Programme of activities design document form
(Version 09.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title of the PoA	KTDA Small Hydro Programme of Activities
Version number of the PoA-DD	8.0
Completion date of the PoA-DD	20/08/2020
Coordinating/managing entity	KTDA Power Company
Host Parties	Republic of Kenya
Applied methodologies and standardized baselines	AMS-I.F Version 3 Renewable electricity generation for captive use and mini-grid
Sectoral scopes linked to the applied methodologies	1 – Energy Industries (renewable- / non-renewable sources)

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

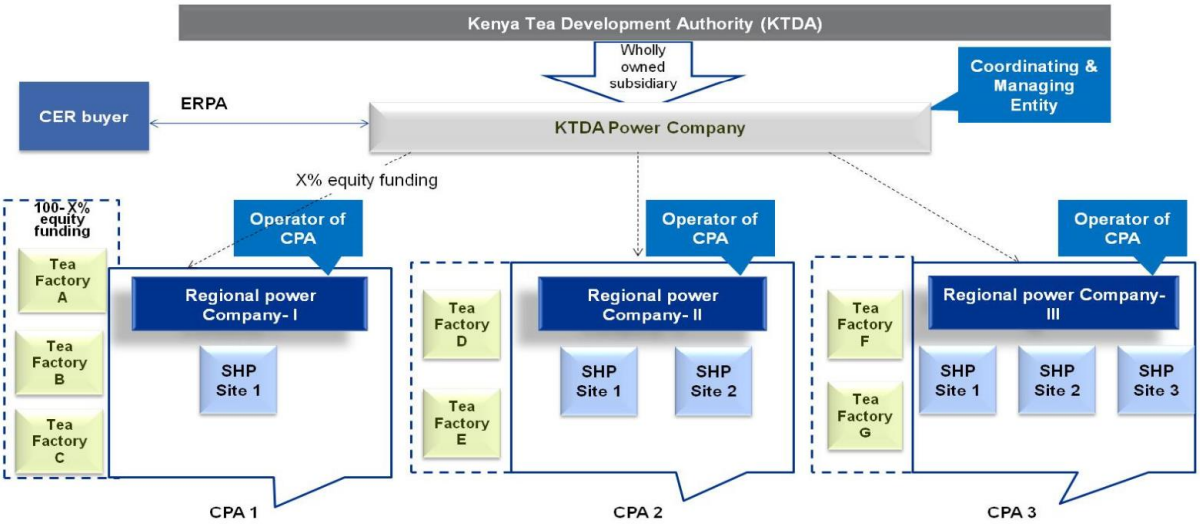
A.1. Purpose and general description of PoA

1. General operating and implementing framework of PoA

The Kenya Tea Development Agency Holdings Limited (KTDA) is the single largest producer and exporter of tea in Kenya, accounting for 28% of Kenya's export earnings, and is also the second largest exporter of black tea in the world. KTDA in collaboration with a number of tea factories under its management is planning the implementation of a number of small scale (≤15 MW) run of the river hydro power projects at various locations in Kenya. KTDA has established the KTDA Power Company (KTPC) as a wholly owned subsidiary of KTDA to manage the implementation of the proposed schemes. KTPC will be the Coordinating / Managing Entity (CME) and will have the following responsibilities with respect to the implementation of the proposed PoA:

− Creating PoA documentation (the CDM-POA-DD and CDM-CPA-DD)
− Obtaining a Letter of Authorisation from the host country
− Obtaining a Letter of Approval from the host country
− Coordinating and communicating with the validator and the EB
− Drafting monitoring reports for all CPAs in accordance with the methodology outlined in the POA DD
− Requesting the UNFCCC to issue CERs into a registry account of the CER buyer(s)

The individual projects will be fully owned by Regional Power Companies (RPC), which, in turn, will be owned by KTPC and one or more Tea Factories under management of KTPC. Same RPC can own one or more individual projects depending upon the location and ownership. KTPC will enter into agreements with the RPCs stipulating that the latter cede all rights over the CERs to KTPC, evidenced through a contract. The overall structure of the proposed scheme is given in the figure below:



In accordance with the scheme, an individual CPA can comprise of a single project or a combination of projects bundles together with an overall capacity not exceeding 15 MW at any time during the crediting period.

2. Policy/measure or stated goal of the PoA

The purpose of the proposed PoA is the generation of electricity by utilizing the hydro power potential in the region. The electricity generated through individual project activities will displace grid electricity consumption at the user end with any excess supplied to the national grid. The tea factory owners have thus taken this initiative to jointly implement run of the river small hydro project activities in order to effectively utilize the hydro power generation potential in the existing water bodies. At present, the tea factories have been buying

electricity from the national grid through the Kenya Power and Lighting Company (KPLC). The project activities will thus lead to emission reductions by replacing electricity that would have otherwise been supplied by thermal power plants connected to the Kenyan grid.

Kenya is currently in an energy deficit position both for commercial and non-commercial energy. The electrification ratio in Kenya is low with only 20% of the population having access to electricity and a per capita consumption of 130 kWh against 550 kWh on average for Sub-Saharan Africa. Outside the main centres, access to electricity is much lower, 7-8%, with low reliability in some areas[1].While large-scale hydropower development is becoming a challenge in Kenya due to environmental and socio-economic concerns and vulnerability to climate change, small hydropower development can serve as a critical part of the solution towards bridging the demand supply gap and meeting the electricity needs of the country. Further, small scale hydro projects in diversified river basins can also reduce the dependence on the fork dams which account for majority of the country's current hydro power capacity. Since small and micro hydro plans are disbursed over a larger geographical area, as opposed to the forks dams, they reduce the susceptibility of the country to major fluctuations in power supply in the event of depressed rainfall in any particular region. Further, the environmental impacts of small/micro hydro plants are minimal through the use of "run-of-the-river" schemes in which no dam or reservoir storage is involved. Thus, minimal interference with natural habitats and productive farmlands, and no relocation of people is necessary since no large reservoirs are required. This will ensure environmental sustainability and acceptance of small hydro projects by the communities.

However, small hydro power schemes are plagued by number of barriers which hinders their development, of which, the impact of poverty is significant in limiting the country's capacity to develop local resources. Some of the factors which limit large scale implementation of small hydro projects in the country are:

- Lack of access to appropriate technologies in the small hydro categories- Due to small heads and high volumes or very high heads and low volumes, these schemes pose special technical challenges.

- Lack of infrastructure for manufacturing, installation and operation. Kenya suffers from the lack of facilities to manufacture turbines or parts that might be critical in maintenance of the small hydro schemes.

- Lack of local capacity to design and develop small hydropower schemes for areas sometimes considered too remote- The country lacks specialisation to undertake feasibility studies that would include detailed design and costing of the schemes to make a meaningful impact on utilisation of small hydro sites.

The PoA, through its successful implementation, would serve as a model for investors and result in perception changes that are critical to expanding the use of small hydro in Kenya. The availability of CER revenue would further provide impetus towards utilisation of small hydro potential of the country by attracting investment from the tea factories. Further, the establishment of a market for investing in small hydro power projects, would significantly impact building of capacity to manufacture system components domestically and lead to value creation and availability of job opportunities in the region.

Through the provision of a clean source of electricity in a country where less than 20% of the population has access to electricity[2], it is expected that all the projects will have a positive contribution to the achievement of MDG Goal 7: Ensure environmental sustainability. The project is also consistent with the objectives of the Kenyan National Task Force on Accelerated Development of Green Energy to install 2000 MW of additional power generation by June 2012.

As per "Kenya National Guidelines on the Clean Development Mechanism (CDM)[3]", CDM projects must demonstrate firm and tangible contribution to sustainable development- *"In elaborating the contents of CDM projects based on the stated purpose of CDM (Art.12.2, Kyoto Protocol) and in accordance with agreed criteria, the following potential benefits will accrue to Kenya:*

[1] https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/KENYA%20-Power%20Transmission%20System%20Improvement%20Project.pdf

[2] http://www.electricalmonitor.com/ArticleDetails.aspx?aid=820&sid=9

[3] https://www.nema.go.ke/images/Docs/Guidelines/CDM%20Guidelines%20kyoto%20protocol.pdf

- *Job creation;*
- *Poverty reduction;*
- *Increased investment capital, over and above ODA;*
- *Enhanced diffusion of environmentally cleaner technologies."*

Thus, in a Component Project Activity Design Document CPA DD, the sustainable development benefits would need to be demonstrated for the above impacts. A typical CPA in the PoA is expected to contribute to sustainable development in the following manner:

Job Creation

- The PoA will increase employment opportunities in the area where the CPAs are located, which will increase the income of the local community.
- Especially during civil works, small hydro power projects are expected to generate considerable employment opportunities for the local population.

Poverty reduction

- The CPAs, by providing employment in the construction as well as operation phase of the project, will contribute to poverty reduction by empowering the local population.
- Further, the PoA will generate demand for various kinds of related services, which would generate employment on regular and permanent basis and help alleviate poverty.

Increased investment capital, over and above ODA

- The PoA does not lead to divergence of any Official Development Assistance (ODA) funding. Therefore, it will be ensured that all investments that take place in the various CPAs would be sans ODA.
- The PoA will promote the sustainable development of the area falling under each CPA by promoting local investment and business environment, and thereby improving the local economy.
- The PoA will reduce lead time and transaction costs associated with CDM for potential investors in future CPAs, thereby making the proposed renewable power generation activity more attractive to sources of capital or equity.
- CERs revenue generated by the first few CPAs can be a potential capital source for future CPAs at early initial stages.
- The PoA generates demand for local products when spare parts are needed, leading to promotion of business activities.

Enhanced diffusion of environmentally cleaner technologies

- The PoA will support the development of hydropower resources in remote regions of the host country, which may not have been supplied electricity from the national grid in absence of the PoA, thereby promoting grid connectivity and providing access to power for populations that are socially disadvantaged.
- The PoA would support transfer of technology and technical know-how from other regions or other countries.
- Small hydro is considered more environmentally friendly since it avoids the significant environmental impacts associated with large-scale hydro, including loss of habitat, change in water quality and siltation.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.
The implementation of small hydro power projects is not mandatory in the Republic of Kenya. The proposed PoA is a voluntary initiative conceived by KTPC (with no direct or indirect mandate by law) with the intent to support the objective of small hydro power development in the country.

A.2. Physical/geographical boundary of PoA

The geographical boundary of the PoA extends up to the physical boundary of the Republic of Kenya.

A.3. Technologies/measures

The project is in accordance with the following small-scale project category:

Project type: Type I - renewable energy project activities with a maximum output capacity equivalent to up to 15 megawatts (or an appropriate equivalent**)**

Category: I.F - Renewable electricity generation for captive use and mini-grid

Reference: AMS I.F, Version 3

The SSC CPA proposed to be employed under the PoA will be one or several run of the river hydro power scheme(s) without reservoir having a total installed capacities ≤ 15 MW (sum of the capacity of all turbines implemented as a part of the project). The electricity generated by the project will displace grid electricity consumption at the user end, with any excess supplied to the Kenyan National Grid. The technical details including major civil works and equipment installed will be detailed in the individual CPA DD.

A.4. Coordinating/managing entity

The coordinating/managing entity of the PoA is the KTDA Power Company (KTPC), a wholly owned subsidiary of KTDA. KTDA and KTPC are both limited liability companies incorporated in Kenya.

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Kenya (Host Country)	Managing Entity: KTDA Power Company (Private Entity)	No

A.6. Public funding of PoA

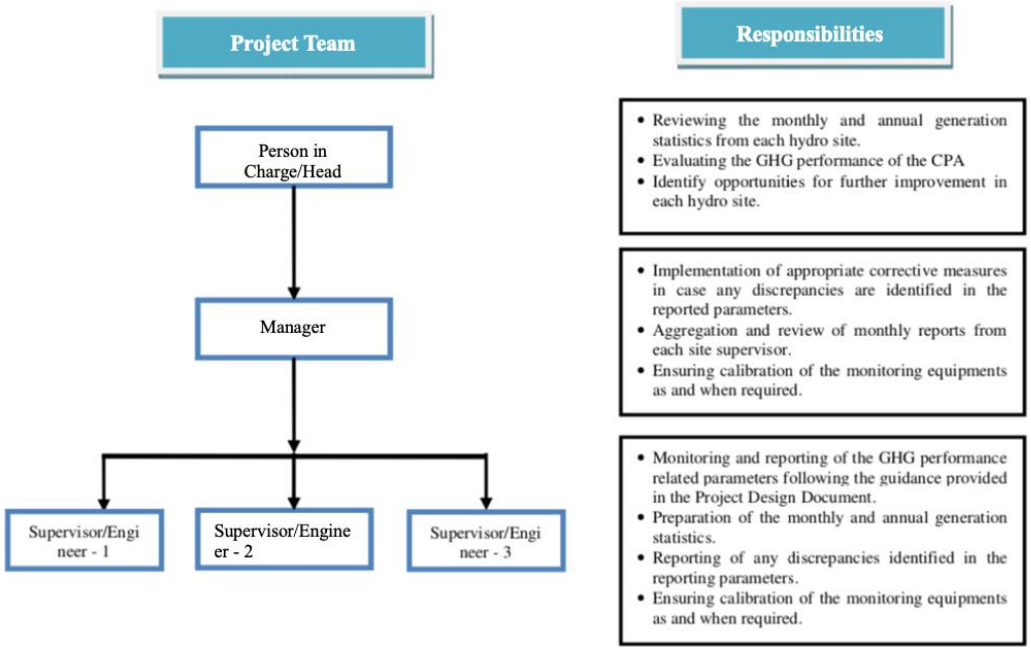
There is no public funding involved in the proposed PoA. The required funds would be raised through various financial institutions and in-house funding. KTPC would ensure that there would be no divergence of Official Development Assistance (ODA) in any of the CPAs under PoA. This would be confirmed through undertaking / declaration from the CPA owner submitted to KTPC.

SECTION B. Management system

The PoA will be monitored at three different levels i.e. individual hydro power site, individual CPA and at the CME level. The operational and management arrangements to be established at the CME level are described in this section, and the arrangements/structure to be established at the CPA and site level are described in section E.7.2.

a. Roles and Responsibilities for Inclusion of CPAs

The authority and responsibility of project management as well as monitoring, measurement and reporting will rest with the individual CPA owner. At the CPA level, a Project Team will be formulated to ensure proper and continuous monitoring of the performance of turbines and generation of power. The operation and management structure that will be implemented by the CPA owners for the purpose of monitoring the CPA is illustrated below:



The structure above is maintained for the inclusion of CPAs. The Head will provide an overview of the documentation required for development of the CPA DD and communicate the list of needs to the Manager who will, in turn, work with the supervisors and engineers to collect the necessary information. The Manager will review the data prior to submission to the Head. The Head will ensure the documentation is accurate and the proposed project meets the requirements to be included under the PoA as a CPA. The CPA DD will be development by the Head, with support from the CME. The engineers/supervisors and Manager will be technical experts in renewable energy or hydro power facilities. The Head will be knowledgeable of power facilities as well as the CDM or rely on a consultant to provide guidance.

b. Training and Capacity Development

Trainings will be on the following aspects of equipment involved in the Project activity – start up techniques, operation, maintenance, monitoring of parameters, precautions, safety instructions and emergency preparedness etc. The following procedure will be followed for training:

- A copy of Operation and Maintenance manual, Safety instructions related to the equipment involved in the Project activity will be made available to all employees involved in the Project.
- During commissioning of the new equipments (of the Project activity), training on all above aspects to all employees involved in the Project activity will be provided.
- Whenever an employee handles the equipments involved in the Project activity first time, training will be provided to him on start up techniques, operation, maintenance, monitoring of parameters, precautions, safety instructions and emergency preparedness etc.
- The training will be provided by respective equipment supplier and expert O & M personnel of the company.

CDM capacity development for the CME will be conducted by external CDM experts. This will ensure that the CME is prepared for the responsibilities with respect to the implementation of the proposed PoA.

c. Technical Review of Inclusion of CPAs

The CME will review the CPA DD and supporting documentation submitted by, or developed alongside, the CPA Implementer. The CME will have the team managing the operations of other CPAs review the documentation to ensure the information is accurate and meets the requirements of the PoA. The CME may rely on external experts to review the documentation if necessary.

d. A system/procedure to avoid double counting

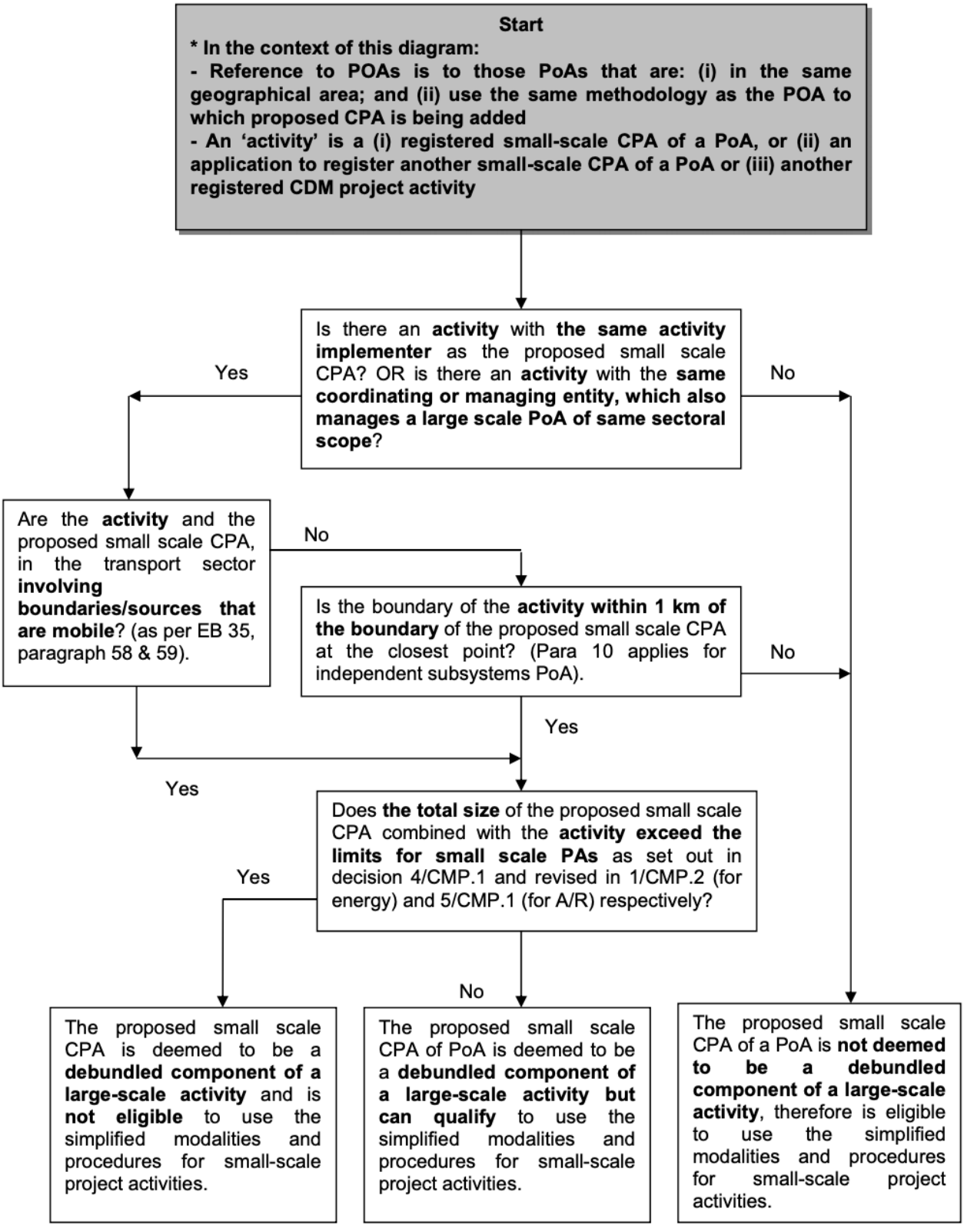
KTPC will confirm as per EB 55 Annex 38 Paragraph 6(i), that the project activities included in the SSC- CPA are not registered in any other SSC CPA of the PoA or any other registered CDM Project activity through following procedure to avoid double counting of CPA under any other CDM or PoA activity:

- At time of CPA eligibility check, KTPC will seek confirmation in SSC-CPA and also check any double counting using public information sources like UNFCCC website data, UNEP Risoe cd4cdm data, VCS website etc.
- At the time of inclusion KTPC shall obtain a declaration from the CPA operator that "there is no double counting of CERs from this CPA under any CDM Project or CPA in another PoA", along with the following undertakings:-
    - The CPA has not been and will not be registered as a single CDM project activity nor as a CPA under another PoA.
    - The implementing entity is aware that the CPA will be subscribed to the present PoA.
    - The implementing entity cedes its rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC to KTPC.

The SSC CPA included in the PoA is not a debundled component of another CDM Programme Activity or another CDM Project activity:

To demonstrate that the SSC CPA included in the PoA is not a debundled component of another CDM Programme Activity or another CDM Project activity, the following approach shall be applied as per the TOOL20 Assessment of debundling for small-scale project activities Version 04.0[4]:

[4] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf/history_view



Following paragraph 15 of TOOL20, a proposed CPA is deemed to be a debundled component of a large-scale activity if there is already an activity that satisfies both of the following conditions:

a) Has the same activity implementer as the proposed small scale CPA or has a Coordinating or Managing entity, which also manages a large scale PoA of the same technology/measure, and;

b) The boundary is within 1 km of the boundary of the proposed small-scale CPA, at the closest point.

KTPC will follow the guidance provided above, in order to avoid registering a SSC CPA that is a de- bundled

component of another CPA or CDM Project.

In relation to the paragraph 15 of TOOL20, if a proposed CPA does not satisfy both the condition a) & b) above, the proposed small scale CPA of a PoA is not deemed to be debundled component of a large-scale activity, and therefore is eligible to use the simplified modalities and procedures for small-scale Project activities. However, if a proposed CPA satisfies above conditions and the total size of the SSC CPA does not exceed the limit for SSC Project activity, the proposed small scale CPA of a PoA is deemed to be debundled component of a large-scale activity but can qualify to use the simplified modalities and procedures for small-scale Project activities.

In relation to paragraph 15, the proposed CPA will be included if the total size of such a CPA combined with the registered small-scale CPA of a PoA or a registered CDM Project activity does not exceed the limits for small-scale CDM Project activity.

e. Record Keeping System for each CPA

A record keeping system will be established by KTPC which would comprise of the following details for enabling unique identification for each CPA:

1. Name of the Regional Power Company (RPC) implementing the project
2. Shareholding pattern of the RPC describing the ownership information of the respective tea factories
3. Exact Location: City/Town/Village, State/Province
4. GPS coordinates (latitude and longitude)
5. Commissioning Details of each unit
6. The record of technical specification of each hydropower plant participating in the SSC-PoA
7. Roles and responsibilities for audit and verification of monitored parameters

A record keeping system will be established by each CPA operator and additionally manual data recording will be carried out in the plant log books. The data monitoring will primarily include the measurement of electricity generated, which displaced electricity used in the baseline in each CPA. The entity responsible for monitoring of CPA i.e. CPA operator, will prepare a report with the monthly records of electricity exported to and imported from the grid, gross electricity generation, transmission/transformation losses and auxiliary consumption. The CPA operator will also carry out a monthly analysis of data for the individual project and in case of any anomalies will take appropriate corrective actions. The review report will be submitted to KTPC. KTPC will maintain a record of this data which will subsequently be provided to the DOE during the verification process. Detailed description of the procedures to be followed by each CPA for monitoring and record keeping of data is provided in section E.7.2.

f. Measures for continuous improvements of the PoA management system

KTPC will continuously evaluate the management system of the PoA through clear and regular communication within the CME team and between the CME and CPA implementers. The trainings and capacity development described earlier will ensure improvement of the system as well.

SECTION C. Demonstration of additionality of PoA

The PoA has been revised for Crediting Period Renewal. The demonstration of additionality below is from the original PoA-DD at the time of registration.

The information presented here shall constitute the demonstration of additionality on the PoA level. The PoA follows Methodological Tool 21 Demonstration of additionality of small-scale project activities for the demonstration of additionality Version 12, as the methodology implemented under the PoA is a small-scale methodology and each CPA will be within the small-scale size limit of 15 MW of installed capacity.

The following is demonstrated in this section:

(i) The proposed PoA is a voluntary coordinated action

(ii) The proposed project activity would not be implemented in the absence of the PoA

(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced

(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation

(i) The proposed PoA is a voluntary coordinated action

The implementation of small hydro power projects is not mandatory in the Republic of Kenya. The Electric Power Act, 1997[5] does not restrict or empower any authority to restrict the fuel choice. The proposed PoA is a voluntary initiative conceived by KTDA to enable individual tea factories under its management to implement small hydro power projects. No obligation exists for the tea factories to utilize or develop run-of-river small/micro hydropower projects. The PoA has been conceived as an enabler to support the objective of small hydro power development in the country. The proposed SSC-PoA can therefore be regarded as a voluntary coordinated action.

In 1997, Kenya's Electric Power Act allowed independent power producers to supply electricity to the grid, but small decentralized schemes, such as hydropower plants <10 MW[6] were not fully addressed[7]. Although prior to the 1960s hydropower plants <10 MW were used for other purposes, mainly aimed at supplying mechanical power for agro-processing activities such as grain mills, however, these out-dated systems were quickly outpaced by the diesel engine for milling grain. Even though today, improved technology can make plants <10 MW economically viable in many situations, but the country lacks the infrastructure for production and installation of these small systems, or for repair of systems once they are installed. In addition, there are no standards or other policies to encourage and enable local investors to take advantage of this renewable and environmentally benign source of power. This is demonstrated by the fact that two major studies on potential SHP sites were carried out in 1979 and 1982. In the 1979 study, 11 out of 52 identified sites were recommended for more detailed research and 8 out of 39 identified sites in the 1982 studies. However, none of these recommended sites could be developed[8].

In March 2008, a feed-in-tariffs policy (FiT) on small-hydro resource generated electricity was introduced post an assessment of small hydro resource potential carried out by the Ministry of Energy which indicated that there are suitable sites for small hydro power development in the country. However, it was also recognised that substantial investments are needed to proceed further and attract private sector capital towards small hydro resource electricity generation.

Till date, only one <10 MW hydro demonstration pilot project of Imenti Tea Factory in Meru (Imenti Mini-hydro Power Plant), which was completed in December 2009 is operational under the FiT scheme of the country. This pilot project was developed by small scale tea farmers of Imenti Tea Factory who entered into a Power Purchase Agreement with the national distributor, Kenya Power and Lighting Company (KPLC). This demonstration small hydro power plant was instrumental in highlighting the limitations and barriers faced by investors which makes it complicated for the private sector to invest in small hydro power in the country and avail of this scheme. So far, no other private sector participant has commissioned an Independent Power Plant and signed a Power Purchase Agreement under this scheme despite the push provided by the government in terms of policy interventions. Thus, targets for small hydro power development have not advanced, and the commercial capacity addition remains at a standstill since 1958 when a 2MW Gogo Falls plant was added.

In this respect, the PoA is expected to provide strong incentive to potential investors leading to systematic implementation of government policy supporting small hydro power development in the country.

(ii) The proposed project activity would not be implemented in the absence of the PoA

In order to facilitate better understanding of the situation of small hydro power projects in Kenya and the

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[5] http://www.erc.go.ke/epa.pdf

[6] The definition of small hydro in Kenya is limited to stations having a capacity of below 10 MW

[7] Community Action to address Climate Change: Case studies linking sustainable energy use with improved livelihoods - Page 9, Case Study: Affecting Electricity Policy through a community micro hydro project, Kenya (http://sgp.undp.org/download/SGPCaseStudiesBook.complete.pdf)

[8] Independent Thematic Review- UNIDO Projects for the Promotion of Small Hydro Power for Productive Use (http://www.unido.org/fileadmin/user_media/About_UNIDO/Evaluation/Project_reports/e-book_small-hydro.PDF)

reason for low penetration of small hydropower, an overview of the barriers faced by these kinds of projects is being provided below. In accordance with Methodical tool: Demonstration of additionality of small-scale project activities Version 12, additionality is demonstrated by showing that the PoA would not have occurred anyway due to at least one of the following barriers:

(a) Investment barrier

(b) Technological barrier

(c) Barrier due to prevailing practice

(d) Other barriers

The barriers identified for the proposed PoA are as follows:

Prevailing Practice barrier

The hydro potential of Kenya with capacity of less than 10MW[9]yr is estimated at 3,000MW, of which it is estimated that less than 30MW have been exploited and only 15MW[10] capacity supplies to the grid. Small hydro (inclusive of mini and micro-hydro) contributes to around 1% of the electricity generation capacity of the country and thus faces prevailing practice barrier. Fossil fuel based thermal energy generation contributes to 32.5%. The high installation cost averaging US$ 2,500 per KW, inadequate hydrological data, effects of climate change, limited local capacity to manufacture small hydro power components have combined to impede exploitation of hydro-electricity from capacities of less than 10 MW. The following table compares the installed capacity of hydro < 15MW (in accordance with CDM SSC Guidelines) with respect to other power generation sources[11] by providing a summary of national electricity percentage by each energy source category.

Category	Capacity Installed (MW)	Proportion	Effective Capacity (MW)	Proportion
Thermal (Fossil)	525	34.3%	448	31.4%
Off Grid (Fossil)	18	1.2%	15.6	1.1%
Large Hydro	749	48.5%	732.2	51.2%
Hydro[14] <15MW	**15.3**	**1%**	**12.8**	**0.9%**
Geothermal	198	12.9%	189	13.2%
Cogeneration (Biomass)	26	1.7%	26	1.8%
Wind	5.1	0.3%	5.1	0.4%
Solar	0	0%	0	0%
	1,537	100%	1,429	100%

Source – Least Cost Power Development Plan 2011-2031

Under the Least Cost Power Development Plan (LCPDP) Study Period 2010-2030, the electricity demand of the country is forecasted to grow by an average rate of 14% increasing from a capacity and energy level of

[9] The definition of small hydro in Kenya is limited to stations having a capacity of below 10 MW. However, for the purpose of illustration of contribution to the national electricity generation by small hydro power, the capacity of hydro power projects up to 15 MW (in accordance with CDM SSC Guidelines) has been considered under the small hydro category.

[10] http://www.energy.go.ke/wp-content/uploads/2010/08/Updated%20%20SREP%20Draft%20Investment%20Plan-May%202011.pdf

[11] Least Cost Power Development Plan 2011-2031 - http://www.erc.go.ke/erc/LCPDP.pdf

[12] The definition of small hydro in Kenya is limited to stations having a capacity of below 10 MW. However, for the purpose of illustration of contribution to the national electricity generation by small hydro power, the capacity of hydro power projects up to 15 MW (in accordance with CDM SSC Guidelines) has been considered under the small hydro category.

1,205MW and 7,391GWh in 2009 to 15,065MW and 92,380 GWh by 2030 respectively. There are committed power generation projects under construction providing an extra 1,450 MW by 2013; and the period to 2030 would have added 13,370 MW comprising of 4,480 MW geothermal, 3,900 MW new coal units, 4,200 MW nuclear, 320 MW new medium speed diesel units and 270 MW of new gas turbines[13]. Thus, there is substantially greater thrust on fossil fuel, nuclear and geothermal based generation sources in the future.

In contrast to small hydro power generation, the implementation of a fossil fuel based power generation projects, like diesel plants, are less afflicted by barriers considering a number of fossil fuel based power generation projects, have already been implemented in Kenya. This indicates that fossil fuel based power plants in general and diesel plants in particular are prevailing practice in Kenya. Further, given the experience with fossil fuel based power plants in Kenya, and because the investment cost for renewable energy projects are typically higher, it can be argued that fossil fuel based power projects are less affected by the access to capital barrier as well. It is a well established fact that renewable energy projects have high upfront investment costs but low operating costs. However, in Kenya, the advantage of having low operating costs is nullified because the cost of fuel is transferred directly to the consumer through the Fuel Cost Charge on the electricity bill in accordance with the 2008 Schedule of Tariffs for Supply of Electricity by the Kenya Power and Lighting Company Limited Set by the Energy Regulatory Commission under Powers Conferred under Section 45 of the Energy Act, 2006. Since the cost of fuel can be transferred to the consumer, a fossil fuel based power plant in Kenya does not only have the benefit of lower perceived risks and lower upfront investment, but can also benefit from the fact that the fuel cost charge is compensating for potentially high operating costs.

The prevailing practice in Kenya was analysed and similar project activities were defined as those that rely on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing etc. Therefore, the following criteria were used to define projects that can be considered similar to the proposed project activities:

Grid-connected hydro power projects: Only grid-connected hydro power projects can be considered in the analysis. A fully captive hydro power project has a different investment climate as compared to the project offsetting its use of grid power and selling excess output to the grid.

Projects implemented by private project developers: Projects that are implemented by the government through public companies have a different investment climate. Such projects are implemented as part of the development plan of the country with an objective of welfare of the community and providing basic infrastructure. On the other hand, private investors have the objective of providing adequate returns to their investors and shareholders. Therefore, the investment climate as well as access to finance is quite different for private and public developers.

Projects with installed capacity less than 15 MW: The proposed project activities under the PoA are small scale projects and therefore project activities with installed capacity more than 15 MW i.e. large scale projects are excluded. *Projects operational at the time of investment decision*: Only those projects were compared to the proposed project activity which were under operation prior to the decision to proceed with the project activity was taken by the developers.

Therefore, similar project activities are being considered as project activities that are grid-connected, small scale in nature, set up by a private investor in the host country (Kenya) and were under operation at the time when the decision to proceed with the project activity was undertaken.

The list of all the operational grid connected hydropower plants in Kenya is provided below:

[13] http://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/KENYA%20-Power%20Transmission%20System%20Improvement%20Project.pdf

Power Plant	Capacity (MW)
Gitaru Power Station	225
Kiambere Power Station	164
Turkwel Power Station	106
Kamburu Power Station	94.2
Sondu Miriu Power Station	60
Kindaruma Power Station	40
Masinga Power Station	40
Tana Power Station	20
Small Hydro Power Stations	14.7
IPP- Imenti Power Station (small hydro)	0.6
TOTAL	**764.5**

Source: Kenya Power and Lighting Company (KPLC)[14]

It can be observed that of the total hydropower installed capacity of 764.5 MW in the country, 749.2 MW or about 98% consists of large hydropower plants that are more than 15 MW capacities.

Further, all but one of these power plants is being operated by KenGen which is a public company with the Government of Kenya owning 70% shareholding and the public 30%[15]. With such a large stake of the government in operation of these power plants, the investment climate of these projects cannot be compared with that for private tea factory owners who would be setting up the proposed project activities. The government has an obligation to operate these power plants since it has to meet the growing energy demand in the country. Most of these plants have been operating for a very long time and are therefore nearing the end of their lifetime. However, even if these plants were to run into losses at any point of time, they have the backing of the government to bail them out.

The same cannot be said to be true for private project developers. Small hydro power projects are severely affected by the seasonal variations in river flow. Further, local expertise in manufacture of small hydropower components like turbines and electronic load controllers is also not available. In case of failure or operational problems, the developers would have to bear a considerable loss of time and money leading to losses[16]. CDM revenues thus become essential for the private developers in order to ensure viability of the projects.

Only the plant at the Imenti Tea Factory, mentioned above, which was undertaken as a pilot demonstration project with an installed capacity of only 600 kW is owned privately and has been instrumental in gaining experience and highlighting the barriers faced by mini hydro projects in the country.[17] Hence, it can be concluded that the existing hydro power plants <5 MW represent only 0.9% of total electricity generation capacities installed in Kenya or 0.44% of the total installed capacity of 764.5 MW and are therefore not prevailing practice.

A buyer of the credits for the first CPAs has already been selected to provide continuous revenue flows for the CERs generated in these CPAs. These revenues provide the incentive for the CME to start the implementation of a hydro power scheme in Kenya, thus alleviating the existing prevailing practice barrier and increasing the share of small-scale hydro power technology in the country.

Investment Barrier

One of the most significant barriers to developing small hydro projects in Kenya is difficulty in securing financing. Kenya does not have strong financial institution for long-term borrowing which creates a lack of

[14] http://www.kplc.co.ke/fileadmin/user_upload/1Report_Pages.pdf
[15] http://www.kengen.co.ke/PIBO/pibo.html
[16] http://www.gtz.de/de/dokumente/gtz2010-en-HERA-EUEI-PDF-framework-conditions-hydropower.pdf

[17] Mbaka J., Mwaniki, M. *Small Hydro-power Plants in Kenya: A Review of Status Challenges and Future Prospects.* Journal of Renewable Energy and Environment. Page 22. Accessed at https://www.researchgate.net/publication/319877431_Small_Hydro-power_Plants_in_Kenya_A_Review_of_Status_Challenges_and_Future_Prospects/download

funds for Hydro Projects. Further, many local banks don't have the capacity to structure project finance for small hydro projects. CDM could potentially overcome this access to finance barrier by attracting loans from banks that would otherwise not have invested in this type of projects.

The local financial situation has resulted in most project developers exploring international financial markets, which offer better rates and longer terms. However, international market financiers are more difficult to access given that the country risk of Kenya has been considered very high by investors. Until quite recently, reputed rating companies such as Moodys[18], Fitch, and Standard & Poor's had not even provided sovereign credit rating for Kenya. Recently, Fitch[19] Ratings affirmed Kenya's Long-term foreign currency Issuer Default Rating of 'B+' and local currency rating of 'BB-' with Stable Outlooks. The Short- term rating was affirmed at 'B' and Country Ceiling at 'BB-'. However, it was also pointed out that high inflation, rising interest rates, exchange rate volatility and growing balance of payments pressures, pose a downside risk to macroeconomic stability. Standard & Poor's[20] also assigned 'B+' long-term foreign currency and 'BB-' long-term local currency sovereign credit ratings to Kenya on 19th November 2010 and 4th February 2008 respectively however it also indicated that political risks continued to remain in the country due to possible political infighting over passing of important legislations in the country[21]. In this circumstance, access to commercial loans for project investments becomes extremely difficult. Also, a United Nations world investment report indicated that Kenya's ability to attract foreign direct investment is limited[22].

Further, large international banks and financing institutions typically don't consider small hydro projects because they are too small in capacity. With the given circumstances for financial institutions, it is a serious challenge to secure finance closures for such small hydro power projects. Most of the developers have to rely on donor funding such as those from multilateral donors like World Bank, AfDB. Others may be supported by bilateral initiatives (e.g. from Belgium, Germany, Japan, Netherlands, UK and Sweden).

Further, there has been very little equity investment in small hydro power projects in the country due to huge capital costs as well as the negative risk perception of investors. The capital intensive nature of the projects can be attributed to the necessity of overcoming problems such as lack of infrastructure, access to civil material like cement and steel, problems of transportation of material, and high cost of equipment and machinery due to low head available at sites among others. Further, unlike fossil-fuel based power generating units, construction of a hydroelectric plant requires a long lead-time for site studies, hydrological studies, and environmental impact assessment. CDM funds are required to impart feasibility to small hydro projects considering the discouraging investment environment for hydro power plants in Kenya.

The table below gives a comparison of generation cost for the various renewable energy sources[23].

Type	Unit Cost (US$ /kWh)
Geothermal	7.0
Biomass	8.0
Biogas	8.0
Wind	8.8
Small Hydro	12

From these figures, it is apparent that the cost of generation from small (including micro) hydropower plants is on a higher side compared to other possible alternatives. Even in comparison with other electricity generation sources such as geothermal power plants, the cost of hydro power generation is higher.

[18] http://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_133633

[19] http://www.fitchratings.com/creditdesk/press_releases/detail.cfm?pr_id=726085

[20] http://www.standardandpoors.com/prot/ratings/entity-ratings/en/ap/?entityID=280394&sectorCode=SOV

[21] http://www.standardandpoors.com/prot/ratings/articles/en/ap/?articleType=HTML&assetID=1245240805993

[22] http://www.unctad.org/en/docs/wir2007_en.pdf

[23] http://www.energy.go.ke/wp-content/uploads/2010/08/Updated%20%20SREP%20Draft%20Investment%20Plan-May%202011.pdf

After registration of the PoA, an Emission Reduction Purchase Agreement will significantly improve cash flow and debt service cover ratio of the project (which is high for capital intensive projects). The hard-currency income will lower the considerable foreign exchange risks for the purchase of the turbines and spare parts and help overcome the high development costs of hydro plants.

(iii) If the PoA is implementing a mandatory policy/regulation, this would/is not enforced

The implementation of small hydro power projects is not mandatory in the Republic of Kenya. The Electric Power Act, 1997 does not restrict or empower any authority to restrict the fuel choice. The applicable environmental regulations do not restrict the use of hydro energy and there is no legal requirement on the choice of a particular technology.

(iv) If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation

The implementation of small hydro power projects is not mandatory in the Republic of Kenya. The Electric Power Act, 1997 does not restrict or empower any authority to restrict the fuel choice.

It follows from the information presented above, that the PoA as a whole is additional under the Methodical tool: Demonstration of additionality of small-scale project activities Version 12.

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

Starting date of the PoA is the date of uploading of the PoA DD for global comment period on 27/08/2011.

D.2. Duration of PoA

28 years 0 months

As per the “Procedures for registration of a programme of activities as a single CDM project activity and issuance of certified emission reductions for a programme of activities” (Version 04.1) EB 55, Annex 38 the length of the PoA shall not exceed 28 years.

SECTION E. Environmental impacts

E.1. Level at which environmental impacts analysis is undertaken

The environmental impact assessment/analysis will be done at the SSC CPA level for each site under it, taking into consideration the differences of socio-economic and environmental conditions at each location.

E.2. Analysis of environmental impacts

Not applicable.

E.3. Environmental impact assessment

As per the Environmental Management and Coordination Act of 1999, an environmental impact assessment (EIA) is required to be carried out in order to obtain the necessary statutory licenses and permits to establish a small hydro power plant and to meet the requirements of banks and financing institutions. Therefore, each CPA will be required to have undertaken an EIA for each site under it and achieved clearance/approval from the environmental agency.

SECTION F. Local stakeholder consultation

F.1. Level at which local stakeholder consultation is undertaken

The Local Stakeholder Consultations will be held at the SSC-CPA level, taking into consideration the differences of circumstances and opinions of each and every community in which each CPA is located. It is essential to capture each community's view on the impact of the CPA implemented in their surroundings.

F.2. Modalities for local stakeholder consultation

Not applicable.

F.3. Summary of comments received

Not applicable.

F.4. Consideration of comments received

Not applicable.

SECTION G. Approval and authorization

The Letter of Approval has been secured from the host country. The only project participant is the CME and has been authorized by the Letter of Approval provided by the host country.

PART II. Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

[Location] small hydro power project

H.2. Reference number of generic CPA

6606-P1-00XX-CPI

H.3. Purpose and general description of generic CPA

The proposed CPA is one or several small run-of-river hydro power plant (s) with a total installed capacity of (installed capacity of CPA) supplying electricity directly to end-users and to the Kenyan national electricity grid.

Purpose of the CPA

The CPA covers the construction and operation of one or more run-of-river hydro power facilities. The hydro power facilities produce renewable electricity to be consumed on-site, with excess electricity supplied to the grid.

Brief description of Technology

The technology implemented is run-of-river hydro power, with no reservoir, and a capacity equal to or below 15 MW.

The generic CPA qualifies as Type I.

H.4. Technologies/measures

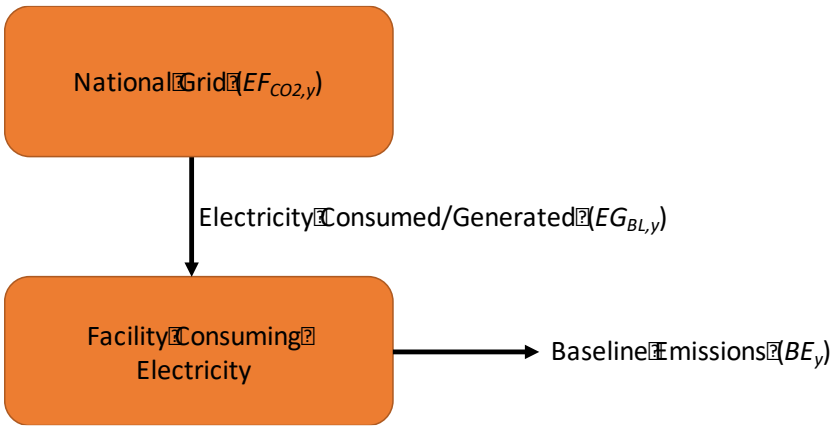
Under AMS-I.F Version 3, renewable energy technologies are used to generate electricity that displaces grid electricity, a carbon intensive mini-grid, or a stand-alone fossil fuel generator. A generic CPA covers the construction of a run-of-river hydro power facility to offset the use of grid power at the tea factories it is connected to. The service provided by the CPA is generation of renewable energy. The total capacity of the hydro power facility will not exceed 15 MW. Hydro power generators typically have a lifetime in excess of 25 years.

The main features of the proposed project activity are as follows:

a) Construction of a concrete weir.
b) Construction of a water canal: The waterway channel is an important part of any hydropower system and its function is to convey water from the intake of the weir and the settling basin to the forebay and down to the turbine through the penstock line.
c) Penstocks to convey water from the intake to the turbines: The projected forebay will be a collector-distributor, or small pond, receiving the water from the canal and distributing it to the penstock.
d) Generating plant: The generating plant will consist of one Pelton turbine and one or more power generation units
e) Power-house: The power house will consist of a building which will shelter the arrival of the penstock, the group turbine-generator, the control boards, controls and automatism necessary for the energy generation.

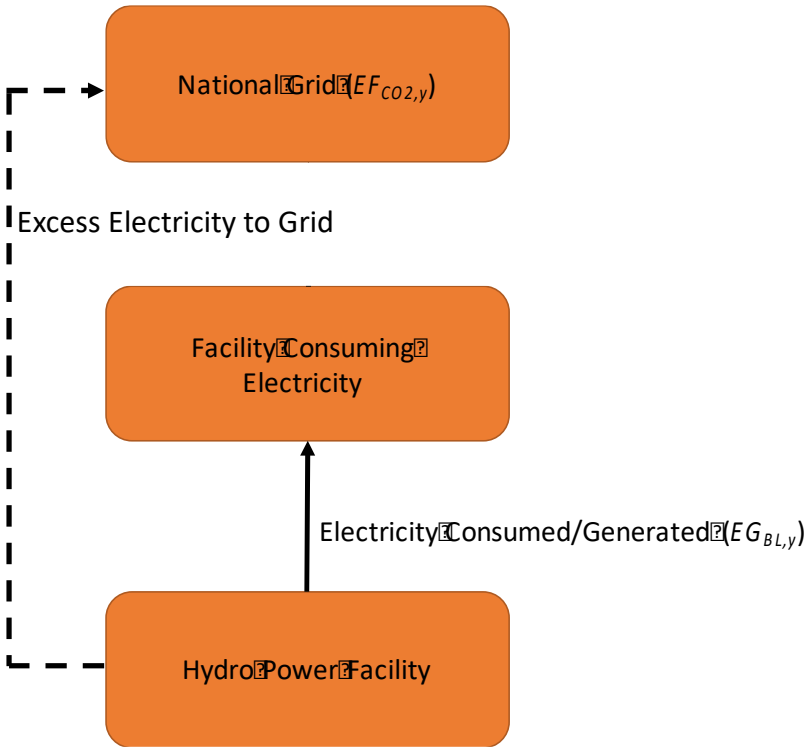
Baseline scenario

Prior to the generic CPA, the facility used electricity from the national grid. The national grid is served by at least one fossil fuel power plant. The baseline scenario is the consumption of grid electricity with the carbon intensity of the grid determined by the grid emission factor and determined for each individual CPA. Below is a diagram of the energy flow in the baseline scenario.



Project scenario

Under the generic CPA renewable energy is generated and sold directly to the tea factories, offsetting grid power use. Excess electricity is sold to the national grid. Below is a diagram of the energy flow in the project scenario.



SECTION I. Application of selected methodologies and standardized baselines

I.1. Reference to methodologies and standardized baselines

CPAs operating under the PoA, reference the following methodologies, tools, and guidelines:

- *AMS-I.F Renewable electricity generation for captive use and mini-grid Version 3.0*[24]
- *Tool to calculate the emission factor for an electricity system Version 7.0*[25]
- *TOOL 11: Assessment the validity of the original/current baseline and to update of the baseline at the renewal of a crediting period/Version 3.0.1*[26]
- TOOL20: Assessment of debundling for small-scale project activities Version 04.0[27]

I.2. Applicability of methodologies and standardized baselines

A generic CPA under the PoA qualifies as Type I as a generic CPA covers projects that generate renewable energy and have a system capacity equal to or below 15 MW. Generic CPAs will not contain more than one component.

The methodology AMS I.F has been applied since it comprises renewable energy generation units including hydro power plants. The applicability criteria of the methodology along with project eligibility are provided in the table below:

[24] https://cdm.unfccc.int/methodologies/DB/9KJWQ1G0WEG6LKHX21MLPS8BQR7242

[25] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf/history_view

[26] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v1.pdf/history_view

[27] https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf/history_view

Applicability Criteria	Project eligibility
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to users. The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit, i.e. the users would have been supplied electricity from one or more sources listed below: a) A national or regional grid b) Fossil fuel fired captive power plant c) A carbon intensive mini-grid	All CPAs under the PoA are run-of-river hydro power generation units, that displace grid electricity consumption at the user end
Table 3 of the methodology provides guidance as to the applicability of AMS-I.D, AMS-I.F, and AMS-I.A based on project types. AMS-I.F covers a project that displaces grid electricity consumption (e.g. grid import and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)	CPAs displace electricity which would have been supplied by a national grid
Hydro power plants with reservoirs that satisfy at least one of the following conditions eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • 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; and • The project activity results in new reservoirs and power density of power plant , as per definitions given in the project emissions section, is greater than 4 W/m^2.	CPAs are required to be run-of-river hydro power generation units. Therefore, they would not involve any reservoir and hence this criterion is not applicable
This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition; (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s).	CPAs are under the PoA only if they install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity i.e. Greenfield plant.
In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	CPAs are greenfield projects and therefore this criterion is not applicable.
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit hall not exceed the limit of 15 MW.	CPAs are greenfield projects and therefore this criterion is not applicable.
If the new unit has both renewable and non-renewable components (e.g. a wind/diesel nit), the eligibility limit of 15 MW for a small-scale CDM	CPAs do not involve any non-renewable components. Hence, this criterion is not applicable.

project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	
Combined heat and power (co-generation) systems are not eligible under this category.	CPAs are run-of-river hydro power generation units. Hence, the applicability criterion is satisfied.
If electricity and/or steam/heat produced by the project activity is delivered to a third party, i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered that ensures that there is no double counting of emission reductions	Any 3rd party consuming electricity generated under the CPA will sign a contract with the supplier to ensure there is no double counting of emission reductions, or a statement from the CPA Implementer that there is no 3rd party consumption of electricity generated under the CPA.

I.3. Application of multiple methodologies

The CPA only applies a single methodology.

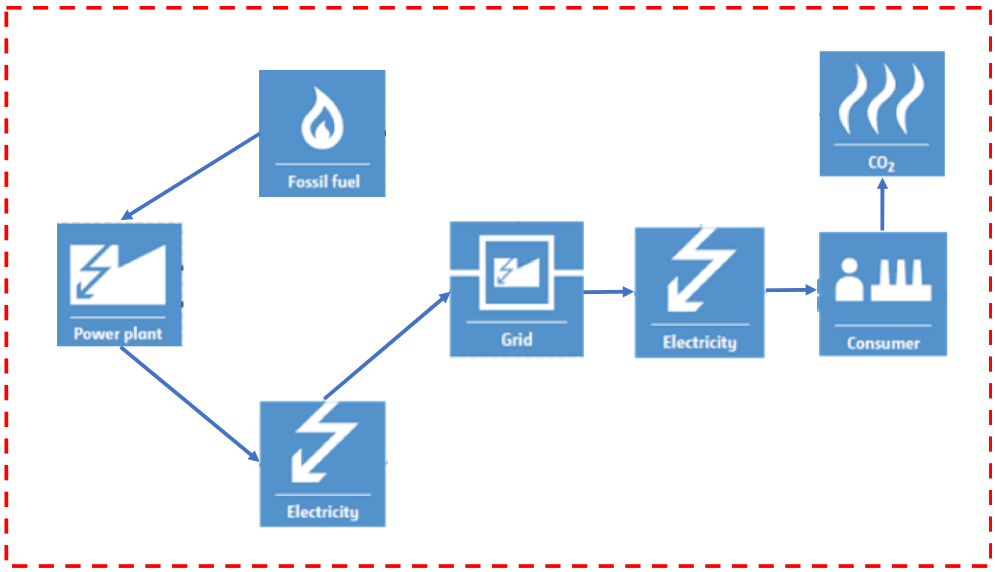
I.4. Project boundary, sources and greenhouse gases (GHGs)

As per the guidelines mentioned in paragraph 17 of AMS I.F, the project boundary covers industrial and commercial facilities consuming energy generated under the system. If electricity generated under the CPA is supplied to distributed end-users via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of generating units. The boundary also extends to the project power plant and all power plants connected physical to the electricity system that the CDM project power plant is connected to.

As such, for CPAs the project boundary covers the covers industrial and commercial facilities consuming energy generated by the hydro power plant. The boundary also extends to the project power plant and all power plants connected physical to the electricity system that the CDM project power plant is connected to. As the CPA supplies excess electricity to the national grid, and power plants connected to it, the project boundary covers the national grid and all connected plants as well.

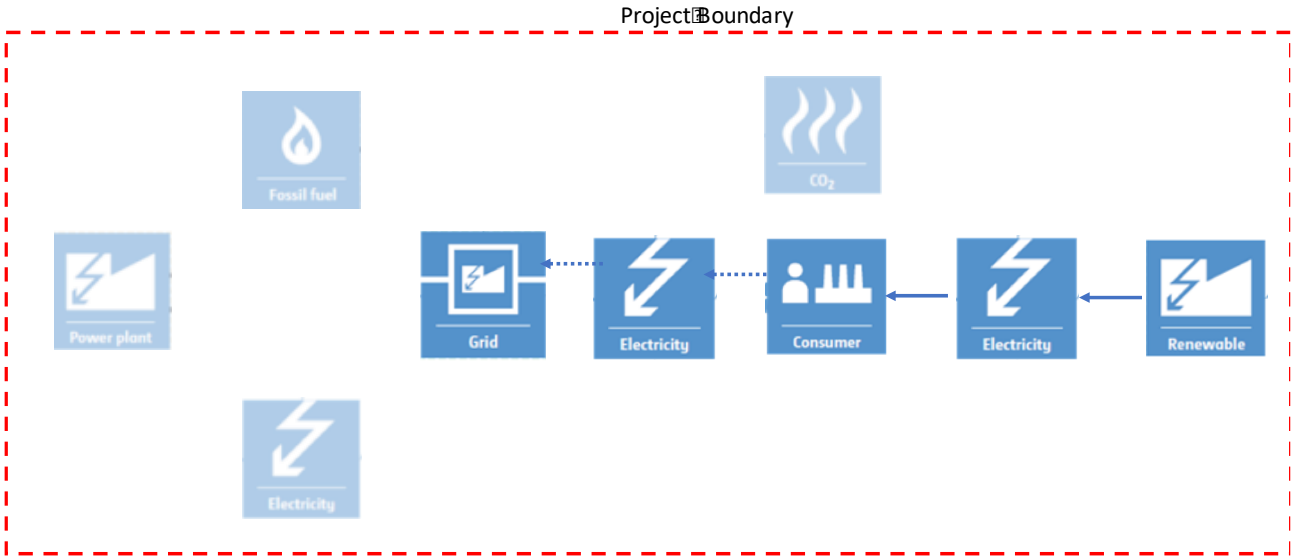
The baseline includes the emissions related to the electricity produced by the facilities and power plants to be displaced by the CPA. This involves emissions from displaced fossil fuel use at power plants connected to the host country electricity grid. The project components and the project boundary is provided below.

In the baseline scenario above, the consumer (facility) is supplied electricity by the national grid, which has at least one fossil fuel powered power plant. The consumption of electricity results in CO_2 emissions.



Baseline Scenario

In the project scenario above, the grid electricity is displaced by electricity from a renewable energy source. Excess electricity may be sold to the national grid. The project boundary is shown in the diagram below.



Project Scenario

The following table illustrates the emission sources and gases included in the project boundary for the purpose of calculating project emissions and baseline emissions:

Source		GHG	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 hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Minor emission source.
		CH_4	No	The proposed CPA's will be small scale run of the river hydro power projects with no storage. Hence these emissions with not be applicable.
		N_2O	No	Minor emission source.

Since the geographic boundary of the Proposed PoA under which the CPA is being included covers entire Kenya, the CPA title is located within the geographical boundaries of the PoA. Please refer section A.4.1.2 for details on the location of the CPA.

I.5. Establishment and description of baseline scenario

The description of the baseline is provided in the corresponding methodology. According to AMS I.F., the baseline scenario is electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit i.e. in the absence of the project activity, the user would have been supplied electricity from a national or regional grid.

For CPAs, the baseline is grid electricity consumed by the industrial or commercial facilities, powered by the hydro power plant under the CPA.

Paragraph 19 of the methodology continues to explain that baseline emissions are the product of the amount of electricity displaced with electricity produced by the renewable generating unit and an emission factor, through one of the following options:

Displaced Electricity from the National Grid: The emission factor in this case is the emission factor of the national grid and is calculated as per the procedures in AMS-I.D.;

Displaced electricity from a min-grid or captive use fossil fuel generated electricity will not be considered under CPAs under PoA. This will result in a conservative estimate of emission reductions.

Renewal of Crediting Period

As per the CDM Project Standard for Programmes of Activities Version 2.0, paragraphs 288-291 describe how each CPA under the PoA will demonstrate baseline validity at renewal of its crediting period. As per the standard, CPAs do not need to re-assess the baseline, only re-assess the modalities to calculate GHG emission reductions resulting from the established baseline scenario.

As per the TOOL 11: Assessment the validity of the original/current baseline and to update of the baseline at the renewal of a crediting period/Version 3.0.1, the procedure for renewal of the crediting period is as follows:

Step 1: Assess the validity of the current baseline for the next crediting period

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies

CPAs will assess and incorporate the impact of national and/or sectoral policies and circumstances existing at the time of requesting renewal unless the CPA in question is using a valid version of an applicable approved standardized baseline. If necessary, as per the TOOL11, the current baseline will be updated for the subsequent crediting period.

Step 1.2: Assess the impact of circumstances

In the situation where the baseline scenario identified at the validation was the continuation of the current practice without any investment, an assessment of the changes in market characteristics is required for renewal of the crediting period. It should be shown that the conditions used to determine baselines emissions in the previous crediting period are still valid.

If new circumstances make a continued validity of the current baseline not plausible, then the current baseline needs to be updated for the subsequent crediting period.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested

The CPA will assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CPA-DD, exceeds the crediting period for which renewal is requested.

Step 1.4: Assessment of the validity of the data and parameters

Finally, if data and parameters used to determine the original baseline, determined ex-ante and not monitored under the PoA, are no longer valid these parameters will be updated as per TOOL 11: Assessment the validity of the original/current baseline and to update of the baseline at the renewal of a crediting period/Version 3.0.1.

Following TOOL11, Step 1.4 of the tool concerns the assessment of the validity of data and parameters. The validity of baseline data and parameters will be assessed, and data/parameters updated where necessary to ensure the modalities to calculate GHG emission reductions resulting from the established baseline scenario are up to date.

As per TOOL11, if any parameters determined at the start of the crediting period are not valid, the current baseline need to be updated for the subsequent crediting period.

If the application of Steps 1.1, 1.2, 1.3, and 1.4 confirmed that the current baseline as well as data and parameters are still valid for the subsequent crediting period, then this baseline, data and parameters can be used for the renewed crediting period. Otherwise, Step will be followed to update the current baseline under Step 2.1 and/or update the data and parameters as per Step 2.2.

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

According to approved methodology AMS I.F. Version 3, the baseline scenario is the electricity generated by the project activity, which would have otherwise been supplied by at least one fossil fuel fired generating unit.

The baseline emissions are the product of electrical energy baseline $EG_{BL,y}$ expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.

$$BE_y = EG_{BL,y} * EF_{CO2,y}$$

Where:

BE_y	Baseline Emissions in year y (t CO2)
$EG_{BL,y}$	Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{CO2,y}$	Emission factor (t CO2/MWh)

As per AMS-I.F Version 3, paragraph 19 states that the emission factor for a grid should be calculated as per the procedures in AMS-I.D. Following AMS-I.D Version 18, the emission factor can be calculated in a transparent and conservative manner as follows:

(a) A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the Tool to calculate the Emission Factor for an electricity system.;

OR

(b) The weighted average emissions (in t CO_2/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

The emission factor (tCO_2/MWh) for the displacement of electricity generated by power plants in the Kenyan electricity system is calculated in a transparent and conservative manner as combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the UNFCCC methodological Tool to calculate the Emission Factor for an electricity system.

The tool calculates the combined margin emission factor (CM) which is the weighted average of the operating margin (OM) and build margin (BM) emission factors of the electricity system; the effect of a specific project upon the electricity grid can be illustrated in terms of its effect upon operations, or the “operating margin” (OM), and its effect upon capacity additions, or the “build margin” (BM). The OM is primarily a near-term effect and the BM a long-term effect. In principle, a project’s effect upon system

capacity mix could be to defer new capacity additions and/or to accelerate existing capacity retirements.

According to the tool, there are 6 main steps in the process of calculating the grid emission factor:

Step 1: Identify the relevant electricity systems

The national energy grid of the Republic of Kenya has been chosen as the project electricity system. In Kenya imports from Uganda and Tanzania form a part of the connected electricity.The emission factor is considered as 0 tons CO_2 per MWh. Electricity exports are not subtracted from electricity generation data used.

Step 2: Choose whether to include off-grid power plants in the project electricity system

Two options are available to calculate the build and operating margin emission factors:

f) to include only grid power plants in the calculation; or

g) to include both grid power plants and off-grid power plants.

CPAs under the PoA will use option a), therefore off-grid power plants are excluded from the calculations and option (a) is chosen.

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

There are four methods available for calculating the OM:

- Simple OM
- Simple adjusted OM
- Dispatch data analysis OM
- Average OM

The simple OM can only be used if the low-cost/must-run resources[28] constitute less than 50% of total grid generation in: 1) average of the 5 most recent years, or 2) based on long-term averages for hydro production. In 2010 low-cost/must-run resources in Kenya constituted 66% of the total generation. The Simple OM method is therefore not applicable for Kenya.

The simple adjusted OM is effective only in cases where the total average low-cost must run capacity is significantly higher than the minimum demand load; otherwise the formula reverts to the simple OM method. In Kenya, hourly data from each grid connected power plant on power generation and fuel type and fuel consumption is available. As per Figure 2 of the Tool to calculate the emission factor for an electricity system, the dispatch data analysis OM is the applicable method for determining the operating margin.

The CME has selected the dispatch data analysis OM to determine the Operating Margin.

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

The **dispatch data analysis OM** is determined based on the grid power units that are actually dispatched at the margin during each hour *h* where the project is displacing electricity.

$$EF_{grid,OM-DD,y} = \frac{\sum_h EG_{PJ,h} \times EF_{EL,DD,h}}{EG_{PJ,y}}$$

Where:

[28] Low-cost/must-run resources are power plants with low marginal generation costs or that are dispatched independently of the daily or seasonal load of the grid. They typically include hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. If coal is sued as must-run, it should also be included in this list.

$EF_{grid,OM-DD,y}$	Dispatch data analysis operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{PJ,h}$	Electricity displaced by the project activity in hour *h* of year *y* (MWh)
$EF_{EL,DD,h}$	CO_2 emission factor for grid power units in the top of the dispatch order in hour *h* in year *y* (tCO_2/MWh)
$EG_{PJ,y}$	Total electricity displaced by the project activity in year *y* (MWh)
H	Hours in year *y* in which the project activity is displacing grid electricity
Y	Year in which the project activity is displacing grid electricity

The hourly emission factor is calculated based on the energy efficiency of the grid power unit and the fuel type used since the hourly fuel consumption data is not available in Kenya for all power plants. It is calculated as follows:

$$EF_{EL,DD,h} = \frac{\sum_{n} EG_{n,h} \times EF_{EL,n,y}}{\sum_{n} EG_{n,h}}$$

Where:

$EF_{EL,DD,h}$	CO_2 emission factor for grid power units in the top of the dispatch order in hour h in year y (tCO2/MWh)
$EG_{n,h}$	Net quantity of electricity generated and delivered to the grid by grid power unit *n* in hour *h* (MWh)
$EF_{EL,n,y}$	CO_2 emission factor of grid power unit n in year y (tCO2/MWh)
n	Grid power units in the top of the dispatch (as defined below)
h	Hours in year y in which the project activity is displacing grid electricity

The CO_2 emission factor of the grid power units *n* is determined using the options A1, A2 or A3 below.

Option A1 – If for a power unit m data on fuel consumption and electricity generation is available the emission factor should be determined as follows

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

Where:

$EF_{EL,m,y}$	CO2 emission factor of power unit m in year y (tCO2/MWh)
$FC_{i,m,y}$	Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	Net calorific value (energy content) of fossil fuel type i in year y (GJ/mass or volume unit)
$EF_{CO2,i,y}$	CO2 emission factor of fossil fuel type i in year y (tCO2/GJ)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
m	All power units serving the grid in year *y* except low-cost/must-run power units
i	All fossil fuel types combusted in power unit *m* in year *y*
y	The relevant year as per the data vintage

Net calorific values and CO_2 emission factors of fossil fuels are derived from the 2006 Intergovernmental Panel for Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories.

Option A2 – If for a power unit m only data on electricity generation and fuel types used is available the emission factor should be determined as follows

$$EF_{EL,m,y} = \frac{EF_{CO2,m,i,y} \times 3.6}{\eta_{m,y}}$$

Where:

$EF_{EL,m,y}$	CO2 emission factor of power unit m in year y (tCO2/MWh)
$EF_{CO2,m,i,y}$	Average CO2 emission factor of fossil fuel type I used in power unit m in year y (tCO2/GJ)
$\eta_{m,y}$	Average net energy conversion efficiency of power unit m in year y (ratio)
M	All power units serving the grid in year y except low-cost/must-run power units
I	All fossil fuel types combusted in power unit m in year y
Y	The relevant year as per the data vintage

Default efficiency factors for power plants can be derived from the UNFCCC 2009 EB50 meeting report.

Option A3 – If for a power unit m only data on electricity generation is available, an emission factor of 0tCO_2/MWh can be assumed as the simple and conservative approach

To determine the set of grid power units *n* that are in the top of the dispatch, the following data is required from the national dispatch centre:

- The grid system dispatch order of operation for each grid power unit of the system including power units from which electricity is imported; and
- The amount of power (MWh) that is dispatched from all grid power units in the system during each hour h that the project activity is displacing electricity.

At each hour *h*, each grid power unit's generation is stacked using the merit order. The group of grid power units *n* in the dispatch margin includes the units in the top x% of total electricity dispatched in the hour *h*, where x% is equal to the greater of either: 10%; or the quantity of electricity displaced by the project activity during hour *h* divided by the total electricity generation by grid power plants during that hour *h*.

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

In terms of vintage of data, CPAs under the PoA will choose between one of the following two options:

Option 1: For the first crediting period, calculate the build margin emission factor ex-ante based on the most recent information available on units already built for sample group *m* at the time of CPA submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

Option 2: For the first crediting period, the build margin emission factor shall be updated annually, ex- post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex-ante, as described in option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

The choice of option to determine the method to calculate the Build Margin is documented in the CPA.

Capacity additions from retrofits of power plants would not be included in the calculation of the build margin emission factor.

The sample group of power units *m* used to calculate the build margin for the CPA would be determined as per the following procedure, consistent with the data vintage selected above:

(a) Identify the set of five power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently ($SET_{5\text{-units}}$) and determine their annual electricity generation ($AEG_{SET\text{-}5\text{-}units}$, in MWh);

(b) Determine the annual electricity generation of the project electricity system, excluding power units registered as CDM project activities (AEG_{total}, in MWh). Identify the set of power units, excluding power units registered as CDM project activities, that started to supply electricity to the grid most recently and that comprise 20% of AEG_{total} (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) (SET ≥ 20%) and determine their annual electricity generation (AEG_{SET-}≥20%, in MWh);

(c) From SET5-units and $SET_{≥20\%}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample});

Identify the date when the power units in SET_{sample} started to supply electricity to the grid. If none of the power units in SET_{sample} started to supply electricity to the grid more than 10 years ago, then use SET_{sample} to calculate the build margin. Ignore steps (d), (e) and (f).

Otherwise:

(d) Exclude from SET_{sample} the power units which started to supply electricity to the grid more than 10 years ago. Include in that set the power units registered as CDM project activity, starting with power units that started to supply electricity to the grid most recently, until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation) to the extent is possible. Determine for the resulting set ($SET_{sample-CDM}$) the annual electricity generation ($AEG_{SET-sample-CDM}$, in MWh);

If the annual electricity generation of that set is comprises at least 20% of the annual electricity generation of the project electricity system (i.e. $AEG_{SET-sample-CDM} ≥ 0.2 \times AEG_{total}$), then use the sample group $SET_{sample-CDM}$ to calculate the build margin. Ignore steps (e) and (f).

Otherwise:

(e) Include in the sample group $SET_{sample-CDM}$ the power units that started to supply electricity to the grid more than 10 years ago until the electricity generation of the new set comprises 20% of the annual electricity generation of the project electricity system (if 20% falls on part of the generation of a unit, the generation of that unit is fully included in the calculation);

(f) The sample group of power units m used to calculate the build margin is the resulting set ($SET_{sample-CDM->10yrs}$).

The BM emission factor is the generation-weighted average emission factor of all power units *m* during the most recent year y

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y} \times EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:

$EF_{EL,m,y}$	CO2 emission factor of power unit m in year y (tCO2/MWh
$EF_{grid,BM,y}$	Build margin CO2 emission factor in year y (tCO2/MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit *m* in year *y* (MWh)
M	All power units serving the grid in year *y* except low-cost/must-run power units
Y	The relevant year as per the data vintage

The CO2 emission factor of the grid power units 'm' is determined using the Options A1, A2 or A3 as described above.

If the power units included in the build margin m correspond to the sample group $SET_{sample-CDM->10yrs}$, then, as a conservative approach, only option A2 would be used and the default values provided in Annex 1 of the tool shall be used to determine the parameter $\eta_{m,y}$.

Step 6: Calculate the combined margin (CM) emissions factor

The calculation of the combined margin (CM) emission factor ($EF_{grid,CM,y)}$ is based on one of the following methods:

(a) Weighted average CM; or
(b) Simplified CM

The weighted average CM method (option A) should be used as the preferred option. Therefore, the combined margin emission factor is calculated as follows:

$EF_{grid,CM,y} = EF_{grid,OM,y} \times W_{OM} + EF_{grid,BM,y} \times W_{BM}$

$EF_{grid,OM,y}$	Operating margin CO_2 emission factor in year y (tCO2/MWh)
$EF_{grid,BM,y}$	Build margin CO_2 emission factor in year y (tCO2/MWh)
W_{OM}	Weighting of operating margin emissions factor (%)
W_{BM}	Weighting of build margin emissions factor (%)

Following paragraph 86 of the Tool to calculate the emission factor for an electricity system, as CPAs do not cover wind or solar activities, the default values for determining the CM are as per paragraph 86 b), namely W_{OM} = 0.5 and W_{BM} = 0.5 for the first crediting period, and W_{OM} = 0.25 and W_{BM} = 0.75 for the second and third crediting period.

Project emissions

As per paragraph 24 of AMS I.F Version 3, project emissions are to be considered for emissions from water reservoirs of hydro power plants. Since all CPAs are new run-of-river small hydro power projects, they do not result in formation of reservoirs. Thus, the project emissions (PE_y) are estimated to be zero.

Further, CPAs under the PoA will not consume fossil fuels on-site as a result of the project activity.

Leakage

As prescribed in AMS-I.F Version 3, leakage estimation is only required for project activities involving biomass. As the Generic CPA under the PoA do not involve biomass leakage is considered zero.

Emission reductions

Emission reductions are calculated as follows: $ER_y = BE_y - PE_y - LE_y$

Where:

ER_y	=	Emission reductions in year y (t CO_2/y)
BE_y	=	Baseline Emissions in year y (t CO_2/y)
PE_y	=	Project emissions in year y (t CO_2/y)
LE_y	=	Leakage emissions in year y (tCO_2/y)

I.6.2. Data and parameters fixed ex ante

(This section is intentionally blank.)

Data/Parameter	
Data unit	
Description	
Source of data	
Value(s) applied	
Choice of data or Measurement methods and procedures	
Purpose of data	
Additional comment	

I.6.3. Modalities for ex ante calculation of emission reductions

Baseline Emissions:

The baseline emissions for each CPA can be estimated as below:

$BE_y = EG_{BL,y} * EF_{CO2,y}$

Where:

BE_y = Baseline Emissions in year y (tCO_2)

$EG_{BL,y}$ = Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO2,y}$ = Emission Factor (tCO_2/MWh)

Project Emissions:

For a CPA under the PoA, project emissions are zero as all technologies are run-of-river hydro power. A CPA will not consume fossil fuels on-site as a result of the project activity.

Leakage Emissions

For a CPA under the PoA, leakage emissions are assumed to be zero as no biomass is used and no technology is transferred from existing facilities.

Emission Reductions:

Each CPA reduces CO_2 emissions by displacing grid electricity by generating renewable energy onsite. The renewable energy offsets the use of grid power and any excess energy may be sold to the grid. The emission reduction ER_y by the project activity during a given year y is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (LE_y), as follows:

$ER_y = BE_y - PE_y - LE_y$

Where

ER_y = Emission reductions in year *y* ($t\ CO_2/y$)

BE_y = Baseline Emissions in year y (t CO_2/y).

PE_y = Project emissions in year y (t CO_2/y).

LE_y = Leakage emissions in year y (t CO_2/y).

I.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{BL,y}$
Data unit	MWh/y
Description	Quantity of net electricity displaced in year y
Source of data	Utility or government records or official publications
Value(s) applied	The values for each power station will be different and will be provided in a separate worksheet or in the CPA DD as applicable
Measurement methods and procedures	Measurements are undertaken using energy meters and cross-checked with invoices for electricity sold. Net electricity displaced is the gross energy generation by the project activity power plant minus the auxiliary/station electricity consumption.
Monitoring frequency	Continuous monitoring, hourly measurements and monthly recording
QA/QC procedures	-
Purpose of data	Determining baseline emissions
Additional comment	-

Data/Parameter	$EF_{CO2,y}$
Data unit	tCO_2/MWh
Description	CO_2 emission factor for the grid/minigrid/captive electricity generation in year y
Source of data	Power generation data and from power generation and/or distribution companies, or studies/reports if available
Value(s) applied	The value will be provided in the CPA DD
Measurement methods and procedures	Calculated
Monitoring frequency	Annually
QA/QC procedures	
Purpose of data	Baseline emissions
Additional comment	-

I.7.2. Sampling plan

There are no monitored parameters determined through sampling, as such there is no sampling plan.

I.7.3. Other elements of monitoring plan

The parameters monitored under a generic CPA are the quantity of electricity displaced in year y, $EG_{BL,y}$, and the CO_2 emission factor for the grid electricity generation in year y, $EF_{CO2,y}$.

Quantity of Electricity Displaced – $EG_{BL,y}$

The quantity of electricity displaced by the project activity is the gross energy generation by the plant, less the station's power consumption. Electricity meter(s) will measure the net export of electricity (i.e. power leaving the station). At least monthly readings of these meters will be taken. The monthly meter readings will be cross-checked with invoices generated for the sale of electricity. Electricity meters will meet relevant local standards and undergo regular calibration.

As the captive use electricity and the excess sold to the grid are both sold. Each will be monitored by an

electricity meter and supported with invoices.

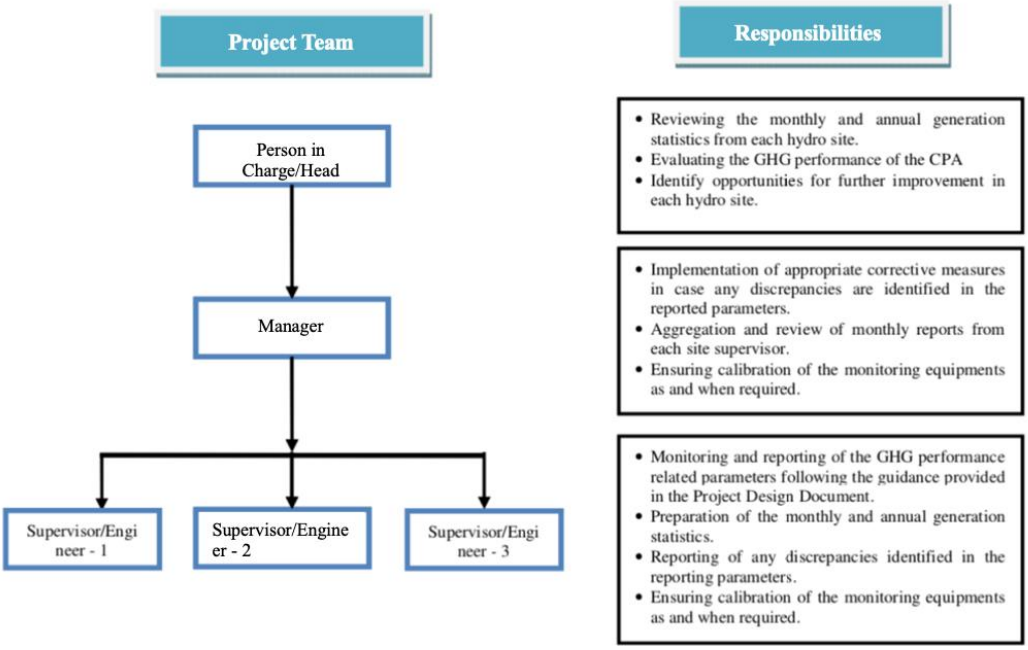
CO_2 Emission Factor – $EF_{CO2,y}$

The emission factor of electricity displaced by the project activity will be determined as follows. As the captive use electricity in the project activity is displacing grid electricity and any excess is sold to the grid, all electricity generated under the project activity displaces grid electricity, The emission factor of the grid is determined as per the steps shown in section I.6.1.

The Combined Margin emission factor is the chosen method to determine the grid emission factor. As per paragraph 65 of the Tool to Calculate the Emission Factor for an electricity system Version 7. Hourly dispatch data will be provided by power generation/distribution companies and used to determine the Operating Margin. The Build Margin will be determined ex ante as per Option 1 or 2 under paragraph 72 of the Tool. The Operating Margin will be determined annually as per paragraph 63 of the Tool. The value of parameter $EF_{CO2,y}$ (the Combined Margin) is therefore determined for a given year y.

Operational and Management Structure

The authority and responsibility of project management as well as monitoring, measurement and reporting will rest with the individual CPA owner. At the CPA level, a Project Team will be formulated to ensure proper and continuous monitoring of the performance of turbines and generation of power. The operation and management structure that will be implemented by the CPA owners for the purpose of monitoring the CPA is illustrated below:



Monitoring Plan Objective and Organisation

The purpose of the monitoring plan is to measure the net electricity displaced by the CPA. Within the CDM team, a supervisor will be designated for each hydropower site covered under the CPA, who will be responsible for compiling, monitoring and reporting of GHG performance related parameters (Process Parameters, Procedures, Calibration) of its allotted hydropower site.

This data collated from each hydropower site will be aggregated by the next superior CDM team member. The data and documents received from each site supervisor will be compiled in a format called the CDM format / report. Quality checks will also be undertaken at this level to ensure all discrepancies are addressed. The net electricity attributable to the CPA will be calculated by subtracting the total electricity imported from the total electricity exported to the grid. The onus of reviewing, storing and archiving of all CDM related information relevant to the CPA in a suitable manner would rest with this team member.

The Manager will aggregate and review all the data received from site supervisors. The review will be

conducted to ensure compliance to the requirements of the monitoring plan and other CDM modalities and procedures including calibration frequency. The Manager will further submit a consolidated report to the Person In Charge who will finally review and sign the monthly performance from each CPA.

To ensure that the data is reliable and transparent, the project entity will establish Quality Assurance and Quality Control (QA&QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents.

Monitoring and Archiving of Data

The net electricity generated by the project needs to be monitored. The monitoring data is derived from periodic electricity meter records kept by the project owners and/or the grid company, which are crosschecked with actual invoices sent by project owners to the grid company and/or electricity purchasers.

The CDM team within the operator of the hydro plant will be responsible for collecting the monitoring data and will provide the coordinating entity with meter readings for electricity delivered and if available calibration certificates. Further, for cross checking purposes, the project proponent will also carry out measurements of gross electricity generation, auxiliary electricity consumption at each hydropower site within the CPA, which will be recorded in site log books.

The electricity data will be recorded by the shift in-charge in the site log books and would be forwarded to the site manager. On regular basis, as decided by the CDM team, the site manager would prepare and forward the reports to the designated site supervisor of the CDM team for review and archiving.

Details of the CPA monitoring plan will be described for each CPA. The data will be archived electronically and be stored for 2 years after the end of the crediting period of each CPA by the coordinating entity.

Quality Assurance and Quality Control

The installation location of the meters will be detailed in each CPA. The project entity will implement QA&QC measures to calibrate and guarantee the accuracy of metering and safety of the project operation. The metering devices will be calibrated and inspected properly and periodically as per standard industry norms and requirements of the Kenyan Electricity Grid Code. The CPA Implementer and the Kenya Power and Lighting Company are responsible for operation and maintenance of their respective electricity meters.

The CDM team will meet periodically to review project parameters, check data collected, emissions reduced etc. The following will be the procedure for taking corrective action and addressing any non- conformances discovered:

- All the mismatching data along with the name of the respective site manager and in-charge of logbooks name will be recorded in a Note Book.
- The respective site supervisors in the CDM team will send FAR (Forward Action Request) or CAR (Corrective Action Request) to the concerned CDM Member.
- After receipt of the communication, within one week, the concerned site in-charge will correct the data and will reply to the site supervisor in the CDM team.
- The corrected data will then be compiled by the respective site supervisors

Capacity development:

Trainings will be on the following aspects of equipments involved in the Project activity – start up techniques, operation, maintenance, monitoring of parameters, precautions, safety instructions and emergency preparedness etc. The following procedure will be followed for training:

- A copy of Operation and Maintenance manual, Safety instructions related to the equipment involved in the Project activity will be made available to all employees involved in the Project.
- During commissioning of the new equipments (of the Project activity), training on all above aspects to all employees involved in the Project activity will be provided.
- Whenever an employee handles the equipments involved in the Project activity first time, training will be provided to him on start up techniques, operation, maintenance, monitoring of parameters, precautions, safety instructions and emergency preparedness etc.
- The training will be provided by respective equipment supplier and expert O & M personnel of the company.

CDM capacity development for the Coordinating / Managing Entity (CME) will be conducted by external CDM experts. This will ensure that the CME is prepared for the responsibilities with respect to the implementation of the proposed PoA.

SECTION J. Crediting period type and duration

The generic CPA uses a renewable crediting period for a duration of 7 years and 0 months, twice renewable.

SECTION K. Eligibility criteria for inclusion of CPAs

No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Technology	Does the proposed CPA comprise of new run-of-river small hydro power project (s) located at a site where there was no renewable energy power plan operating prior to the implementation of the project activity (Greenfield plant)?	Detailed Project Report, Land Documents, Clearances, Purchase Orders
2	Size Limit	Is the installed capacity of the individual project/projects bundled together under the CPA ≤ 15 MW?	Purchase orders of equipment, Commissioning certificate (s) (if applicable at the time of submission), engineering report, feasibility study report, generation license, allotment letter etc.
3	Location	Is the CPA located in the Republic of Kenya?	Land Documents, GPS Coordinates
4	Methodology Eligibility	Does the industrial or commercial facility utilize the renewable electricity generated on site?	Technical specifications of hydro power facility, Power Purchase Agreement
5	CER Rights	Has the CPA owner entered into a contractual agreement with the CME?	Contract with the CME
6	Project Eligibility	Is the proposed CPA a voluntary initiative, not mandated by any policy and/or regulation in the hose country?	Relevant abstracts from public/regulatory sources to demonstrate that the project is not mandated by law/regulation.
7	National Laws and Regulations	Is the CPA in conformance with mandatory laws and regulations?	Relevant abstracts from public/regulatory sources or clearances to demonstrate that the project is in conformance with mandatory laws and regulations.
8	Double Counting	Is the proposed CPA registered as a part of any other PoA or as an individual CDM project?	GPS coordinates showing location of project activity is at least 5km away from other hydro power CPAs or CDM Projects, undertaking from the CPA owner, Analysis of project in the CDM pipeline

9	Monitoring	Can the electricity generated from the individual CPA be accurately measured and recorded to calculate actual emission reductions according to the applied baseline and monitoring methodology?	Monitoring plan, Details of monitoring equipment
10	EIA	Has the CPA conducted an environmental impact assessment for each site and achieved clearance/approval from the environmental agency?	EIA Report/clearance from the Government Agency
11	Additionality	Does the CPA face at least one of the barriers specified below or demonstrated that EB approval for automatic additionality of micro-scale hydro power technology has been obtained.	
		i) Investment barrier (Access to Finance) (to demonstrate additionality of CPAs with capacity of ≤ 15 MW)	• A statement from the financing bank that the revenues fom the CDM are critical in the approval of the loan. • The loan approval (or other significant financing decision(s)) by the lender with an explicit mention of the CDM registration. • The loan agreement with an investor which is also the buyer of CERs (the loan agreement should have a mention of CER sale arrangement). • Proof that a significant part of the project investment is provided upfront by a company as a pre-payment for expected CERs
		ii) barrier due to prevailing practice (to demonstrate additionality of CPAs with capacity of ≤ 5 MW)	Relevant statistical data from national and/or international statistics of the installed capacity of similar projects in the country.
		iii) Guidelines for the demonstration of additionality of micro-scale project activity", version 03 (to demonstrate additionality of CPAs with capacity ≤ 5 MW)	• EB approval on recommendation of DNA of Kenya • Detailed project report or relevant purchase orders of equipment to demonstrate that the capacity of the individual project including all its units is ≤ 5 MW.

		iv) Investment Barrier (application of Investment Analysis – Benchmark Analysis) (to demonstrate additionality of CPAs with capacity of ≤ 5 MW)	Financial model for a CPA illustrating calculation of a suitable financial indicator using the guidance on investment analysis which remains lower than the applicable benchmark
12	Methodology Eligibility	If electricity and/or steam/heat produced by the project activity is delivered to a third party, i.e. another facility or facilities within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered that ensures that there is no double counting of emission reductions	Any 3rd party consuming electricity generated under the CPA will sign a contract with the supplier to ensure there is no double counting of emission reductions, or a statement from the CPA Implementer that there is no 3rd party consumption of electricity generated under the CPA.
13	Methodology Eligibility	Is the CPA a run-of-river hydro power generation unit that displaces grid electricity consumption at the user end with any excess possibly sold to the grid?	Technical specifications of hydro power plant under the CPA and power purchase agreements related to the CPA.

Appendix 1. Contact information of coordinating/managing entity and project participants

Coordinating/managing entity and/or project participants	☒ Coordinating/managing entity ☐ Project participant
Organization name	KTDA Power Company (KTPC)
Country	Kenya
Address	KTDA Farmers Building, Nairobi, Nairobi, 30213-00100
Telephone	254 020 -3227951
Fax	254 020-22211240
E-mail	info@ktdateas.com
Website	www.ktdateas.com
Contact person	Mr. Japheth Sayi

Appendix 2. Affirmation regarding public funding

As discussed under section A.6, there is no recourse to any public funding for the proposed PoA.

Appendix 3. Applicability of methodologies and standardized baselines

The baseline data will be provided in each CPA at the time of its submission.

Appendix 4. Further background information on ex ante calculation of emission reductions

This section is intentionally blank.

Appendix 5. Further background information on monitoring plan

Details monitoring information with respect to metering equipment used, calibration method etc. will be provided under each CPA.

Appendix 6. Summary report of comments received from local stakeholders

This section is intentionally blank.

Appendix 7. Summary of post-registration changes

PRC-6606-001
Date of Approval: 07/11/2019

Post registration changes to the PoA have been made and cover the following changes:

1. Update of the PoA-DD template from Version 1.0 to Version 9.0;

2. Switch from AMS-I.D Version 17.0 to AMS-I.F Version 3.0 and update of applicability conditions and relevant eligibility criteria.

3. The monitoring plan has been updated to reflect the monitoring requirements of AMS-I.F Version 3.0.

4. Additionality of the programme is now shown through Methodological Tool 21 Demonstration of additionality of small-scale project activities for the demonstration of additionality Version 12

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Document information

Version	*Date*	*Description*
09.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for programmes of activities" (CDM-EB93-A07-STAN); • Make editorial improvements.
08.1	28 June 2017	Revision to: • Remove a duplicated instruction; • Make editorial improvement.
08.0	7 June 2017	Revision to: • Improve consistency with the "CDM project standard for programmes of activities" and with the PDD and CPA-DD forms; • Make editorial improvement.
07.0	25 May 2017	Revision to: • Ensure consistency with the "CDM project standard for programmes of activities" (CDM-EB93-A07-STAN) (version 01.0); • Incorporate the "Programme design document form for small-scale CDM programmes of activities" (CDM-SSC-PoA-DD-FORM); • Make editorial improvement.
06.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
05.0	9 March 2015	Revision to: • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Make editorial improvement.
04.1	5 August 2014	Editorial revision to correct the document information table.

Version	*Date*	*Description*
04.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM programme of activities (these instructions supersede the Guideline: Completing the programme design document form for CDM programme of activities (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6; • Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM; • Make editorial improvement.
03.0	3 December 2012	EB 70 Revision to reflect changes to the *Guideline: Completing the programme design document form for CDM programmes of activities* (EB 70, Annex 6).
02.0	13 March 2012	EB 66 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).
01.0	27 July 2007	EB 33, Annex 41 Initial publication.

Decision Class: Regulatory
Document Type: Form
Business Function: Registration
Keywords: programme of activities, project design document