decarbonization of the grid is under way.

21. Further, it is also noted from the 'WAPP GEF – Grid Emission Factor Report' that construction is ongoing to interconnect remaining WAPP member countries namely Sierra Leone, Liberia, Guinea, Guinea Bissau and The Gambia with the WAPP.

22. Taking into account the above dynamic nature of decarbonization in the WAPP grid, the assessment team proposes to maintain the default validity period of 3 years for the standardized baseline.

23. 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.

[2] Economic Community of West African States refer Member States | Economic Community of West African States(ECOWAS) for further details.

[3] WAPP | West African Power Pool the specialized agency of ECOWAS (ecowapp.org)

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	Date – (20/01/2021) The DNA missed to submit the source files for the generation and fuel consumption records for all the plants included in the calculation. Submission of the source files are essential for the secretariat to validate the primary data that is used for calculation of grid emission factor. The DNA is requested to submit background data files/source files from the respective utilities that contain information reg. yearly power plant generation for the period 2015 to 2019 and yearly fuel consumption data for the period 2017 to 2019. If the DNA or person authorized by it has collected the primary data from utilities via emails, then DNA may submit a copy of email communication and or its attachments from the utility confirming that the primary data is collected by the respective utilities.	Para 15 (b) of the "Guidelines: Quality assurance and quality control of data used in the establishment of standardized baselines", version 2.0	Date – (28/01/2021) The data was reported by utilities and regulators in form of excel files and pdfs using a common structure for data collection. We have compiled these files in a folder. To support the validation of the data, source, we have compiled a sample of email communications, through which the utilities / regulators submitted the data.	Date – (08/02/2021) The data reg. electricity generation and fuel consumption provided by the utilities to the DNA is cross checked against the data that is used for EF calculation. No inconsistency in data reporting is noted. For fuel consumption records it is noted that where the fuel consumption is recorded in

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)
				measurement units other than SCM (standard cu. meter), Liter or m3 it is converted into these measurement units using conversion factors. The excel file under tab 'DV' includes list of conversion factors that are used for conversion. Further, it is also informed by the DNA that for following power plants data that was either missing or incorrect was confirmed with the respective utility in one-to-one communication.

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. Power plant no. 48 – Data related to commissioning date and fuel consumption for 2017 to 2019 is corrected; 2. Power plant no. 49, 51 and 52 – Data related to commissioning date is corrected; 3. Power plant no 58 – Fuel type is correctly mentioned as 'Gas/Diesel oil'; 4. Power plant no. 86 to 93 and 95 to 98 – Fuel type is corrected as 'Gas/Diesel oil' from 'Residual fuel oil'; 5. Power plant no. 94 – Fuel type is corrected as 'Natural Gas' from

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)
				'Residual fuel oil'; 6. Power plant no. 99 and 100 – Fuel type is mentioned as 'Anthracite' 7. Power plants no. 249 to 255 and 257 to 264 – Data related to commissioning date is corrected. The DNA also applied apportioning method to calculate fuel consumption and electricity generation where instead of per unit data per facility data was available together with installed capacity of each unit. This approach is found acceptable as the electricity

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<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></td><td></td><td></td><td>generation and fuel consumption is apportioned with respect to installed capacity of each unit.

The CL is closed.</td></tr>
<tr><td>2</td><td>Date – (20//01/2021)
It is noted that the emission factor of some of the power plants under excel sheet ‘OM(1)’, ‘OM(2)’ and ‘OM(3)’ is more than 1.0 tCO2/MWh during one or more data vintage year. Please refer to following table that lists such power plants and their OM EF for respective year. The number in red text colour indicates the OM EF more than 1.0.
<table>
<tr><th>Power plant Sr. No. in base data sheet</th><th>Power Plant name</th><th>Fuel</th><th>Commissioning year</th><th>OM EF 2017 (tCO2/MWh)</th><th>OM EF 2018 (tCO2/MWh)</th><th>OM EF 2019 (tCO2/MWh)</th></tr>
<tr><td>5</td><td>Natitingou</td><td>Gas/Diesel Oil</td><td>2005</td><td>1.0184</td><td>0.7108</td><td>0.6618</td></tr>
<tr><td>6</td><td>Maria-Gleta 1</td><td>Natural Gas</td><td>2019</td><td>-</td><td>-</td><td>1.2405</td></tr>
<tr><td>25</td><td>KOMPIENGA THERMIQUE</td><td>Gas/Diesel Oil</td><td>1988</td><td>1.0219</td><td>1.2767</td><td>1.2580</td></tr>
<tr><td>53</td><td>Kpone Thermal Power Plant KTPP</td><td>Gas/Diesel Oil</td><td>2016</td><td>0.7926</td><td>3.9159</td><td>4.1802</td></tr>
</table></td><td>Para 15 (f) and (h) of the “Guidelines: Quality assurance and quality control of data used in the establishment of standardized baselines”, version 2.0</td><td>Date – (28/01/2021)

This section reports i) on corrections conducted and ii) plant specific justification / context of high EFs. In general, it is our understanding that the high EFs depends predominately on fuel; for coal and diesel plants it is common to report EFs above 1 tCO2/MWh. For the US, EPA reports the</td><td>Date – (08/02/2021)

The corrected data file is reviewed against the data submitted by the DNA. No inconsistency is noted in data reporting. Further, no conversion error is noted while converting non-metric measurement units to metric units.</td></tr>
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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)
	58	Tema CENIT Thermal Power Plant	Gas/Diesel Oil	2012	6.5909	6.5909	28.1750		weighted average EF for diesel at 0.97 and for coal at 1.00 tCO2/MWh, In countries facing difficult political economic framework, sub-optimal maintenance and lack of investment in new plants may lead to higher specific emissions. Nr. 5: data was checked, no mistakes could be identified. The load factor is low in all three years (0.0% - 0.4%) and the plant is small in terms of installed capacity (12 MW) leading to a comparably high EF. Nr. 6: a mistake was	However, it is noted that power plants Sr. No. 5, 25, 53, 65, 94, 248, 249 and 250 have EF more than 1. The EF of above-mentioned power plants is ranging between 1.0 to 1.45 tCO2/MWh, and their installed capacity is 711 MW which is @ 2% of the total installed capacity of the WAPP grid. Upon further review of the power generation and fuel consumption records of these plants, no reporting
	63	Karpowership	Residual Fuel Oil	2015	1.3338	1.0415	0.9279			
	65	AKSA	Residual Fuel Oil	2017	1.1651	1.0786	0.9911			
	94	NIAMEYII	Residual Fuel Oil	1966	1.0153	-	-			
	99	SONICHAR	Anthracite	1981	2.3684	2.4162	1.9304			
	100	SONICHAR	Anthracite	1982	2.1379	2.2582	2.1038			
	101	SONICHAR	Gas/Diesel Oil	1982	3.4175	3.9267	0.9376			
	102	SONICHAR	Gas/Diesel Oil	1982	273.0802	140.7746	2.7815			
	156	AFAM IV GT17	Natural Gas	1982	8.3471	0.6402	0.6856			
	157	AFAM IV GT18	Natural Gas	1985	8.3471	0.6402	0.6856			
	198	IHOVBOR GT1	Natural Gas	2013	0.5924	1.1092	0.5956			
	199	IHOVBOR GT2	Natural Gas	2013	0.5924	1.1092	0.5956			
	200	IHOVBOR GT3	Natural Gas	2013	0.5924	1.1092	0.5956			
	201	IHOVBOR GT4	Natural Gas	2013	0.5924	1.1092	0.5956			
	216	OMOKU GT1	Natural Gas	2006	0.5125	4.6989	0.7537			
	217	OMOKU GT2	Natural Gas	2006	0.5125	4.6989	0.7537			
	218	OMOKU GT3	Natural Gas	2006	0.5125	4.6989	0.7537			
	219	OMOKU GT4	Natural Gas	2007	0.5125	4.6989	0.7537			
	220	OMOKU GT5	Natural Gas	2007	0.5125	4.6989	0.7537			

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<tr><td>221</td><td>OMOKU GT6</td><td>Natural Gas</td><td>2008</td><td>0.5125</td><td>4.6989</td><td>0.7537</td></tr>
<tr><td>247</td><td>CALABAR NIPP GT1</td><td>Natural Gas</td><td>2015</td><td>2.5536</td><td>0.6455</td><td>0.6325</td></tr>
<tr><td>248</td><td>Cap des Biches - C.III Vapeur</td><td>Residual Fuel Oil</td><td>1966</td><td>1.0751</td><td>1.0902</td><td>1.1081</td></tr>
<tr><td>249</td><td>Bel air - TAG 4</td><td>Gas/Diesel Oil</td><td>2011</td><td>1.1666</td><td>1.0699</td><td>1.0917</td></tr>
<tr><td>250</td><td>Cap des Biches - TAG 2</td><td>Gas/Diesel Oil</td><td>2000</td><td>1.1705</td><td>1.4511</td><td>1.4311</td></tr>
</table>
The DNA is requested to review the OM EF calculations for these power plants and also BM EF and CM EF calculations for entire WAPP grid and provide any justification why EF of these power plants is more than 1.0.
</td>
<td></td>
<td>found in the conversion of RFO from kL to t. The mistake was corrected.

Nr. 25: old plant, only 0.52 MW and only load factor of 0.4%-0.7%. This results in higher specific fuel consumption and related EFs.

Nr. 53: The data was crosschecked and replaced with data delivered by the regulator. The new data results in a value of above 1tCO2/MWh and for year 1 and below 1 for year 3. Please note that the power plant was mainly running of residual fuel oil in year 1 and on natural gas in</td>
<td>error is noted. Though, it is noted that power plants with;

i) Sr. No. 5 and 25 operate at low load factor ranging from 0 to 0.4%;

ii) Sr. No. 53 and 65 operates on residual fuel oil;

iii) Sr. No. 94 operates on residual fuel oil and in addition this plant has surpassed its operational life and operated as a reserve plant in 2017 with load factor @13%. The power plant was not operated in</td>
</tr>
</table>

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)
			year 3. Nr. 58 data was crosschecked, and conversion errors were identified and amended. Nr. 63. Data was checked and found to be integrated and converted correctly. Please note, this refers to a mobile power ship which, during year 1 and 2 operates based solely on RFO and in year 3 on RFO and partially on natural gas (connected to gas pipeline in Oct 2017) resulting in a decrease of the EF in year 3. Nr. 65: Data was checked and found to be integrated and converted correctly.	2018 and 2019; iv) Sr. No. 248 has surpassed its operational life time and its operated on residual fuel oil v) Sr. No. 249 and 250 operate at @ 4.7% load factor. Therefore, the clarification provided by the DNA that the higher EF of these plants is due to one or more of the following reasons, i) use of residual fuel oil, ii) low load factor and iii) continuing operation beyond

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)
			The plant operates exclusively on RFO which naturally results in a high EF. Moreover, plant was commissioned during 2017 (completed in Nov) and operated partially before the completion of commissioning. The emission factor slightly improves from year 1 to year 2 and 3 related to improvement of the plant's operational management. Nr 94. The plant operates based on residual fuel oil, resulting typically in high EFs. The plant is very old (commissioned in 1966) and is mainly operated as reserve.	the operational life time that has resulted in lower efficiency of the power unit, is found acceptable. Due to these corrections simple operating margin EF and build margin EF of WAPP grid has been changed resulting change in combined margin EF. The EF values calculated in excel file 'WAPP GEF Calc 2021-02-02' are same as reported in the update request form and updated ASB.

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)
			The load factor for 2017 was 13% with no production in 2018 and 2019. Nrs 99-102: Data was crosschecked, and no mistake could be identified. The coal power-based EFs are deemed unlikely, and the diesel based EFs are deemed impossible; all four units hence were switched to the A2 calculation mode. They now produce reasonable results. Nrs 156-157: the data reported by the TCM exhibits an unusually high fuel consumption for 2017. We have changed this year to the A2 calculation approach.	The 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)
			Nrs 198-201 was checked. The submitted data exhibits a usually high fuel consumption for 2018. We have changed this year to the A2 calculation approach. Nrs 216-221: an omission was identified. The transmission company provided the data on plant level, however unit specific installed capacities and commissioning dates. The total consumption was erroneously not broken down to the individual units for the year 2017. This was corrected.	

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)
			Nr 247: the fuel consumption data for 2017 was leading to very high EFs. That plant was changed to A2 calculation approach for 2017. Nr. 248: the plant was commissioned in 1966 and has surpassed it is expected operational live. Moreover, the plant operates on residual fuel resulting in comparably high EFs. Nrs. 249 +250: the data and units were checked and is considered to be correct. Both plants were operated at very low load factors ranging from 1.5% to 10.3% (average	

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)
			4.7%). Such intermittent operation of plants leads to a higher fuel consumption and higher EFs.	
3	Date – (20/01/2021) It is noted that the calculation of OM EF under excel sheet 'OM Calc' does not consider generation from all the power plants that are not LCMR plants. Refer cells D291, F291 and H291 in the sheet 'OM Calc', the annual electricity generation should consider the generation from all plants that are not LCMR plants in respective year, the DNA did not consider the generation from all the plants. It considered the plants only up to cell D155 instead up to cell D290. The correct application of the formulae needs the DNA to consider all the plants i.e. up to cell D290. The correct application of the formulae for OM calculation leads to change OM EF. This will also lead to a minor change in CM EF values. To address this issue the DNA, need to submit revised excel file together with revised 'WAPP GEF - Grid Emission Factor Report 2020-12-11.docx' and 'ASB0034 2020-12-12 Update 2020.docx'.	Para 15 (f) of the "Guidelines: Quality assurance and quality control of data used in the establishment of standardized baselines", version 2.0	Date – (28/01/2021) The excel functions have been corrected.	Date – (08/02/2021) The revised excel file is checked against the consistency of the formulae used and it is noted that the file does not have any calculation error. The CL is closed.

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Document information

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01.0	27 May 2013	Initial publication
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