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 Mongolia's national electricity grid
Reference of proposed standardized baseline:	PSB0041
Name(s) of the Party or Parties to which the proposed standardized baseline applies:	Mongolia
Name(s) of the proponent(s) of the proposed standardized baseline:	Ministry of Environment and Tourism of Mongolia
History of the submission & assessment:	1) 28/12/2016: first submission was received • 29/12/2016: the initial assessment was successfully concluded and the proposed standardized baseline (PSB) was uploaded on the UNFCCC website. • 20/01/2017: its assessment was finalized for data quality aspects and compliance checking in accordance with the relevant standards/guidelines and the assessment findings were communicated to the DNA 2) 23/04/2018: second submission was received • 07/05/2018: its assessment was successfully concluded for data quality aspects and compliance checking.

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 Using one approved approach: ☐ 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:	07/05/2018

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 the energy sector, which includes electricity generation/consumption in Mongolia.

3. Projects shall use standardized baseline together with the approved methodological tool: "TOOL07: Tool to calculate the emission factor for an electricity system" (version 06.0).

A.2. Description of the proposed standardized baseline

4. Key data parameters and data sources:

Key data parameters *(note: e.g. total production of output, kiln technology, fuel type & consumption etc.)*	Data sources *(note: specify the sources in detail e.g. individual facilities, government documents, literature etc.)*
Fuel properties (NCV, CO_2 emission factor)	- IPCC guideline for National Greenhouse Gas Inventories 2006, Chapter 2, stationary combustion
Electricity generated (gross and net) by all power plants connected to the Mongolian grid	- National Dispatching Centre, Ministry of Energy Mongolia
Electricity imported from Russia	- National Dispatching Centre, Ministry of Energy Mongolia
Power plants names and year of commissioning	- National Dispatching Centre, Ministry of Energy Mongolia

5. The scope and coverage of the data:

(a) The data include relevant facilities connected to the following electric subsystems from the Mongolia National Grid:

(i) Central Energy System (CES)

a. CHP2: 24 MW coal subcritical power plant, commissioned on 1961;

b. CHP3: 148 MW coal subcritical power plant, commissioned on 1973;

c. CHP4: 580 MW coal subcritical power plant, commissioned on 1983;

d. DARKHAN CHP: 48 MW coal subcritical power plant, commissioned on 1965;

e. ERDENET CHP: 36 MW coal subcritical power plant, commissioned on 1987;

f. Salkhit Wind Farm: 50 MW wind power plant registered under the CDM, commissioned on 2013;

g. Import from Russia (Buryat Energy System);

(ii) Altai-Uliastai Energy System (AUES)

a. Esunbulag: 7.9 MW diesel open cycle power plant, commissioned on 1980;

b. Taishir HPP: 11 MW hydro power plant registered under the CDM, commissioned on 2010;

c. Tosontsengel diesel: diesel open cycle power plant, commissioned on 2007;

d. Uliastai Diesel: 7.9 MW diesel open cycle power plant, commissioned before the year 2000;

(iii) Eastern Energy System (EES)

a. Dornod CHP (Choibalsan): 36 MW coal subcritical power plant, commissioned on 1969;

(iv) Western Energy System (WES)

a. Durgun HPP: 12 MW hydro power plant registered under the CDM, commissioned on 2008;

b. Import from Russia;

(v) Southern (Gobi) Energy system (SES)

a. Dalanzadgad: 6 MW coal subcritical power plant, commissioned on 2000;

b. Ukhaa khudag: 18 MW coal subcritical power plant, commissioned on 2011;

(b) The data include key information for each facility (name, region, output type, production, fuel type/consumption and technology).

(c) The data represent all regions in the country.

(d) The data represent three years (2013, 2014 and 2015).

(e) The development of the PSB includes only grid-connected power plants.

6. The DNA uses a data template in accordance with the approved methodological tool "TOOL07: Tool to calculate the emission factor for an electricity system" (version 06.0).

7. The PSB applies the following assumptions (and/or conservative approaches) in order to process the data

(a) Only grid power plants are included in the calculation (Option I from Step 2 of the tool);

(b) The average share of low-cost/must-run power plants (hydro, solar and imports from Russia) over the last five years (2011-2015) was equal to 9.30% (i.e., less than 50%), therefore the Operating Margin Emission Factor (EF_{OM}) was calculated using the Simple OM method in accordance with para 40 of the "TOOL07: Tool to calculate the emission factor for an electricity system", and the emission factor will be fixed ex-ante;

(c) Electricity imports from Russia are assigned an emission factor equal to 0 tCO2e/MWh;

(d) Since data on fuel consumption for all power plants was not available, the default efficiencies of power plants utilizing different types of fuels, different technologies and commissioning dates were applied using the provision of the "TOOL07: Tool to calculate the emission factor for an electricity system" (please refer to the provisions from Data / Parameter table 6 of the monitoring methodology section i.e., based on the default values provided in Table 2, Appendix of the version 2.0 of the "TOOL09: Determining the baseline efficiency of thermal or electric energy generation systems"). The values applied are:

(i) Central Energy System (CES)

a. CHP2 (24 MW coal subcritical power plant, commissioned on 1961): 37%;

b. CHP3 (148 MW coal subcritical power plant, commissioned on 1973): 37%;

c. CHP4 (580 MW coal subcritical power plant, commissioned on 1983): 37%;

d. DARKHAN CHP (48 MW coal subcritical power plant, commissioned on 1965): 37%;

e. ERDENET CHP (36 MW coal subcritical power plant, commissioned on 1987): 37%;

(ii) Altai-Uliastai Energy System (AUES)

a. Esunbulag (7.9 MW diesel open cycle power plant, commissioned on 1980): 30%;

b. Tosontsengel diesel (diesel open cycle power plant, commissioned on 2007): 39.5%;

c. Uliastai Diesel (7.9 MW diesel open cycle power plant, commissioned before the year 2000): 30%;

(iii) Eastern Energy System (EES)

a. Dornod CHP (Choibalsan, 36 MW coal subcritical power plant, commissioned on 1969): 37%;

(iv) Southern (Gobi) Energy system (SES)

a. Dalanzadgad (6 MW coal subcritical power plant, commissioned on 2000): 37%;

b. Ukhaa khudag (18 MW coal subcritical power plant, commissioned on 2011): 39%;

SECTION B. Summary of Assessment

B.1. Assessment process

8. The purpose of the 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 the requirements of the approved procedures contained in the methodological tool "TOOL07: Tool to calculate the emission factor for an electricity system" (version 06.0).

9. 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.

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

(a) The submission dated 28/12/2016 which was successful in the initial assessment included:

(i) PSB form (F-CDM-PSB), version 1.0 dated 28/12/2016;

(ii) Quality Control (QC) Report, dated 28/12/2016;

(iii) GEF Calculation sheet;

(iv) GEF Report.

(b) Assessment findings were communicated to the DNA on 20/01/2017, in response to which the DNA submitted the revised documents and additional relevant documents.

(c) The submission dated 23/04/2018 included:

(i) A signed letter from the Ministry of Energy indicating the gross, net and internal electricity consumed by all power plants connected to the Mongolia National Grid (in Mongolian and the translation to English);

(ii) A spreadsheet containing the raw data provided by the Ministry of Energy;

(iii) Revised calculation of the grid emission factor, taking into account the responses to the findings;

(iv) Revised PSB form, taking into account the revised grid emission factor calculated;

(v) A public consultation report of the grid emission factor;

(vi) A revised QC report, taking into account the responses to the findings;

(vii) A document containing the response to the findings.

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

B.2. Assessment opinion:

11. In accordance with the QA/QC guidelines, the secretariat concluded that the all following requirements were met by this PSB:

(a) A QC system (resource/procedure) was implemented to check the data quality before and after data collection. Data was sourced from the National Dispatching Centre of Ministry of Energy Mongolia and all data collected, including changes and development related to power plants and transmission systems, will be archived electronically and will be kept for at least three years by the DNA in a way that allow for the reproduction of the calculation of the emission factor of national electricity grid. Activity data was cross-referenced with data collected by research institutes for the calculation of grid emission factor of the previous years and the publicly available data provided by international organizations. Sampling method was not necessary.

(b) QC activities were clearly documented in the QC report. Data is sourced from the annual statistics published by the Ministry of Energy that are open to the public. The

National Dispatching Centre is the national authority responsible for collecting and publishing national electricity generation data, coordinate daily system operation of all power and heat sector entities which includes the real time coordination of the power plants operation, transmission and distribution. Default values established by the IPCC were used in cases where national values are not available.

(c) The consultation process was clearly documented. According to the consultation meeting report, stakeholders (such as UNFCCC Focal Point, National Dispatch Centre, Ministry of Energy, Energy Regulatory Committee and consultants who prepared Mongolia's Nationally Determined Contributions) were invited to provide inputs and comments.

(d) All relevant documents and data were available for assessment.

(e) The primary data were collected in accordance with the predefined QC system. The secondary data sources were government authorities, which collected credible data in accordance with their national standards and procedures. Other data sources were also credible since they are peer-reviewed documents.

(f) The data scope was comprehensive enough to produce a "true and fair" representative SB in the particular energy industry sector.

(g) The key data and information are consistently presented.

(h) The data vintage (3 years) was met as per the provisions of the methodological tool "TOOL07: Tool to calculate the emission factor for an electricity system" (version 06.0).

(i) The assumptions and conservative approaches for data processing and calculations were all justified.

(j) There were no confidential data.

12. The details of issues (assessment findings) raised by the secretariat and the responses provided by the DNA are provided in Appendix-1 to this document.

13. The secretariat concluded that the PSB complies with the methodological tool "TOOL07: Tool to calculate the emission factor for an electricity system" (version 06.0).

Appendix 1. Findings and resolutions

<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>1</td><td>Information sources: Primary data.
For traceability, reference documents of electricity generation and fuel consumption data for 3 years for each plant from the utility or government records or official publications should be submitted (e.g. copies of relevant report from the National Dispatching Centre of Ministry of Energy Mongolia). This will help to expedite data review/validation.</td><td>Traceability
Paragraph 15 (k) of the QA/QC Guidelines version 2.0.
Paragraph 99 of the “tool to calculate the emission factor of an electricity system”</td><td>National Dispatching Centre, Ministry of Energy provided copies of relevant data, together with an official letter from Ministry of Energy.</td><td>Closed</td></tr>
<tr><td>2</td><td>Data accuracy: Auxiliary consumption
For some plants auxiliary electricity consumption is either substantially high or low i.e., in the range of 1% to above 70% . For others gross electricity generation is equal to net generation. Furthermore, in case of power plants ‘Taishir HPP ‘and ‘Diesel at soums’ net electricity generation is greater than gross electricity generation.
The share of auxiliary electricity consumption was calculated using net generation and gross generation provided in the “raw data” sheet in the excel file “c) Mongolia GEF Calculation Sheet”, whose result is as shown below.
<table>
<tr><th></th><th>2009</th><th>2010</th><th>2011</th><th>2012</th><th>2013</th><th>2014</th><th>2015</th></tr>
<tr><td>CHP2</td><td>16.35%</td><td>16.07%</td><td>15.25%</td><td>15.15%</td><td>15.86%</td><td>15.33%</td><td>14.29%</td></tr>
<tr><td>CHP3</td><td>20.54%</td><td>20.76%</td><td>21.13%</td><td>23.17%</td><td>20.39%</td><td>18.28%</td><td>16.57%</td></tr>
<tr><td>CHP4</td><td>14.09%</td><td>13.84%</td><td>13.24%</td><td>13.13%</td><td>12.83%</td><td>12.99%</td><td>12.42%</td></tr>
<tr><td>DARKHAN CHP</td><td>19.47%</td><td>19.18%</td><td>18.66%</td><td>18.67%</td><td>17.00%</td><td>17.68%</td><td>16.57%</td></tr>
<tr><td>ERDENET CHP</td><td>21.59%</td><td>21.57%</td><td>21.59%</td><td>21.20%</td><td>20.72%</td><td>20.28%</td><td>19.49%</td></tr>
</table></td><td>Data quality objectives; consistency specified in paragraph 15 (c) of the QA/QC Guidelines, version 2.0</td><td>(a) Raw data of gross and net electricity generation are provided
(b) OM EF and BM EF were recalculated</td><td>Closed</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>Salkhit Wind Farm</td><td></td><td></td><td></td><td></td><td>2.84%</td><td>2.33%</td><td>1.88%</td></tr>
<tr><td>Durgun HPP</td><td>0.28%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td><td>0.78%</td><td>0.73%</td></tr>
<tr><td>Taishir HPP</td><td>30.53%</td><td>11.69%</td><td>2.78%</td><td>4.53%</td><td>3.45%</td><td>2.89%</td><td>-52.27%</td></tr>
<tr><td>Esunbulag</td><td>1.32%</td><td>1.22%</td><td>1.83%</td><td>2.50%</td><td>5.11%</td><td>5.99%</td><td>4.72%</td></tr>
<tr><td>Uliastai Deisel</td><td>3.25%</td><td>1.53%</td><td>3.62%</td><td>2.99%</td><td>4.53%</td><td>2.58%</td><td>2.69%</td></tr>
<tr><td>Tosontsengel disel</td><td>0.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td><td>0.00%</td><td></td><td></td></tr>
<tr><td>Diesels at soums</td><td></td><td>-3.81%</td><td>0.06%</td><td>48.70%</td><td>-70.75%</td><td>0.11%</td><td>0.13%</td></tr>
<tr><td>Diesel</td><td>100.00%</td><td>100.00%</td><td>100.00%</td><td>100.00%</td><td>100.00%</td><td></td><td></td></tr>
<tr><td>Dornod CHP (Choibalsan)</td><td>20.68%</td><td>19.72%</td><td>18.61%</td><td>18.19%</td><td>16.95%</td><td>16.38%</td><td>15.79%</td></tr>
<tr><td>Dalanzadgad</td><td>22.96%</td><td>24.29%</td><td>25.09%</td><td>24.31%</td><td>42.85%</td><td>77.17%</td><td>74.20%</td></tr>
<tr><td>Ukhaa khudag CHP</td><td></td><td></td><td></td><td>13.03%</td><td>10.92%</td><td>10.33%</td><td>10.49%</td></tr>
</table>
The DNA is requested to:
(a) Provide the raw data related to the gross generation and net generation;
(b) To recalculate the OM EF and BM EF by using correct values.</td><td></td><td></td><td></td></tr>
<tr><td>3</td><td>Data consistency:
Power plant ‘Diesel’ (row 25 of the workbook “Raw data”) is not included in the operating margin (OM).
It is requested to address inconsistency, i.e. if a certain power plant is to be excluded proper explanation shall be given.</td><td>Data quality objectives; consistency specified in paragraph 15 (c) of the QA/QC Guidelines, version 2.0</td><td>“Diesel” (row 25) was excluded, because Diesel is not a power plant. This row that indicated the sum of power generation from all diesel plants was included by mistake.</td><td>Closed</td></tr>
<tr><td>4</td><td>Fuel consumption
The plants emission factors are calculated using ‘specific fuel consumption (g/kWh)’. This approach is not allowed under the grid tool. Moreover, for the plant ‘Tosontsengel disel’ specific fuel consumption is inconsistent for the year 2013 with</td><td>Data quality objectives; consistency specified in paragraph 15 (c) of the QA/QC</td><td>Option A2 was used to calculate OM EF.</td><td>Closed</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>the value obtained based on electricity generation and total fuel consumption. For installations that produce not only electricity, e.g. cogeneration plants, it is recommended to calculate the emission factor by applying option A2 in the grid tool. This option is based on the electricity generated, fuel type and the default efficiency.
It is requested to align determination of the plants' emission factor with the requirements of the grid tool.</td><td>Guidelines, version 2.0
Paragraph 47 of the "tool to calculate the emission factor of an electricity system"</td><td></td><td></td></tr>
<tr><td>5</td><td>Data accuracy: Plant specific emission factors
The emission factors are substantially high or low for example in the range of 0.012978 (Dornod CHP (Choibalsan)) to 4.393994 Dalanzadgad
.
<table>
<tr><th></th><th>2013</th><th>2014</th><th>2015</th></tr>
<tr><td>CHP2</td><td>1.640966</td><td>1.668977</td><td>1.666311</td></tr>
<tr><td>CHP3</td><td>0.928451</td><td>0.965127</td><td>0.895809</td></tr>
<tr><td>CHP4</td><td>0.815781</td><td>0.807827</td><td>0.797163</td></tr>
<tr><td>DARKHAN CHP</td><td>1.1441</td><td>1.130425</td><td>1.178415</td></tr>
<tr><td>ERDENET CHP</td><td>0.869583</td><td>0.866482</td><td>0.866482</td></tr>
<tr><td>Esunbulag</td><td>0.250959</td><td>1.25759</td><td>1.25747</td></tr>
<tr><td>Uliastai Deis el</td><td>0.661671</td><td>0.661671</td><td>0.661671</td></tr>
<tr><td>Tosontsengel disel</td><td>5.311542</td><td></td><td></td></tr>
<tr><td>Diesel at soums</td><td>0.661671</td><td>0.948699</td><td>0.947021</td></tr>
<tr><td>Dornod CHP (Choibalsan)</td><td>0.012978</td><td>1.762557</td><td>1.713767</td></tr>
<tr><td>Dalanzadgad</td><td>1.822162</td><td>4.393994</td><td>4.276686</td></tr>
</table></td><td>Data quality objectives; consistency specified in paragraph 15 (c) of the QA/QC Guidelines, version 2.0</td><td>After adopting Option A2 and recalculating OM EF, this issue did not exist any longer.</td><td>Closed</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)
	<table><tr><td>Ukhaa khudag CHP</td><td>2.146706</td><td>2.082222</td><td>2.068891</td></tr></table> The DNA is requested to provide explanation and supporting documents related to the fuel consumption and electricity generation for the plants, where emission factors are greater than 1.5 tCO2/MWh.			
6	**Data accuracy:** Build Margin (BM) BM is calculated using 2013 data, whereas the most recent data is for 2015. It is requested to recalculate the BM EF according to the grid tool requirements, by using data for 2015.	Data quality objectives; consistency specified in paragraph 15 (c) of the QA/QC Guidelines, version 2.0	2015 data was used for BM EF.	Closed
7	**Data consistency:** Build Margin (BM) The emission factor for power plant "Tosontsengel disel" is **5.311542067** tCO2/MWh for the year 2013 in the workbook "Calculation_Main Grid", whereas it equals **1.382594** tCO2/MWh in the workbook "SampleGroup_BM". It is requested to address inconsistency in addition to the above comments on unusually high emission factors.	Data quality objectives; consistency specified in paragraph 15 (c) of the QA/QC Guidelines, version 2.0	After recalculating OM EF and BM EF, this issue did not exist any longer.	Closed
8	**Public consultation report:** In accordance with the "Quality assurance and quality control of data used in the establishment of standardized baselines", it is recommended that the DNA provide a public consultation report.	Documentation provisions; public consultation report specified in paragraph 15(j) and 31 (d) of the	A public consultation report was prepared.	Closed

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		QA/QC Guidelines, version 2.0		
9	**Electricity exports** According to the requirements of the grid tool, electricity exports should not be subtracted from electricity generation data used for calculating and monitoring the electricity emission factors. It is requested therefore to confirm whether amount of electricity exported to Russia is included in the calculations.	Paragraph 24 of the "tool to calculate the emission factor of an electricity system"	It is confirmed that no electricity was exported to Russia and therefore electricity exports are 0 MWh.	Closed

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Document information

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01.0	27 May 2013	Initial publication
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