



Proposed standardized baseline submission form
(Version 03.0)

To be used by a designated national authority (DNA) when submitting a proposed standardized baseline in accordance with the "Procedure: Development, revision, clarification and update of standardized baselines" (CDM-EB63-A28-PROC).

INFORMATION TO BE COMPLETED BY THE DNA

Title of the proposed standardized baseline:		Grid Emission Factor, Baseline Identification
Name(s) of the Party or Parties to which the proposed standardized baseline applies:		Grenada
DNA submitting this form:		Ministry of Finance, Planning, Economy, Energy, and Cooperatives, Grenada
Is the proposed standardized baseline submitted by a single Party or group of Parties?		<input checked="" type="checkbox"/> Single Party <input type="checkbox"/> Group of Parties
Attachments:		<p><input checked="" type="checkbox"/> Additional documentation supporting the submission (e.g. relevant data, statistics, studies, calculation tables, quality control report, etc.), where applicable</p> <p><input checked="" type="checkbox"/> Data used to establish the proposed standardized baseline in a sector-specific data template</p> <p><input type="checkbox"/> An assessment report prepared by a designated operational entity (DOE)</p> <p><input type="checkbox"/> Letters of approval of all the DNAs of the Parties to which the proposed standardized baseline applies, where the standardized baseline applies to a group of Parties</p>
Name of authorized officer signing for the DNA:	Mr. John Auguste	
Date (DD/MM/YYYY) and signature for the DNA:	22/09/2016 	
Contact information of the focal point(s) of the DNA: (Names, e-mail addresses and phone contacts for procedural and technical communication on the submission)	<p>Mr. John Auguste Senior Energy Officer Ministry of Finance, Planning, Economy, Energy, and Cooperatives Carenage, St. George's Grenada, W.I. Tel: +1 473 440 2731 Ext. 1202, +1 473 435 8708 Mob: +1 473 419 2354 Fax: +1 473 440 4115 E-mail: john_auguste@yahoo.com energydivisionou@gmail.com</p>	

Name(s) of the proponent(s) of the proposed standardized baseline: DNA - Ministry of Finance, Planning, Economy, Energy, and Cooperatives, Grenada	
Affiliation of the proponent(s): (The definition of "admitted observer organization" can be found at https://cdm.unfccc.int/Reference/Guidelines/glos_CDM.pdf)	
<input checked="" type="checkbox"/> Party <input type="checkbox"/> Project Participant (PP) <input type="checkbox"/> International Industry Organization <input type="checkbox"/> Admitted Observer Organization	Contact information of the focal point(s) of the proponent(s): (Names, e-mail addresses and phone contacts for procedural and technical communication on the submission. This section does not need to be completed if the DNA(s) is(are) the proponent(s) of the proposed standardized baseline.)
INFORMATION TO BE COMPLETED BY THE SECRETARIAT AND THE PROPONENT(S)	
Further inputs requested from the proponent(s) on the proposed standardized baseline: (List of additional information and/or modifications that are required to prepare a draft standardized baseline, if applicable.)	
Response from the proponent(s): (If there are changes in the proposed standardized baseline form as a result of changes carried out, submit the changes in the highlighted text).	



Proposed standardized baseline submission form
CDM-PSB-FORM (Version 03.0)

Title: GRID EMISSION FACTOR, BASELINE IDENTIFICATION AND POSITIVE LIST FOR GRENADA

Submission date (dd/mm/yyyy): 22/09/2016

Version number: 03.0

Approaches

Check below all the approaches used to develop the proposed standardized baseline and state the version and/or the reference (number, title, version) if applicable.

☐ The approach contained in the “Guidelines for the establishment of sector specific standardized baselines” (Version: _____)

☐ A methodological approach contained in an approved, proposed new or revised baseline and monitoring methodology (reference: _____)

☒ A methodological approach contained in an approved, proposed new or revised methodological tool (reference: version 5.0 of the “Tool to calculate the emission factor for an electricity system”)

☐ The approach contained in the “Guideline: Establishment of standardized baselines for afforestation and reforestation project activities under the CDM” (version: _____)

Combination of the approaches (if applicable)

Provide a justification for the necessity and the appropriateness of the combination if more than one approach was used for the development of the proposed standardized baseline.

New or revised methodological tool (if applicable)

This section is applicable to the following situations:

1. *If there is no approved methodological tool available that can be used for the development of the proposed standardized baseline, and if the proponent wishes develop a new methodological approach by submitting a new methodology or methodological tool or revise the approach contained in an approved methodology or methodological tool, and/or*

2. *If there is no approved methodology available to be used together with the proposed standardized baseline for the estimation of emission reductions, and the proponents wishes to develop new methodology or revise the existing approved methodology.*



Check below how the new or revised methodology or methodological tool is/was submitted for approval by the CDM Executive Board and for what purpose in accordance with the "Procedure: development, revision and clarification of baseline and monitoring methodologies and methodological tools". In this case, indicate below the title of the new or revised methodology or methodological tool if applicable:

• *New or revised methodology or methodological tool¹:*

- ☐ New methodology (title: _____)
- ☐ Revised methodology (title: _____)
- ☐ New methodological tool (title: _____)
- ☐ Revised methodological tool (title: _____)

• *Purpose:*

- ☐ For using the methodological approach in new/revised methodology/methodological tool for development of the proposed standardized baseline
- ☐ For using the new/revised methodology together with the proposed standardized baseline to estimate emission reductions

• *Process:*

- ☐ Methodology(ies)/methodological tool is/was proposed through the bottom-up process
- ☐ Request the secretariat to seek a mandate from the CDM Executive Board for its top-down development (if this option is selected, provide justification below)

(Justification: _____)

Elements to be standardized

Check below all the elements to be standardized by the proposed standardized baseline:

- ☐ Additionality
- ☐ Baseline/baseline land-use scenario
- ☒ Baseline emission/removal parameter
- ☐ Land eligibility (applicable only to afforestation and reforestation project activities)

¹ The proposed new or revised methodology or methodological tool for the purpose of developing a proposed standardized baseline, or the proposed new or revised methodology or methodological tool that will be used together with the proposed standardized baseline, may be submitted to the secretariat at the same time with the proposed standardized baseline in accordance with the "Procedure: development, revision and clarification of baseline and monitoring methodologies and methodological tools".



**SECTION C: PROPOSED STANDARDIZED BASELINE DEVELOPED USING A
METHODOLOGICAL APPROACH CONTAINED IN AN APPROVED OR
PROPOSED NEW OR REVISED METHODOLOGICAL TOOL**

Complete this section only when the proposed standardized baseline is developed using a
methodological approach contained in the valid version of an approved methodological tool or in a
proposed new or revised methodological tool (an example of this is the application of the “Tool to
calculate the emission factor for an electricity system” to estimate the CO₂ emission factor of an
electricity grid).

Applicability of the proposed standardized baseline

State the host country(ies) or region(s) within a host country to which the proposed standardized
baseline is applicable. In case of region(s) within a host country, document transparently the
geographical boundaries of the region (e.g. provinces, electric grids, etc.).

Grenada – whole country.

Baseline parameter standardization

*Explain how the methodological approach contained in the valid version of the approved
methodological tool or in the proposed new or revised methodological tool was applied to standardize
the baseline parameter (e.g. baseline emission factor). Document all underlying data, data sources,
assumptions, calculation steps and outcomes in a clear and transparent manner.*

The grid emission factor will be calculated following the steps from the “Tool to determine the emission
factor of an electricity system” (Tool), version 5.0.

Step 1. Identify the relevant electricity systems

Grenada is composed by 3 island (Grenada, Petit Martinique and Carriacou), each with its electric grid
which are not interconnected among themselves. Therefore, the electricity systems are:

- Electric grid from the island of Grenada
- Electric grid from the island of Carriacou
- Electric grid from the island of Petit Martinique

Step 2. Choose whether to include off-grid power plants in the project electricity system (optional);
The electric system of each island is composed by one power plant each. Therefore, there are no off-grid
plants.

**Step 3: Select a method to determine the operating margin (OM);**

The Dispatch Data Analysis OM is not applicable since the three electric systems are composed solely by one power plant each and there is no merit dispatch order. Since the power plants installed are solely fossil-fuel based and there has been no renewable energy plants so far in operation in the country as indicated by the yearly reports from GREENLEC (Grenada Electricity Services Ltd), the share of low-cost/must-run is deemed less than 50%. Since the electric grids do not meet the requirements of para 82 of version 5.0 of the Tool and the systems are located in a SIDS, the Simplified Combined Margin option is chosen, where OM is determined as average operating margin (para 88 from the Tool)

Step 4: Calculate the operating margin emission factor according to the selected method

GREENLEC, the electric company from Grenada and responsible for managing the power plants, performs measurements of the quantity and type of fossil fuel consumed, the NCV of each fossil fuel and the electricity generated by each power plant. Therefore, Option A (Calculation based on average efficiency and electricity generation of each plant) was used to calculate the operating margin CO₂ emission factor ($EF_{grid,OM-ave,y}$) i.e., Option A1 was used to determine the CO₂ emission factor of power unit m ($EF_{EL,m,y}$).

GREENLEC provided the following information about the power plants:

Power Plant	Electric System (Island)	Electricity Generated (GWh) ²			Fuel consumed (m ³) ³			Fuel density (kg/L or Mg/m ³) ⁴	
		2010	2011	2012	2010	2011	2012	2010	2011
Queen's Park Power Plant	Grenada	193,474	188,883	185,349	47,182	45,711	44,131	0.853	0.854
Carriacou Power Plant	Carriacou	8,051	7,9891	7,654	2,106	2,040	1,932	0.853	0.851
Petite Martinique Power Plant	Petit Martinique	0.791	0.792	0.760	264	271	260	0.853	0.851

The first step is to convert the amount of fuel to Gg, by multiplying the amount of m³ of fuel by the density and dividing by 1,000. The results were:

Power Plant	Electric System (Island)	Electricity Generated (GWh)			Fuel consumed (Gg)		
		2010	2011	2012	2010	2011	2012
Queen's Park Power Plant	Grenada	193,474	188,883	185,349	40.23	39.05	37.53
Carriacou Power Plant	Carriacou	8,051	7,9891	7,654	1.80	1.74	1.66
Petite Martinique Power Plant	Petit Martinique	0.791	0.792	0.760	0.22	0.23	0.22

² Source: GREENLEC – Grenada Electricity Services Ltd.
³ Source: GREENLEC – Grenada Electricity Services Ltd.
⁴ Source: GREENLEC – Grenada Electricity Services Ltd.



The OM Emission Factor is calculated for each island through equation (3) from the Tool, as follows:

$$EF_{grid, OM-ave, y} = \frac{\sum_m EG_{m, y}}{\sum_m EG_{m, y} \times EF_{EL, m, y}}$$

$EF_{EL, m, y}$ was calculated for power plant through Option A1, as follows:

$$EF_{EL, m, y} = \frac{\sum_{m,i} FC_{i, m, y} \times NCV_{i, y} \times EF_{CO2, i, y}}{EG_{m, y}}$$

The combination of the above equations result in the one indicated below:

$$EF_{grid, OM-simple, y} = \frac{\sum_m EG_{m, y} \times \frac{\sum_{m,i} FC_{i, m, y} \times NCV_{i, y} \times EF_{CO2, i, y}}{EG_{m, y}}}{\sum_m EG_{m, y}}, \text{ where:}$$

$EF_{grid, OM-ave, y}$	=	Average operating margin in CO ₂ emission factor in year y (tCO ₂ /MWh)
$EG_{m, y}$	=	Net quantity of electricity generated and delivered to the grid by power unit <i>m</i> in year y (MWh)
$FC_{i, m, y}$	=	Amount of fuel type <i>i</i> consumed by power unit <i>m</i> in year y (Mass or volume unit)
$NCV_{i, y}$	=	Net calorific value (energy content) of fuel type <i>i</i> in year y (GJ/mass or volume unit)
$EF_{CO2, i, y}$	=	CO ₂ emission factor of fuel type <i>i</i> in year y (tCO ₂ /GJ)
<i>m</i>	=	All power units serving the grid in year y except low-cost/must-run power units
<i>i</i>	=	All fuel types <i>i</i> combusted in power unit <i>m</i> in year y

The table below provides a step-wise calculation of the $EF_{grid, OM-ave, y}$ for each electric system and for each year (2010, 2011 and 2012). The OM grid emission factor will be fixed ex-ante.



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CDM – Executive Board

Power Plant <i>m</i>	Electric System (Island)	Year	Electricity Generated (GWh)	Fuel consumed (Gg)	Fuel type	NCV fuel (TJ/Gg)	EF _{CO₂, diesel} (tCO ₂ e/TJ)	EF _{EL, Queen's Park, y} (tCO ₂ e/MWh)	OM 2010-2012 (average)
Queen's Park Power Plant	Grenada	2010	193.4737	40.23	Diesel	42.60	72.60	120,909	0.634
		2011	188.8839	39.05	Diesel	42.28	72.60	117,359	
		2012	185.3488	37.53	Diesel	42.40	72.60	112,799	

Power Plant <i>m</i>	Electric System (Island)	Year	Electricity Generated (GWh)	Fuel consumed (Gg)	Fuel type	NCV fuel (TJ/Gg)	EF _{CO₂, diesel} (tCO ₂ e/TJ)	EF _{EL, Carriacou, y} (tCO ₂ e/MWh)	OM 2010-2012 (average)
Carriacou Power Plant	Carriacou	2010	8.051004	1.80	Diesel	42.60	72.60	5,398	0.675
		2011	7.98916	1.74	Diesel	42.28	72.60	5,216	
		2012	7.653595	1.66	Diesel	42.40	72.60	4,993	

Power Plant <i>m</i>	Electric System (Island)	Year	Electricity Generated (GWh)	Fuel consumed (Gg)	Fuel type	NCV fuel (TJ/Gg)	EF _{CO₂, diesel} (tCO ₂ e/TJ)	EF _{EL, Petit Martinique, y} (tCO ₂ e/MWh)	OM 2010-2012 (average)
Petit Martinique Power Plant	Petit Martinique	2010	0.791256	0.2247	Diesel	42.60	72.60	675	0.890
		2011	0.7924	0.2302	Diesel	42.28	72.60	692	
		2012	0.759832	0.2219	Diesel	42.40	72.60	667	

Step 5: Calculate the build margin (BM) emission factor

The calculation of BM requires at least 5 power plants in each system. Since there is only one power plant in each island, the electric systems do not meet the requirements of para 82 from version 5.0 of the Tool and the systems are located in a SIDS, the simplified Combined Margin (CM) is calculated solely using the average operating margin i.e., using the weight of BM as 0 following para 88 and 90 of the Tool).

Step 6: Calculate the combined margin emissions factor

Since the electric grids do not meet the requirements of para 82 of version 5.0 of the Tool and the systems are located in a SIDS, the Combined Margin (CM) will be calculated as the Simplified CM – where the weight of BM is equal to 0 and the weight of OM is equal to 1, where OM is determined as average operating margin (para 88 from the Tool). The results for each electric system for each type of power plant are presented in the table below:

Plant's Name	Electric System (Island)	EF _{grid, Simplified CM}
Queen's Park Power Plant	Grenada	0.634
Carriacou Power Plant	Carriacou	0.675
Petite Martinique Power Plant	Petit Martinique	0.890

Validity of the proposed standardized baseline

State the period of time for which the proposed standardized baseline is valid in accordance with the “Standard for determining coverage of data and validity of standardized baselines”.

The proposed SBL will be valid for 3 years.

Deviations from the approved methodological tool (if applicable)

Provide descriptions of and justifications for the necessity and the appropriateness of any deviations from the valid version of the approved methodological tool to develop the proposed standardized baseline. Also justify why a revision of the valid version of the approved methodological tool is not necessary.

Not applicable.

References and any other relevant information

Not applicable.

Document information

Version	Date	Description
03.0	1 September 2015	Revision to: <ul style="list-style-type: none">• Reflect updated requirements in the version 04.0 of "Procedure: Development, revision, clarification and update of standardized baselines" (CDM-EB63-A28-PROC) ;• Include editorial improvement.
02.0	1 December 2013	The document title has changed from "Proposed standardized baseline form" (F-CDM-PSB) to "Proposed standardized baseline submission form" (CDM-PSB-FORM). Revision to: <ul style="list-style-type: none">• Reflect updated requirements in the "Procedure: Development, revision, clarification and update of standardized baselines"• Include editorial improvement
01.0	23 March 2012	Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Methodology Keywords: standardized baselines		