CLEAN DEVELOPMENT MECHANISM
PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-CPA-DD)
Version 01

CONTENTS

Annexes

NOTE:

(i) This form is for the submission of CPAs that apply a large scale methodology using provisions of the proposed PoA.

(ii) The coordinating/managing entity shall prepare a CDM Programme Activity Design Document (CDM-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the PoA DD. At the time of requesting registration the PoA DD must be accompanied by a CDM-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the PoA must submit a completed CDM-CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of CDM programme activity (CPA)

A.1. Title of the CPA:

The [CPA name, including technology type] project, [region], [country] (CPA [short name])

Version 1
Date: [date]

A.2. Description of the CPA:

The CPA [project name] involves the [construction, replacement, retrofit] of a [hydropower/wind-power/ solar-power/ geothermal-power] plant located [CPA specific information] near [village / town name], [region / province], [country]. [Other relevant CPA information]

The CPA [project name]'s installed capacity and estimated annual gross power generation is [rated capacity] MW and [forecasted production] MWh, respectively.

The project's purpose is to supply renewable electricity to the [grid name] grid via the Power Purchase Agreement (PPA) signed with [grid operator]. The net electricity generated from this project - the annual estimated volume is [forecasted production] MWh -, will be supplied to the grid via a [line capacity] kV single line in conformity with [country] grid standards and local requirements.

The [CPA name] (the CPA [short name] or the project) is being proposed by [project implementer] (the project implementer) and will generate renewable power, which will displace part of the electricity otherwise supplied by fossil fuel fired power plants. Thus, greenhouse gas (GHG) emission reductions can be achieved via this project.

[background information on country power sector status]

The project's contributions to the sustainable development of the local area as well as the host country are as follows:

[contributions to sustainable development]

A.3. Entity/individual responsible for CPA:

[project implementer] is the project owner and implementer of the CPA [short name].

A.4. Technical description of the CPA:

[project description]

[project diagram]

Figure 1: [CPA name] scheme

Figure 2: Photographs of [CPA name] site (where available)

Table 1: Main technical parameters of the proposed project activity

[Insert technical summary table]

Source: [source]

A.4.1. Identification of the CPA:

SPEAR PoA – CPA [3-digit CPA number] [CPA name]

A.4.1.1. Host Party:

[host country]

A.4.1.2. Geographic reference of other means of identification allowing the unique identification of the CPA (maximum one page):

[project name] is located [location including town / village name, district / region and country]. [include other specific details of project location]. The project(s) (in the case of a bundle) unique identification is the location of [its/the] powerhouse[s] at [latitude] and [longitude] (see below figure(s)).

[figure]

Figure 2: Project Location. Source: [source]

The project implementer contact details (see also annex 1):
[Name of contact person]
[Name of company]
[Address]

A.4.2. Duration of the CPA:

A.4.2.1. Starting date of the CPA:

[date] ([nature of the event chosen as project start date])

[justification]

A.4.2.2. Expected operational lifetime of the CPA:

[] years

A.4.3. Choice of the crediting period and related information:

Renewable crediting period;

A.4.3.1. Starting date of the crediting period:

[date]

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

7 years

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Table 2: Estimated amount of emission reductions over the chosen crediting period

Years	Annual estimation of emission reductions in tonnes of $tCO_2.eq$
Y1 ([])	[]
Y2 ([])	[]
Y3 ([])	[]
Y4 ([])	[]
Y5 ([])	[]
Y6 ([])	[]
Y7 ([])	[]
Total emission reductions (tonnes of CO_2-eq)	[]
Total number of crediting years	7
Annual average over the crediting period of estimated reductions (tonnes of CO_2-eq)	[]

A.4.5. Public funding of the CPA:

[Insert information about public funding]

A.4.6. Confirmation that CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA:

[At the date of the CPA-DD being submitted to validation, there has been no PoA [technology] project and only [number] CDM project(s) undertaken in [country] submitted for registration to the EB[4] as can be seen in the record keeping system.]

As a consequence there cannot be any other registered CPA of a PoA, an application to register another small-scale CPA of a PoA or stand alone CDM project activity with the following characteristics:

[4] UNEP Risoe CDM Pipeline, http://cdmpipeline.org/, retrieved on [date].

a) The same project implementer as [name of CPA].
b) The boundary is within 1 km of the boundary of the proposed project, at the closest point.

[Include details of CDM projects registered and in validation in host country]

Moreover, the Coordinating/Managing Entity (CME) does not manage another PoA of the same sectoral scope within [country].

By using the precise geographical coordinates of the CPA provided in section A.4.1.2 and comparing it with the database of registered CDM project activities and registered PoAs it has been established that the CPA is neither registered as an individual CDM project activity nor is part of another registered PoA.

SECTION B. Eligibility of CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which CPA is added:

Sustainable Promotion of East African Renewables (SPEAR) (referred later on as PoA).

B.2. Justification of the why the CPA is eligible to be included in the Registered PoA :

[CPA name] is eligible to be included to the PoA because it fulfils all eligibility requirement of the PoA:

i. be in line with the respective laws and regulations in force at the time of inclusion of the CPA into the PoA;
ii. In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power) plants have started commercial operation at least five years before, and no capacity expansion or retrofit of the plants will have been undertaken in the five years before the implementation of the project activity.

i.	be one or more hydro, wind, solar or geothermal power plants generating electricity	[]
ii.	have, in case of a hydropower plant with a reservoir, a power density greater than 4 W/m^2.	[]
iii.	supply the renewable electricity generated to the national grid of the country where the CPA is situated.	[]
iv.	have a agreement with SPEAR that governs the CPA's participation in the PoA.	[]
v.	consists of one or more power plants. The proposed projects can only be bundled in one CPA if they are of the same type, technology and measure.	[]
vi.	demonstrate that it is in compliance with one of the additionality approaches as described in section E.5.2 of the PoA-DD.	[]
vii.	have a project start date after the global stakeholder consultation of the PoA	[]
viii.	be in line with laws and regulations available at the time of inclusion of the CPA into the PoA.	[]
ix.	In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power) plants have started commercial operation at least five years before, and no capacity expansion or retrofit of the plants will have been undertaken in the five years before the implementation of	[]

the project activity.	

CPA [CPA name] also fulfils all eligibility requirements of ACM0002 version 12:

This methodology is applicable to grid-connected renewable power generation project activities.	[]
The project activity is the installation, capacity addition, retrofit or replacement of a power plant/unit of one of the following types: hydro power plant/unit (either with a run-of-river reservoir or an accumulation reservoir), wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit;	[]
In the case of capacity additions, retrofits or replacements (except for wind, solar, wave or tidal power): the existing plant started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion or retrofit of the plant has been undertaken between the start of this minimum historical reference period and the implementation of the project activity;	As per eligibility criteria ix.
In case of hydro power plants, one of the following conditions must apply: o The project activity is implemented in an existing reservoir, with no change in the volume of reservoir; or o The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m^2; or o The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m^2.	As per eligibility criteria ii.

B.3. Assessment and demonstration of additionality of the CPA, as per eligibility criteria listed in the Registered PoA:

As per section E.5.2 of the PoA-DD, the project participant can prove additionality either on the basis of Approach 1 or Approach 2.

Prior consideration of the CDM:
[define project start date]
[project timeline]

Approach 1: Is the installed capacity of the CPA below or equal to 5 MW, and is the CPA located in a Least Developed Country (LDC) or an underdeveloped zone of the host country?

Test	Yes	No
CPA capacity is below or equal to 5 MW		
CPA is in a Least Developed Country (LDC) or undertaken in a special underdeveloped zone as defined by the Government		

CPA [CPA name] is a [capacity and technology type] plant situated in [country and justification]. Hence, the project activity is additional.

Approach 2: Tool for the demonstration and assessment of additionality

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

Alternative scenarios to the CPA [CPA name] are as follows:

1. The CPA [CPA name] is not implemented as a CDM project
2. [*The continuation of the current situation, i.e. to use all power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance. The additional power generated under the project would be generated in existing and new grid-connected power plants in the electricity system*]
3. [*All other plausible credible alternatives to the project activity that provide an increase in the power generated at the site, which are technically feasible to implement. This includes, inter alia, different levels of replacement and/or retrofit at the power plant/unit(s).*]

Sub-step 1b: Consistency with mandatory laws and regulations
The alternative(s) are in compliance with all mandatory applicable legal and regulatory requirements.

The CME may choose to follow either step 2, 3 or both

Step 2: Investment analysis
It must be determined whether the proposed project activity is not:

- The most economically or financially attractive; or

- Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

Sub-step 2a: Determine appropriate analysis method
The analysis method to be used will be [simple cost analysis / investment comparison analysis / benchmark analysis] [*justification*].

Sub-step 2b: Option I. Apply simple cost analysis
[*Document the costs associated with the CDM project activity and the alternatives identified in Step 1 and demonstrate that there is at least one alternative which is less costly than the project activity*].

It is concluded that the proposed CPA [CPA name] is more costly than at least one alternative.

Sub-step 2b: Option II. Apply investment comparison analysis
[*Identify the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service most suitable for the project type and decision-making context*].

Sub-step 2b: Option III. Apply benchmark analysis
[*Identify the financial/economic indicator, such as IRR, most suitable for the project type and decision context*].

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III)
[*Calculate the suitable financial indicator for the proposed CDM project activity and, in the case of Option II above, for the other alternatives. Present a clear comparison of the financial indicator for the proposed CDM activity and:*

- *The alternatives, if Option II (investment comparison analysis) is used.*
- *The financial benchmark, if Option III (benchmark analysis) is used.*]

Sub-step 2d: Sensitivity analysis (only applicable to Options II and III)
[*Include a sensitivity analysis that shows whether the conclusion regarding the financial/economic attractiveness is robust to reasonable variations in the critical assumptions*].

Outcome of Step 2: It is concluded that the proposed CDM project activity [is unlikely to be the most financially/economically attractive / is unlikely to be financially/economically attractive].

Step 3: Barrier analysis
If this Step is used, determine whether the proposed project activity faces barriers that:
(a) Prevent the implementation of this type of proposed project activity; and
(b) Do not prevent the implementation of at least one of the alternatives.

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity:
[*Technological and investment barriers have been established in the PoA-DD A.4.3. and will be used here with additional support if required.A.4.3. describes existing barriers in East Africa, most of them are on a country/region level and will not need to be reassessed further at CPA level. The approach to be taken on CPA level will be:*

- *For the technological barriers details will be taken from section A.4.3. of the PoA with further evidence detailed if required. or:*

- *For the investment barrier, whenever the debt provider states explicitly the critical importance of CDM revenues to provide loans to the project, it shall be considered as additional as per EB50, Annex 13, paragraph 9*].

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity)
[]

Step 4: Common practice analysis

Sub-step 4a: Analyse other activities similar to the proposed activity
[*Provide an analysis of any other activities that are operational and that are similar to the proposed project activity*].

Sub-step 4b: Discuss any similar options that are occurring
[*If similar activities are identified above, then it is necessary to demonstrate why the existence of these activities does not contradict the claim that the proposed project activity is financially/economically unattractive or subject to barriers*].

The stepwise approach for Common Practice as described in the *Guidelines on Common Practice*[5] will be applied:
Step 1: Calculate applicable output range as +/-50% of the design output or capacity of the proposed project activity.
Step 2: In the applicable geographical area, identify all plants that deliver the same output or capacity, within the applicable output range calculated in Step 1, as the proposed project activity and have started commercial operation before the start date of the project. Note their number N_{all}. Registered CDM project activities shall not be included in this step.
Step 3: Within plants identified in Step 2, identify those that apply technologies different that the technology applied in the proposed project activity. Note their number N_{diff}.
Step 4: Calculate factor $F=1-N_{diff}/N_{all}$ representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.
The proposed project activity is a ìcommon practiceî within a sector in the applicable geographical area if the factor F is greater than 0.2 and $N_{all}-N_{diff}$ is greater than 3.

It has been demonstrated from the above that the CPA [CPA name] is additional.

B.4. Description of the sources and gases included in the project boundary and proof that the CPA is located within the geographical boundary of the registered PoA.

CPA [short name] is located within the boundaries of [country]. The project boundary for CPA [short name] includes the [short name] project site and the [33kv] line to the interconnection point with the grid and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

[5] EB 63, Annex 12, Version 01.0

CPA [short name] is a renewable and clean energy project [details of project emissions if applicable]. Gases and emissions in the project boundary source exclusively from power plants connected to the [name of grid].

The GHG emission sources included in or excluded from the project boundary are as follows:

Table 3: GHG Sources included to within project boundary

Source		Gas	Included?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
Project activity	For geothermal power plants, fugitive emissions of CH_4 and CO_2 from non-condensable gases contained in geothermal steam	CO_2	Yes	Main emission source
		CH_4	Yes	Main emission source
		N_2O	No	Minor emission source
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Minor emission source
		CH_4	Yes	Main emission source
		N_2O	No	Minor emission source

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

[grid calculation if Project located in Sudan or Burundi]/[refer to PoA-DD grid calculation for projects located in Kenya, Rwanda, Tanzania and Uganda]

Data/Parameter:	$EF_{CM,y}$
Data unit:	tCO2/MWh
Description:	CO_2 emission factor for electricity displaced in the grid Grid Emission Factor (GEF) – [] Grid: $EF_{CM,y}$ is the combined margin CO_2 emission factor of power plants connected to the [] electricity grid in year 'y', calculated ex-ante based on the weighted average of $EF_{OM,y}$ and $EF_{BM,y}$
Source of data to be used:	Generation Reports from UETCL.
Value applied	$EF_{CM,y}$ = [] tCO_2/MWh
Justification of the choice of data or	The GEF has been calculated using generation data from [] and is based on the tool "Tool to calculate the emission factor for an electricity system" (Version [])

description of measurement methods and procedures actually applied :	
Any comment:	All emission factors will be fixed for one crediting period and will be revised as per available published values in the following crediting periods

For geothermal

Data/Parameter:	GWP_{CH4}
Data unit:	tCO_2e/tCH_4
Description:	Global warming potential of methane valid for the relevant commitment period
Source of data to be used:	IPCC
Value applied	For the first commitment period: 21 tCO_2e/tCH_4
Justification of the choice of data or description of measurement methods and procedures actually applied :	IPCC default value
Any comment:	

For retrofit / replacement / capacity additions

Data/Parameter:	$EG_{historical}$
Data unit:	MWh/yr
Description:	Annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data to be used:	Project activity site, Electricity meters
Value applied	[]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[]
Any comment:	[]

Data/Parameter:	$\sigma_{historical}$
Data unit:	MWh/yr
Description:	Standard deviation of the annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data to be used:	Calculated from data used to establish $EG_{historical}$

Value applied	[]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[]
Any comment:	[]

Data/Parameter:	$DATE_{BaselineRetrofit}$
Data unit:	date
Description:	Point in time when the existing equipment would need to be replaced in the absence of the project activity
Source of data to be used:	[]
Value applied	[]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[]
Any comment:	[]

Data/Parameter:	$DATE_{hist}$
Data unit:	date
Description:	Point in time from which the time span of historical data for retrofit or replacement project activities may start
Source of data to be used:	[]
Value applied	[]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[]
Any comment:	[]

For hydro power with reservoirs

Data/Parameter:	EF_{Res}
Data unit:	$kgCO_2e/MWh$
Description:	Default emission factor for emissions from reservoirs
Source of data to be used:	Decision by EB23
Value applied	90 $kgCO_2e/MWh$

Justification of the choice of data or description of measurement methods and procedures actually applied :	Decision by EB23
Any comment:	[]

Data/Parameter:	Cap_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero
Source of data to be used:	[]
Value applied	[]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[]
Any comment:	

Data/Parameter:	A_{BL}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero
Source of data to be used:	Project site
Value applied	Measured from topographical surveys, maps, satellite pictures, etc.
Justification of the choice of data or description of measurement methods and procedures actually applied :	[]
Any comment:	[]

B.5.2. Ex-ante calculation of emission reductions:

The total emission reductions of the project are calculated on the basis of the equations and parameters presented and explained in the section E.6.2 of the PoA-DD and B.5.1 of this document. Baseline information for the combined margin emission factor is [insert details of calculation].

Baseline emissions

Table 4: Net electricity generation of the project

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7
$EG_{PL,y}$ (kWh/yr)							

As the [CPA name] is a [greenfield / retrofit / replacement / capacity addition] project, as per E 6.3 of the PoA-DD, baseline emissions are calculated as follows:

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y} \quad (1)$$

Where:

BE_y = Baseline emissions in year *y* (tCO_2/yr)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EF_{grid,CM,y}$ = Combined margin CO_2 emission factor for grid connected power generation in year *y* calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"

Calculation of $EG_{PJ,y}$

[*Greenfield renewable energy power plants*]

If the project activity is the installation of a new grid-connected renewable power plant/unit at a site where no renewable power plant was operated prior to the implementation of the project activity, then:

$$EG_{PJ,y} = EG_{facility,y} \quad (2)$$

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

Table 5: Baseline emissions from electricity generation (BE_y)

Year	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8
BE_y	2,400	4,800	4,800	4,800	4,800	4,800	4,800	2,400
$EG_{PL,y}$	3,375,000	6,750,000	6,750,000	6,750,000	6,750,000	6,750,000	6,750,000	3,375,000
$EG_{facility,y}$	3,375,000	6,750,000	6,750,000	6,750,000	6,750,000	6,750,000	6,750,000	3,375,000

$EF_{grid,CM,y}$ = [] tCO_2/MWh [source]

[*Retrofit or replacement of an existing renewable energy power plant*]

If the project activity is the retrofit or replacement of an existing grid-connected renewable power plant, the baseline scenario is the continuation of the operation of the existing plant. The methodology uses historical electricity generation data to determine the electricity generation by the existing plant in the baseline scenario, assuming that the historical situation observed prior to the implementation of the project activity would continue.

The power generation of renewable energy projects can vary significantly from year to year, due to natural variations in the availability of the renewable source (e.g. varying rainfall, wind speed or solar radiation). The use of few historical years to establish the baseline electricity generation can therefore involve a significant uncertainty. The methodology addresses this uncertainty by adjusting the historical electricity generation by its standard deviation. This ensures that the baseline electricity generation is established in a conservative manner and that the calculated emission reductions are attributable to the project activity. Without this adjustment, the calculated emission reductions could mainly depend on the natural variability observed during the historical period rather than the effects of the project activity.

$EG_{PJ,y}$ is calculated as follows:

$$EG_{PJ,y} = EG_{facility,y} - (EG_{historical} + \sigma_{historical}); \textbf{ until DATE}_{\textbf{BaselineRetrofit}} \quad (3)$$

and

$$EG_{PJ,y} = 0; \textbf{ on/after DATE}_{\textbf{BaselineRetrofit}} \quad (4)$$

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EG_{facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y* (MWh/yr)

$EG_{historical}$ = Annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity (MWh/yr)

$\sigma_{historical}$ = Standard deviation of the annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity (MWh/yr)

$DATE_{BaselineRetrofit}$ = Point in time when the existing equipment would need to be replaced in the absence of the project activity (date)

$EG_{historical}$ is the annual average of historical net electricity generation, delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity. To determine $EG_{historical}$, project participants may choose between two historical periods. This allows some flexibility: the use of the longer time period may result in a lower standard deviation and the use of the shorter period may allow a better reflection of the (technical) circumstances observed during the more recent years.

Project participants may choose among the following two time spans of historical data to determine $EG_{historical}$:

(a) The five last calendar years prior to the implementation of the project activity; or

(b) The time period from the calendar year following $DATE_{hist}$, up to the last calendar year prior to the implementation of the project, as long as this time span includes at least five calendar years, where $DATE_{hist}$ is latest point in time between:

(i) The commercial commissioning of the plant/unit;

(ii) If applicable: the last capacity addition to the plant/unit; or

(iii) If applicable: the last retrofit of the plant/unit.

Result:

Table 5: Baseline emissions from electricity generation ($BE_{retrofit,CO2,y}$)

EGhistorical	[]	
SDhistorical	[]	
DATEBaselineRetrofit	[]	

Year								
BEretrofit,CO2,y	[]	[]	[]	[]	[]	[]	[]	[]
EGBL,retrofit,y	[]	[]	[]	[]	[]	[]	[]	[]
EGPJfacility,y	[]	[]	[]	[]	[]	[]	[]	[]
EGhistorical	[]	[]	[]	[]	[]	[]	[]	[]
SDhistorical	[]	[]	[]	[]	[]	[]	[]	[]
DATEBaselineRetrofit	[]	[]	[]	[]	[]	[]	[]	[]

$EF_{grid,CM,y}$ = [] tCO_2/MWh [source]

[*Capacity addition to an existing renewable energy power plant*]

In the case of hydro or geothermal power plants, the addition of a new power plant or unit may significantly affect the electricity generated by the existing plant(s) or unit(s). For example, a new hydro turbine installed at an existing dam may affect the power generation by the existing turbines. Therefore, the same approach as for retrofits and replacements is used for hydro power plants and geothermal power plants.

In the case of wind, solar, wave or tidal power plants, it is assumed that the addition of new capacity does not significantly affect the electricity generated by existing plant(s) or unit(s).[6] In this case, the electricity fed into the grid by the added power plant(s) or unit(s) could be directly metered and used to determine $EG_{PJ,y}$.

If the project activity is a capacity addition, project participants may use one of the following two options to determine $EG_{PJ,y}$:

Option 1: Use the approach applied to retrofits and replacements above. $EG_{facility,y}$ corresponds to the total electricity generation of the existing plant(s) or unit(s) and the added plant(s) or unit(s). A separate metering of electricity fed into the grid by the added plant(s) or unit(s) is not necessary under this option. This option may be applied to all renewable power projects.

Option 2: For wind, solar, wave or tidal power plant(s) or unit(s), the following approach can be used provided that the electricity fed into the grid by the added power plant(s) or unit(s) addition is separately metered:

$$EG_{PJ,y} = EG_{PJ\_Add,y} \quad (5)$$

Where:

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EG_{PJ\_Add,y}$ = Quantity of net electricity generation supplied to the grid in year *y* by the project plant/unit that has been added under the project activity (MWh/yr)

Project participants should document in the CDM-PDD which option is applied.

Calculation of $DATE_{BaselineRetrofit}$

In order to estimate the point in time when the existing equipment would need to be replaced/retrofitted in the absence of the project activity ($DATE_{BaselineRetrofit}$), project participants may take the following approaches into account:

(a) The typical average technical lifetime of the type equipment may be determined and documented, taking into account common practices in the sector and country, e.g. based on industry surveys, statistics, technical literature, etc.;

(b) The common practices of the responsible company regarding replacement/retrofitting schedules may be evaluated and documented, e.g. based on historical replacement/retrofitting records for similar equipment.

The point in time when the existing equipment would need to be replaced/retrofitted in the absence of the project activity should be chosen in a conservative manner, i.e. if a range is identified, the earliest date should be chosen.

[6] In this case of wind power capacity additions, some shadow effects can occur but are not accounted under this methodology.

Result:

Table 5: Baseline emissions from electricity generation ($BE_{retrofit,CO2,y}$)

EGhistorical	[]	
SDhistorical	[]	
DATEBaselineRetrofit	[]	

Year								
BEretrofit,CO2,y	[]	[]	[]	[]	[]	[]	[]	[]
EGBL,retrofit,y	[]	[]	[]	[]	[]	[]	[]	[]
EGPJfacility,y	[]	[]	[]	[]	[]	[]	[]	[]
EGhistorical	[]	[]	[]	[]	[]	[]	[]	[]
SDhistorical	[]	[]	[]	[]	[]	[]	[]	[]
DATEBaselineRetrofit	[]	[]	[]	[]	[]	[]	[]	[]

$EF_{grid,CM,y}$ = [] tCO_2/MWh [source]

Project Emissions

For most renewable power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y} \quad (6)$$

Where:

PE_y = Project emissions in year *y* (tCO_2e/yr)

$PE_{FF,y}$ = Project emissions from fossil fuel consumption in year *y* (tCO_2/yr)

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year *y* (tCO_2e/yr)

$PE_{HP,y}$ = Project emissions from water reservoirs of hydro power plants in year *y* (tCO_2e/yr)

[CPA name] is [technology type] and therefore [required project emission caluclations].

[*Fossil Fuel Combustion ($PE_{FF,y}$)*]

For geothermal and solar thermal projects, which also use fossil fuels for electricity generation, CO_2 emissions from the combustion of fossil fuels shall be accounted for as project emissions ($PE_{FF,y}$).

$PE_{FF,y}$ shall be calculated as per the latest version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

[*Emissions of non-condensable gases from the operation of geothermal power plants ($PE_{GP,y}$)*]

For geothermal project activities, the CME shall account fugitive emissions of carbon dioxide and methane due to release of non-condensable gases from produced steam. Non-condensable gases in geothermal reservoirs usually consist mainly of CO_2 and H_2S. They also contain a small quantity of hydrocarbons, including predominantly CH_4. In geothermal power projects, non-condensable gases flow with the steam into the power plant. A small proportion of the CO_2 is converted to carbonate/bicarbonate in the cooling water circuit. In addition, parts of the non-condensable gases are reinjected into the geothermal reservoir. However, as a conservative approach, this methodology assumes that all non-condensable gases entering the power plant are discharged to atmosphere via the cooling tower. Fugitive carbon dioxide and methane emissions due to well testing and well bleeding are not considered, as they are negligible.

$PE_{GP,y}$ is calculated as follows:

$$PE_{GP,y} = \left(w_{steam,CO2,y} + w_{steam,CH4,y} \cdot GWP_{CH4}\right) \cdot M_{steam,y} \quad (7)$$

Where:

$PE_{GP,y}$ = Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year *y* (tCO_2e/yr)

$w_{steam,CO2,y}$ = Average mass fraction of carbon dioxide in the produced steam in year *y* (tCO_2/t steam)

$w_{steam,CH4,y}$ = Average mass fraction of methane in the produced steam in year *y* (tCH_4/t steam)

GWP_{CH4} = Global warming potential of methane valid for the relevant commitment period (tCO_2e/tCH_4)

$M_{steam,y}$ = Quantity of steam produced in year *y* (t steam/yr)

[*Emissions from water reservoirs of hydro power plants ($PE_{HP,y}$)*]

For hydro power project activities that result in new reservoirs and hydro power project activities that result in the increase of existing reservoirs, project proponents shall account for CH_4 and CO_2 emissions from the reservoir, estimated as follows:

(a) If the power density of the project activity (*PD*) is greater than 4 W/m^2 and less than or equal to 10 W/m^2:

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000} \quad (8)$$

Where:

$PE_{HP,y}$ = Project emissions from water reservoirs (tCO_2e/yr)

EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year *y* ($kgCO_2e/MWh$)

TEG_y = Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y* (MWh)

(b) If the power density of the project activity (*PD*) is greater than 10 W/m^2:

$$PE_{HP,y} = 0 \qquad (9)$$

The power density of the project activity (*PD*) is calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}} \qquad (10)$$

Where:

PD = Power density of the project activity (W/m^2)

Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity (W)

Cap_{BL} = Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero

A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2)

A_{BL} = Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero

PE_y = []

B.5.3. Summary of the ex-ante estimation of emission reductions:

Table 6: Ex-ante estimation of emission reductions

Year	Estimation of project activity emissions	Estimation of baseline emissions	Estimation of leakage	Estimation of overall emission reductions
	(tonnes of CO_2e)	(tonnes of CO_2e)	(tonnes of CO_2e)	(tonnes of CO_2e)
Y1 (6 months)	[]	[]	0	[]
Y2	[]	[]	0	[]
Y3	[]	[]	0	[]
Y4	[]	[]	0	[]
Y5	[]	[]	0	[]
Y6	[]	[]	0	[]
Y7	[]	[]	0	[]
Y8 (6 months)	[]	[]	0	[]
Total estimated emissions and emission reductions in tonnes of CO2e	[]	[]	0	[]

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

The monitoring plan of [project name] is consistent with methodology ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (version []). A description of the monitoring plan is presented below.

1. Monitoring Plan Objective and Organisation

The project implementer will have overall responsibility to monitor the electricity delivered to the [country] grid by the project. Electricity generation is the main input variable for the calculation of emission reductions. The project implementer should report readings to the CME and [grid company] on a monthly basis, and the figures will be used for reporting emission reductions. At the end of each monitoring period the data from the monthly meter reading records will be added up to the net electricity generation and multiplied with the combined margin emission factor in a Microsoft Excel spreadsheet. Thus, the complete baseline calculations are always transparent and traceable.

The project implementer's personnel will be trained adequately for the task of meter reading. The data will be archived electronically and will be stored for 2 years after the end of the crediting period of the project. To ensure that the data is reliable and transparent, the project implementer will also establish Quality Assurance and Quality Control (QA/QC) measures to effectively control and manage data reading, recording, and auditing, as well as archiving data and all relevant documents.

[Objectives of Project Emissions monitoring]

2. Monitoring Data

The data to be monitored is the net electricity delivered to the [country] grid by the project. The monitoring of electricity delivered will be carried out as follows in compliance with an agreed Power Purchase Agreement (PPA).

[Insert details of monitoring system]

[Details of project emissions monitoring]

3. Quality Assurance and Quality Control

QA/QC procedures for recording, maintaining and archiving data shall be fully implemented as part of the project.

The location of the meters will be at [location]. The project implementer will implement QA/QC measures to calibrate and guarantee the accuracy of metering and the security of the project's data.

All testing should be carried out by qualified personnel using test equipment [details of requirements].

All readings shall be reported to the CME and [grid operator] and readings from main meter shall be primarily used. All data required for verification and issuance will be kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. The invoice documentation can be used to quality assure report.

The project implementer will ensure that its interconnection arrangements and agreements are in accordance with the [country] Grid Code. The project implementer shall deliver energy in accordance with the quality of supply standards of the [country] Grid Code as they apply to embedded generation, excepting any standards that the [regulator] may have provided exemption from.

[Details of project emissions monitoring QA/QC]

4. Verification of Monitoring Results

The project implementer, with the help of the CME will have the responsibility for providing the DOE with all necessary information, before, during and, in the event of queries, after the verification.

The parameters to be monitored are as follow:

Data / Parameter:	$EG_{PL,y}$
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*
Source of data to be used:	Project activity site, Electricity meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	

For capacity additions in wind and solar

Data / Parameter:	$EG_{PJ\ Add,y}$
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied to the grid in year y by the project plant/unit that has been added under the project activity
Source of data to be used:	Project activity site, electricity meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods	[]

and procedures to be applied:	
QA/QC procedures to be applied:	[]
Any comment:	

For geothermal projects

Data / Parameter:	$w_{steam,CO2,y}$
Data unit:	tCO_2/t steam
Description:	Average mass fraction of carbon dioxide in the produced steam in year *y*
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	

Data / Parameter:	$w_{steam,CH4,y}$
Data unit:	tCH_4/t steam
Description:	Average mass fraction of methane in the produced steam in year *y*
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	As per the procedures outlined for $w_{steam,CO2,y}$
Description of measurement methods and procedures to be applied:	As per the procedures outlined for $w_{steam,CO2,y}$
QA/QC procedures to be applied:	[]
Any comment:	

Data / Parameter:	$M_{steam,y}$
Data unit:	t steam/yr
Description:	Quantity of steam produced in year *y*
Source of data to be	Project activity site

used:	
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

For geothermal and solar thermal

Data / Parameter:	$PE_{FF,y}$
Data unit:	tCO_2/yr
Description:	Project emissions from fossil fuel consumption in year *y*
Source of data to be used:	[]
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
QA/QC procedures to be applied:	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Any comment:	

For hydro power projects resulting in reservoir

Data / Parameter:	TEG_y
Data unit:	MWh/yr
Description:	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y*
Source of data to be used:	Project activity site, Electricity meters
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods	[]

and procedures to be applied:	
QA/QC procedures to be applied:	[]
Any comment:	[]

Data / Parameter:	Cap_{PJ}
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data to be used:	Project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data to be used:	Project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

For geothermal and solar thermal where fossil fuel is used

Data / Parameter:	$FC_{i,j,y,}$
Data unit:	Mass or volume unit per year (e.g. ton/yr or m^3/yr)
Description:	Quantity of fuel type 'i' combusted in process 'j' during the year 'y' (volume unit)
Source of data to be used:	Onsite measurements
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

Data / Parameter:	$w_{Ci,y}$
Data unit:	tC / mass unit of the fuel
Description:	Weighted average mass fraction of carbon in fuel type *i* in year *y*
Source of data to be used:	Project site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

Data / Parameter:	$\rho_{i,y}$
Data unit:	Mass unit / volume unit
Description:	Weighted average density of fuel type *i* in year *y*
Source of data to be used:	[]
Value of data applied for the purpose of calculating expected	[]

emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ per mass or volume unit
Description:	Weighted average net calorific value of the fuel type 'i' in year 'y'
Source of data to be used:	[]
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	tCO2 / GJ
Description:	Weighted average CO2 emission factor of fuel type *i* in year *y*
Source of data to be used:	[]
Value of data applied for the purpose of calculating expected emission reductions in section B.5	[]
Description of measurement methods and procedures to be applied:	[]
QA/QC procedures to be applied:	[]
Any comment:	[]

SECTION C. Environmental analysis

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

Local and specific impacts of each hydropower project (depending on its location, capacity, and required construction) justify a separate environmental assessment for each project. An environmental analysis will therefore be conducted for each hydropower plant included in a CPA according to the applicable national environmental policies at the time of inclusion of the CPA into the PoA.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

[description of environmental impacts]

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

[At the date of registration of the proposed PoA, the rules governing Environmental Impact Assessments in [country] are detailed as follows:

Burundi
EIA is required by law[7], the institution responsible for the EIA is the Ministry of Urban Planning, Tourism and Environment.

Kenya
EIA is required by law[8], as advised by the National Environment Management Authority (NEMA) that was established under the Environmental Management and Coordination Act (EMCA) No. 8 of 1999, as the principal instrument of government in the implementation of all policies relating to the environment.

Rwanda
EIA is required by law[9], as advised by the Rwanda Environment Management Authority (REMA).

Sudan
No legalization or institutionalisation of EIAs has taken place.

[7] http://www.unep.org/biosafety/files/BINBFrepEN.pdf

[8] http://www.nema.go.ke/index.php?option=com_content&task=view&id=47&Itemid=55

[9] http://rwanda.e-regulations.org/show-step.asp?l=en&mid=72&rid=358

Tanzania
EIA is required by law, as advised by [10] the National Environment Management Council (NEMC) that came into being in 1983 when the Government of Tanzania enacted the National Environment Management Act No. 19 of 1983.

Uganda
In terms of Uganda's National Environment Act of 19 May, 1995, an EIA is required by law where, the Executive Director of the National Environment Management Authority (NEMA), in consultation with a lead agency, is of the view that the project:
(a) may have an impact on the environment;
(b) is likely to have a significant impact on the environment; or
(c) will have a significant impact on the environment.]

SECTION D. Stakeholders' comments

>>

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

Local and specific impacts of each hydropower project (depending on its location, capacity, and required construction) justify a local stakeholder consultation (LSC) at CPA level.

D.2. Brief description how comments by local stakeholders have been invited and compiled:

[The following is an idealised scenario for what will be done for each local CDM stakeholder consultation:

1. Documents to be prepared:
A. Non-technical summary of the project activity (including environmental and social impacts)
B. Attendance list (name, profession, relation to the project, contact, signature)

2. Stakeholders to be invited:
A list of stakeholders to be invited will be compiled and kept for reference.
The attendance list (1.B above) shall be submitted to the validator as part of the PDD.
An explanation will be given as to which stakeholder(s) were invited and for what reasons.

3. Invitation procedure and publicity:
An invitation for comments by local stakeholders shall be made in an open and transparent manner, in a way that facilitates comments to be received from local stakeholders and allows for a reasonable time for comments to be submitted.

[10] http://www.nemctan.org/eiaguide.htm

The identified stakeholders shall be invited by post, email, face-to-face or fax. Hard copies of invitations (including copies of emails) will be kept for reference. Invitations shall be sent at least two weeks prior to the meeting. The invitation letter will contain a brief description of the purpose of the meeting, the time, date and the location of the meeting and should provide a postal or email contact address for written comments. The non-technical project description (1.A above) shall be attached to the invitation.

4. Public meeting:
The following meeting structure is recommended:

- Opening (5 min)
- Purpose of the consultation (5 min)
- Description of project and environmental/socio-economic impacts (20 min)
- Answering of questions (30 min)
- General feedback (15 min)

5. Documentation of meeting:
The following documents will be collected during the meeting:
Attendance list (1.B); comments received; and photographs/videos.

6. Meeting Report:
A meeting report will be compiled and a summary of the comments received will be included in the PDD (under Section E.2.) and an explanation as to how the received comments have been taken into account will also be included (under Section E.3).]

D.3. Summary of the comments received:

[insert comments received]

D.4. Report on how due account was taken of any comments received:

[insert report on actions taken]

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE CPA

Organization:	[]
Street/P.O.Box:	[]
Building:	[]
City:	[]
State/Region:	
Postfix/ZIP:	[]
Country:	[]
Telephone:	[]
FAX:	[]
E-Mail:	[]
URL:	
Represented by:	[]
Title:	[]
Salutation:	[]
Last Name:	[]
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	[]

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

[information on public funding.]

Annex 3

BASELINE INFORMATION

[baseline information]

Annex 4

MONITORING INFORMATION

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