



**PROGRAMME DESIGN DOCUMENT FORM FOR
SMALL-SCALE CDM PROGRAMMES OF ACTIVITIES (F-CDM-SSC-PoA-DD)
Version 02.0**

PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

PART I. Programme of activities (PoA)

SECTION A. General description of PoA

A.1. Title of the PoA

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Tanzania Renewable Energy Programme

Version number: 08

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A.2. Purpose and general description of the PoA

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The objective of the Programme of Activity (PoA) is to increase access to modern energy services in Tanzania promoting both off-grid (isolated mini-grid) and national grid renewable energy projects in the country. Rural Energy Agency (REA), under the Ministry of Energy and Minerals of the United Republic of Tanzania, is the nodal agency for promotion of rural electrification projects in Tanzania. REA will implement the PoA and acts as a coordinating and managing entity (CME).

1. General operating and implementing framework of PoA

REA is currently responsible for coordinating all rural energy activities in Tanzania. REA has been set up to promote investment in modern energy services by working with key partners and collaborators from the project developers, banks, NGOs, CBOs, and Government agencies to mobilise resources in order to promote and facilitate improved access to modern energy services in Tanzania, particularly utilizing local renewable energy resources. REA has been coordinating several projects and activities with a large number of donors involved in the rural energy sector.

REA, with assistance of a World Bank project, is supporting small rural and renewable energy initiatives in several ways: (i) through an enabling policy and regulatory framework, including standardized power purchase agreements and simplified regulatory rules which ease some of the transaction costs for small renewable power projects, (ii) through a subsidy scheme for new connections in rural areas (performance grants) and technical assistance/pre-investment support (matching grants) for project developers; and (iii) through a line of credit (LOC) to Tanzanian financial institutions for long-term on-lending to small renewable energy projects.

To further assist projects developers to invest in and implement renewable energy projects, REA is developing a Renewable Energy Programme of Activity (PoA) under which individual projects could claim the carbon credit benefits. The PoA will mainly help to develop a platform for overcoming institutional, financial and structural hurdles for the development of small scale renewable energy projects including hydro, photovoltaic, wind and biomass power projects.

As the coordinating/managing entity for the proposed small-scale PoA, REA will undertake the following main activities: (i) coordinate the implementation of the PoA, (ii) screen and accept CPAs under the programme, (iii) support the effective commercialization of CERs, (iv) liaise with project



developers to maintain the required database for verification, (v) any other functions that are required to be performed as per the PoA rules.

The CPAs will be implemented by project developers, building on REA's existing relationship with individual project developers. REA will enter into a contractual agreement with each individual power projects (CPAs). The contract would give REA the legal rights to deal with the carbon credits that will be generated from these projects and monitor the project implementation and all necessary parameters that are required for the calculation of emission reductions from each CPA. The conditions for participation shall be in line with the eligibility criteria of the projects for inclusion in the PoA and shall be elaborated in the agreements between REA and the project developers.

2. Policy/measure or stated goal of the PoA

The objective of this Program is to increase access to modern energy services in Tanzania promoting both isolated mini-grids and national grid renewable energy projects in the country using hydro, photovoltaic, wind and biomass technologies for electricity generation.

Tanzania has, over the years, strived to create an appropriate policy environment to attract private investments into renewable energy generation sector. The National Energy Policy 2003 sets national energy objectives to ensure availability of reliable and affordable energy supplies, and to promote efficient energy use in order to support national development goals. The policy recognizes that, the main thrust has to be based on private initiatives and investments for exploitation of local energy sources. The policy sets an entirely new approach to modern energy in rural areas of Tanzania and the government has committed itself to develop and implement the new strategy to address modern energy needs of over 85% of Tanzanians living in rural areas.

For these reasons, the Rural Energy Board (REB), the Rural Energy Agency (REA), and the Rural Energy Fund (REF) were established and entrusted with the role of promoting, stimulating and facilitating improved access to modern energy services in rural areas through empowering both public and private sector initiatives in rural energy.

The proposed programme to promote renewable energy projects is fully in line with the Government's strategy for the sector.

3. Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity.

There are no mandatory requirements in Tanzania to oblige project developers to implement renewable energy projects or to REA to achieve certain targets of implementing renewable energy projects. The proposed PoA is a voluntary initiative by REA to encourage investments in renewable energy projects in view of increasing electricity access in rural Tanzania.

This voluntary action will contribute to achieve the national energy objectives.

Contribution to sustainable development

The PoA will increase and improve energy supply in the rural areas through the implementation of renewable energy projects. Thus, the PoA will contribute significantly in improvement of the livelihoods of the rural population and the attainment of sustainable economic growth of the country. More specifically, the successful implementation of CPAs will contribute to Tanzania's sustainable development as follows:

- The PoA provides employment opportunities in the areas where CPAs are located, which will give an increase in local community's income in general. Thus, the PoA contributes to poverty alleviation and improved living and health conditions through the use of clean energy by households.
- The PoA encourages generation of electricity from renewable resources, which otherwise would have been generated from alternate fuels (most likely fossil fuels), contributing to reduction in GHG emissions.
- The PoA facilitates the economic development process through the provision of modern energy sources and enhances the local investment environment and thereby improves the local economies.
- The implementation of renewable energy projects will diversify the sources of electricity generation, important for meeting the growing energy demand.

More specifically, meets the Tanzanian Sustainable Development requirements as published by the DNA.

Tanzanian Sustainable Development Requirements	PoA Responses
The CDM project activity should be consistent with National Strategy for Growth and Reduction of Poverty, 2005 and that it should aim at poverty alleviation by generating additional employment and improving standards of living.	The programme is in line with the National Strategy for Growth and Reduction of Poverty (NSGPR), 2005, that aims at putting emphasis in rural development, especially creating access to modern energy services to the rural majority in the country. The project also, through provision of electricity power to the surrounding communities, helps in poverty reduction by generating additional employment to the community directly working in the power provision facilities and indirectly through the productive end-uses in micro/small enterprises supported by the generated power. The project also improves standard of living of the communities around by improving social services.
The CDM project activity should bring an additional financial investment and should be consistent with the Vision, 2025 for Tanzania mainland.	The PoA brings in additional financial investment in the form of developer equity, commercial capital and from the sale of CERs. The PoA is also consistent with the Vision, 2025 of Tanzania mainland, which aims at reducing the current extreme poverty and hunger and enhancing quality of life for all Tanzanians.
The project activity should be consistent with the Environmental Management Act (EMA), 2004 and its EIA and Audit Regulation, 2005. The project should reflect resource sustainability and resource degradation if any, impact on biodiversity, human health and other environmental issues.	Environmental Management Act (EMA), 2004 of Tanzania requires that all newly established projects define and establish their environmental management aspects, including proper environmental auditing as per the Audit Regulation, 2005. All CPAs will undertake the Environmental Impact Assessment which defines all aspects of environmental degradation caused by the project activities, their remedial measures and the subsequent management.
The CDM project activity should lead to transfer of environmentally benign and sound technologies to Tanzania.	Despite the fact that Tanzania is endowed with substantial renewable energy resources, little has been done to tap this resource. The PoA is designed to foster the development of renewable energy power projects by creating awareness, skills transfer and technology transfer to the local people.

**A.3. CMEs and participants of PoA**

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Rural Energy Agency (REA) will act as the Coordinating and Managing Entity (CME) of the SSC-PoA. The International Bank for Reconstruction and Development (IBRD), as Trustee of its Carbon Funds (Trustee) will manage the communications directly with the CDM Executive Board, in close coordination with REA.

A.4. Party(ies)

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) project participants (as applicable)	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
United Republic of Tanzania (host)	Rural Energy Agency (REA)	No
Government of Sweden	Swedish Energy Agency International Bank for Reconstruction and Development (IBRD) as the Trustee of the Carbon Partnership Facility	Yes

A.5. Physical/ Geographical boundary of the PoA

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The geographical boundary of Tanzania is considered the programme boundary. All small-scale CDM programme activities (SSC-CPAs) to be included in the PoA will be located in Tanzania. Moreover, each CPA will be delineated by the grids (national grid or isolated) and areas it will feed the generated electricity to. The country geographical coordinates are:

Latitude: (-) 6.00

Longitude: (+) 35.00.



Figure 1: Political Map of Tanzania as PoA Boundary¹

A.6. Technologies/measures

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The PoA is developed to include the following renewable energy technologies: hydro, photovoltaic, wind and biomass (with no leakage potential) excluding cogeneration projects.

The electricity supply industry in Tanzania has remained vertically integrated with TANESCO's being a major player with its own electricity generation, transmission and distribution facilities operating in Mainland Tanzania, despite enactment of the new sector legislation Electricity Act Cap, 131 of 2008. Electricity is distributed in the country through the two main systems: the national grid and isolated mini-grids all operated by TANESCO.

¹ http://www.foreign.go.tz/index.php/tanzania/category/country_profile/

The national grid includes a mix of hydro and thermal power plants, while the isolated mini-grids include only diesel power plants. Tanzania also imports small quantity of power from Uganda for the Kagera region, from Zambia for the Rukwa region and part of Mbeya and from Kenya for the Longido district in Arusha region. The following table provides an overview of the mix of electricity generation in Tanzania.

Summary of Installed and Available Capacity of Tanzanian Electricity System²

#	Item	Capacity (MW)	
		Installed	Available
1	TANESCO grid generation	1,027.74	873.10
2	TANESCO off-grid thermal generation	39.47	29.14
3	Off-Grid gas power plant IPP (Artumas)	12.00	12.00
4	TANESCO Imports on off-grid	-	13.80
	Total	1,039.78	898.93

The PoA-DD is developed to accommodate all kinds of technologies to the extent they can be covered under one of the following methodologies or a combination of the two.

CPA Category 1: CPAs that supply the main grid only	CPA Category 2: CPAs that supply an isolated mini-grid (new or existing)	CPA Category 3: CPAs that supply the main grid and an isolated mini-grid
•AMS-I.D. Grid connected renewable electricity generation, Version 17, EB 61	•AMS-I.F. Renewable electricity generation for captive use and mini-grid, Version 02, EB 61	•AMS-I.D. and AMS-I.F.

A typical CPA under this PoA comprises of one or more grid-based (national grid or mini-grid) renewable energy power plants with a total installed capacity not exceeding 15MW. The renewable energy plants are newly constructed by one or more project owners and generate electricity. The renewable energy power generation technologies employed in each CPA may differ within the same CPA (i.e. one or more renewable energy technologies in one CPA) and from one CPA to the next.

The CPAs 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., in the absence of the project activity, the users would have been supplied electricity from the national grid or isolated mini-grids or combination of the two.

A.7. Public funding of PoA

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No public funding will be used for this activity. The financing scheme encourages private investments. The World Bank Group (IDA) provides Line of Credit to local banks that lend this money to project promoters. This financing does not constitute a diversion of public resources or of ODA.

² EWURA Annual Report 2009/2010

SECTION B. Demonstration of additionality and development of eligibility criteria**B.1. Demonstration of additionality for PoA**

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- (i) The proposed PoA is a voluntary coordinated action;

The proposed PoA is a voluntary initiative by REA to encourage investments in renewable energy projects in view of increasing electricity access in rural. REA designs, manages and coordinates this PoA to support and scale up the development of renewable energy projects by considering the CDM to overcome difficulties encountered by projects developers to finance such projects. There are no mandatory requirements in Tanzania to oblige project developers to implement renewable energy projects or participate in the PoA. Project developers are free to choose either participating in the Tanzania REP or joining other CDM programmes or activities. REA has no mandatory obligations to implement this programme and the implementation of this PoA assists the government achieving greater energy access in the country while removing barriers that exist for implementation of these kinds of project in Tanzania.

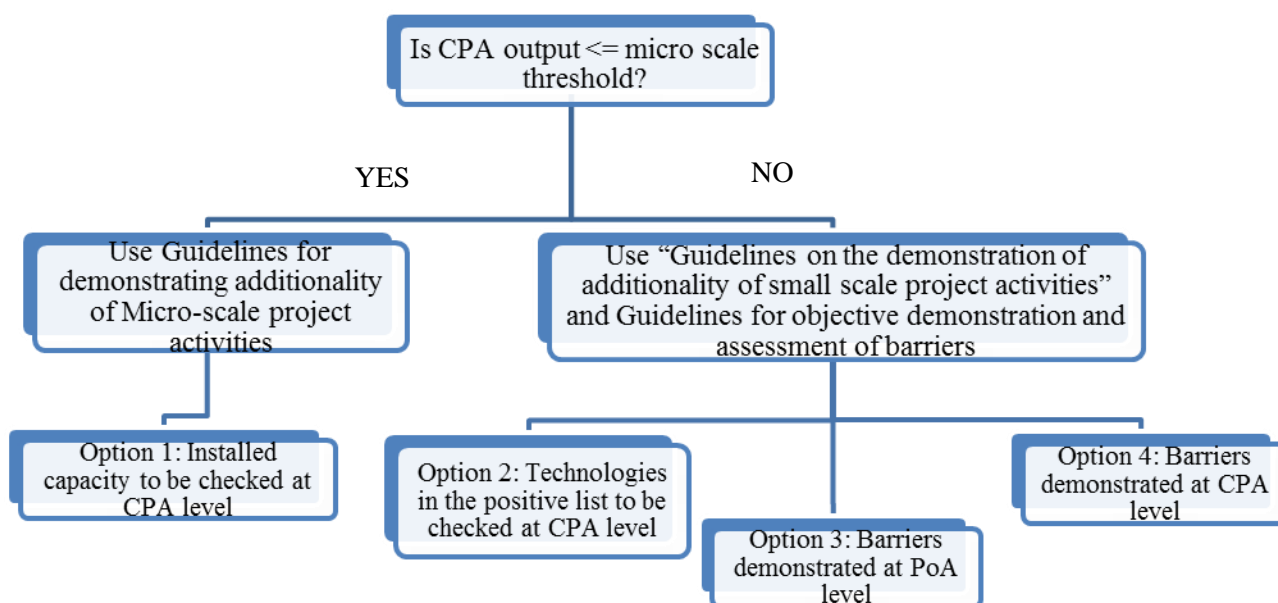
The proposed PoA is a voluntary coordinated action to encourage project developers to implement renewable energy projects.

- (ii) If the PoA is implementing a voluntary coordinated action, it would not be implemented in the absence of the PoA;

According to the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 03, EB 74. Additionality shall be demonstrated by establishing that in the absence of CDM, none of the implemented Component Project Activity (CPA) would occur. The standard requires that:

- PoAs that will include one or more microscale projects as CPA shall include eligibility criteria derived from all the relevant requirements of the “Guidelines for demonstrating additionality of microscale project activities”, Version 05, EB 73.
- PoAs that will include one or more small-scale projects as CPAs shall include eligibility criteria derived from all the relevant requirements of “Guidelines on the demonstration of additionality of small scale project activities”, Version 09, EB68.

The project participants have chosen to demonstrate the additionality at both PoA level and CPA level to offer some flexibility as the PoA includes CPAs with different features and background. Four options were identified as per the below decision tree.



The applicability of the requirements provided in the “Guidelines for demonstrating additionality of Micro-scale project activities”, Version 05, EB 73, (or latest available version at the time of CPA inclusion) will be checked at CPA level (Option 1).

As renewable energy projects face several barriers in Tanzania, the “Guidelines on the demonstration of additionality of small scale project activities” are used to demonstrate common barriers that constrain the development of renewable energy projects at PoA level. The additionality of the CPAs will be demonstrated through the eligibility to a positive list (Option 2) or a check list (Option 3).

CPAs that experience other barriers than those described in the PoA-DD could be additional provided that they demonstrate strong barriers to their implementation without CDM (Option 4).

The programme is developed to overcome the barriers and provide incentive to project promoters to implement renewable energy projects in the country.

Option 1: For micro-scale CPAs - As per “Guidelines for demonstrating additionality of micro-scale project activities”

As per the paragraph 2 of the “Guidelines for demonstrating additionality of Micro-scale project activities”, Version 05 (EB 73), project activities up to 5 megawatts that employ renewable energy as their primary technology are additional if the geographic location of the project activity is in one of the Least Developed Countries or the Small Island Countries (LDCs/SIDs) or in a special underdeveloped zone of the host country.

In accordance with the UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States, the United Republic of Tanzania is considered to be an LDC³. Hence under the proposed PoA, renewable energy CPAs having up to 5 MW installed capacity and located in Tanzania are automatically considered to be additional.

³ <http://www.unohrrls.org/en/ldc/25/>

Option 2: For CPAs included positive list of technologies and project activity types - as per the “Guidelines on the demonstration of additionality of small scale project activities”

The “Guidelines on the demonstration of additionality of small scale project activities” have established a positive list of grid-connected and off-grid renewable electricity generation technologies of installed capacity up to 15 MW that are automatically defined as additional, without further documentation of barriers. According to the list, projects using photovoltaic are automatically additional without further documentation of barriers. The list of eligible technologies and project activity types shall be sourced from the Guidelines.

Option 3: For CPAs in the capacity range > 5-15 MW facing specific identified barriers demonstrated at PoA level and that will be addressed with joining of the program - as per the “Guidelines on the demonstration of additionality of small scale project activities”

The barriers analysis which is presented is consistent with and in accordance with “Guidelines on the demonstration of additionality of small scale project activities”, Version 09, EB68.

Under the Version 01 of “Guidelines for objective demonstration and assessment of barriers” (Annex 13 of EB 50 guidelines), Guideline 7 states that “For projects in Least Developed Countries it is sufficient to transparently describe the relevant barriers, as less stringency is needed with regards to data availability in the actual demonstration of barrier, as compared to the projects in other countries. Projects in Least Developed Countries are not bound by the provisions in this guideline and may use other approaches that are more adapted to the local circumstances”. In accordance with the UN list, the United Republic of Tanzania is considered to be an LDC.

Tanzanian Power Sector Development Context

At present, the national electricity coverage is less than 14% which mostly caters to urban areas; while rural coverage is below 2%. Despite the relative high technical potential for small scale renewable projects, particularly of small hydro power plants, the exploitation of renewable resources till date has been very slow in Tanzania.

Acknowledging the direct link between energy access and development, the Government of Tanzania (GoT) has established a Rural Energy Agency (REA) by the Act of Parliament in 2005 to lead the development of a rural access strategy which encompasses grid and off-grid expansions and promoted the concept of Rural Energy Fund (REF) to finance rural energy projects, with a particular focus on renewable energy, administered by REA.

Project developers are responsible for raising the required capital to implement their projects. Given the financial market issues, GoT has already put in place a strong policy foundation and several financial incentive schemes to attract and support private sector investments, some targeted at the developers directly and some for the banks to enable them to provide long term finance to the projects. These include:

- *Project Preparation Grant* for undertaking studies, etc. to prepare the project for small renewable energy projects.
- *Upfront connection grant* for projects supplying electricity directly to the consumers (based on no. of households to be connected), which could be used as promoter’s equity. So the private sector can enter into direct distribution in off-grid areas; a \$500 subsidy per rural connection is provided by REA.
- *Long term loans* from the local banks facilitated by the IDA Line of Credit
- Standard Power Purchase Agreement (SPPA) and tariff framework exist for projects to feeding <10MW to the grid, with the TANESCO, and enforced by EWURA the independent regulator.

- *Small equity grants* by donors coordinated by REA (under development)
- *Simplified regulatory* processes for small power producers.
- Both domestic and international investments in energy generation permitted.
- Establishment of the Rural Energy Agency (REA), a Public National Entity, which coordinates and implements the policy.

However, despite this support, the Tanzanian renewable energy sector is still in very early stages, its development still being constrained by enduring administrative and financial barriers and uncertainties.

Within the current rural electrification development framework, a typical grid-based renewable energy power project faces three main constraints that impede its implementation: (i) the difficulty for private investors to mobilize the required equity for the financing closure, (ii) the power sector regulations for distributed power and tariffs setting methods, (iii) insufficient technological capacity about renewable energy power project. Among the three listed barriers, mobilizing the needed equity appears to be the major headache for investors.

1- Access to finance barriers

Many barriers have been identified that hinder the development of the renewable energy projects in Tanzania, especially the private sector investment in the Tanzanian power sector. Among those barriers, access to finance is documented to be a major barrier in Tanzania for implementing power projects.

Given financial market conditions in Tanzania, the promoters do not have access to long term finance in addition to huge collaterals required by banks. According to the latest Enterprise Surveys in Tanzania, 16.25% of firms have loans from Financial Institutions, only 6.79% of firms use banks to finance investments. The value of collateral required by banks is on average 124% of the value of the loan⁴.

Moreover, financing is done based on existing relationship with banks and based on the balance sheets of the company. The concept of project finance does not exist. With the support of the IDA Line of Credit, the banks now are willing to provide long term financing to the projects. Still, the unfamiliarity of Tanzanian banks to RE projects makes them reluctant to provide loans and create some bottlenecks to access bank financing. During a workshop held in August 2011 in Dar es Salaam, banks clearly expressed that they are more comfortable in lending money to project which can earn additional revenue from CDM to minimize the risk of repayment.

2- Difficulty for project developers to mobilize the required equity to close project financing

As discussed above, the Tanzanian power sector investment framework is driven by series of financial mechanisms put in place for promotion of rural electrification. Any project developer can access these mechanisms including performance grants, preparation costs grants, banks loans. Nevertheless, project developers are struggling to mobilize the equity required by banks. This difficulty is somehow linked to the small size of most project promoters who do not have sufficient assets and own capital to bring their share of the financing to complete the financial closure. Thus, covering the equity gap becomes another financing hurdle to overcome.

⁴ Enterprise Surveys - Tanzania (2006), www.enterprisesurveys.org

In a typical RE project, the banks require the promoters to bring in about 30% of project capital as equity. Analysis of information from various projects in the pipeline shows that the project developers are able to arrange up to 20-25% of the project capital as equity leaving a gap of about 5-10%.

Table 1: Typical Financing Structure of RE Projects in Tanzania

Funding Source	Percentage	Comments
Debt Financing	70%	Long term debt from banks enabled by World Bank Line of Credit
Equity Requirement	30%	To be arranged by the Project Developers
In Kind Equity	5%	Valuation of Promoters' efforts in getting water right, land, preparatory works etc.
Cash Equity	10-15%	Typical availability (based on actual data from several projects)
Performance Grants	5%	Based on number of connections provided (banks accept this as promoter's equity)
Equity Gap	5-10%	to be addressed through market based solutions (Proposed Carbon Equity Advance Scheme)

REA, as part of addressing this particular issue, is exploring the carbon equity advance scheme mainly to bridge the equity gap to an extent, at least for initial set of projects that will be implemented during next 5-6 years and thereby enabling the projects to achieve financial closure.

3- Difficult tariffs setting framework that increase risk on power generation projects

The existing power generation regulations are sources of commercial risks that affect the private investment in the power sector. Two main constraints are perceived by private investors in operating power plants and distributing electricity in un-served areas:

- As per “The Electricity (Development of Small Power Projects) Rules, 2010 (Part V, para 23)⁵, there is an obligation to connect an isolated mini-grid to the national main grid once the main grid comes to the project areas. In the event that a mini-grid is interconnected with TANESCO main grid, an SPPA concluded by TANESCO and an SPP developer shall terminate and the parties thereto shall conclude a new main-grid SPPA comprising a new tariff that will enter into force when the main grid is interconnected with the mini-grid. TANESCO shall provide details to an SPP developer on the extension plans of interconnecting the main grid with DNO's network. However, it is well established in Tanzania that the TANESCO Master plan for grid expansion (2009-2025) is not followed and is influenced by political agenda which is out of the control of TANESCO and project developers. The main risk is that main grid tariffs are lower than isolated mini-grid tariffs. The current tariff order provides an average main grid tariff at 121.13 TZS/KWh while the tariff for mini-grid is 380.22 TZS/KWh⁶. The shift from the isolated mini-grid tariffs to grid tariffs without clear agenda is a serious commercial loss from electricity sales, thus adding difficulty to payback bank loans and to recover the investment costs.
- Electricity tariffs setting method by EWURA is another disincentive to project developers. EWURA uses the Standardized Tariff Methodology (STM) to establish electricity sale tariffs for main grid and mini grid. For isolated mini-grids, the tariff calculation basis is the avoided cost for

⁵ EWURA, The Electricity (Development of Small Power Projects) Rules, 2010

⁶ The Electricity (Standardized Small Power Projects Tariff for Year 2011) Order, 2011

TANESCO, the investment cost for a new diesel engine generator and fuel costs⁷. The critical issue is that the tariff setting is not technology based to reflect actual generation cost for different renewable energy technologies. Moreover, the tariff calculation excludes all investment related to the development of the transmission and distribution network.

CDM revenues that could be generated by the sales of emission reductions provides incentives to partly mitigate the missed cash flow from the current tariffs and boost renewable energy power projects in the country.

4- Technical barriers

The development of renewable energy power projects is at the early stage. However, the few existing private sector initiatives are dominated by micro hydro power plants with installed capacities ranging from 30 kW to 4 MW. There is no actual experience about projects with more than 5 MW installed capacity. There is a lack of technical capacity to design and implement grid-based renewable energy power projects in Tanzania. Only very few RE based power plants are in operation in the country and the local market is limited from the technology side (technologies imported).

Option 4: For CPAs in the capacity range >5-15 MW with barriers demonstrated at CPA level- as per the “Guidelines on the demonstration of additionality of small scale project activities

For CPAs that do not face the above listed “specific” barriers but faces other barriers and are addressed by becoming part of the program, project developers shall provide an explanation to show that the project activity would not have occurred anyway in absence of the program due to at least one of the following barriers in accordance with “Guidelines on the demonstration of additionality of small scale project activities”:

- a) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions;

For CPAs that chose to demonstrate additionality using investment barrier, the following best practice examples could be followed as per the “Non-binding best practice examples to demonstrate additionality for SSC project activities”, EB35, Annex 34. *Best practice examples include but are not limited to, the application of investment comparison analysis using a relevant financial indicator, application of a benchmark analysis or a simple cost analysis (where CDM is the only revenue stream such as end-use energy efficiency). It is recommended to use national or global accounting practices and standards for such an analysis.*

The selection of the appropriate analysis method shall follow Guidance 19 of the “Guidelines on the assessment of investment analysis”, Version 05, EB62, that states “*If the proposed baseline scenario leaves the project participant no other choice than to make an investment to supply the same (or substitute) products or services, a benchmark analysis is not appropriate and an investment comparison analysis shall be used. If the alternative to the project activity is the supply of electricity from a grid this is not to be considered an investment and a benchmark approach is considered appropriate*”.

Based on the PoA design, the following situations could apply:

- The detailed calculation and comparison of financial indicators should be carried out at the CPA level.
- The simple cost analysis should be excluded from the investment analysis options as the CPAs generate financial and economic benefits other than CER revenues.

⁷ Detailed Tariff Calculation for Year 2011 for the Sale of Electricity to Mini-grids in Tanzania

- For CPA Category 1, there are no other credible and realistic baseline scenario alternatives other than electricity supply from the grid. Thus, the benchmark analysis will be most appropriate and will be chosen to demonstrate additionality. The financial internal return rate (FIRR) of the project (Equity IRR or Project IRR) is compared to a benchmark. This benchmark represents the minimal required FIRR of the project to be attractive.
 - As indicated in the “Guidelines”, local commercial lending rates (debt interest rate) or weighted average costs of capital (WACC) are appropriate benchmarks for a project IRR. For those CPAs where equity on return is important for decision making, equity IRR will be selected as appropriate benchmark. The value for the same will either be chosen from local publicly available information or uses the default values as specified for Tanzania (Group 1 projects) in the Appendix A of the Guidelines as available at the time of decision making/inclusion process.
 - For project involving equity and debt financing, the benchmark FIRR will be calculated as a weighted average costs of capital for each CPA using the following formula:
$$\text{FIRR benchmark} = (\text{Return on equity} \times \text{Equity percentage}) + (\text{Debt interest rate} \times \text{Debt percentage}) \times (1 - \text{corporate tax})$$
 - The CPAs in order to be eligible under the program need to demonstrate that their FIRR in the absence of CDM incentive is below the required minimum FIRR as per Guidelines.
- For CPA Category 2, the baseline scenario is fossil fuel fired generator units in a mini-grid. Thus, an investment comparison shall be conducted for the CPA technology and a modern diesel generating unit.
- For CPA Category 3, the most predominant supply option (largest portion of electricity supplied either to the national grid or the mini-grid) shall be used to select the appropriate analysis method.

The financial model will consider at least the following main parameters:

- Investment costs (e.g. construction costs, equipment costs)
- Operation and Maintenance costs
- Taxes
- Revenues from electricity sales.

The data used as inputs for the financial analysis will be sourced from project specific documents (feasibility study, business plan, offer for project construction, company benchmark for etc.), market data (local lending rates, etc.) and government published data (taxes, electricity rates, grants, incentives, etc.).

A sensitivity analysis is proposed to test the sensitivity of the cash flows to the changes, when relevant, in the parameters including:

- Energy generation exported to the grid;
 - Capital cost;
 - Operation and Maintenance cost
 - Tariff set scheme.
- b) Technological barrier: a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions;
- c) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions;

- d) Other barriers: without the project activity, for another specific reason identified by the project participant, such as institutional barriers or limited information, managerial resources, organizational capacity, financial resources, or capacity to absorb new technologies, emissions would have been higher.

An illustration of the role of carbon finance through the REA's Carbon Equity Advance Scheme

The CDM programme is designed to help private project developers invest in renewable energy grid power projects to increase the electricity access in Tanzania. In particular, addressing the equity gap has been one of the main drivers for REA to develop this PoA. Inspired by the carbon market developments and opportunities offered by the Carbon Partnership Facility (CPF), REA is proposing a CDM Programme of Activity for renewable energy projects and has submitted a written request to the World Bank to become a Seller Participant in the WB CPF program. Carbon finance based equity could be an important pillar of financing to bridge the equity gap that is documented to be one of the major hurdles for RE projects in Tanzania. REA believes that a programmatic approach and particularly collaboration with the WB CPF is the most appropriate option as it could help mainly smaller projects get access to carbon finance and close their project financing. These smaller projects, although economically very attractive, will be commercially unviable and cannot reach financial closure without an appropriate equity advance scheme.

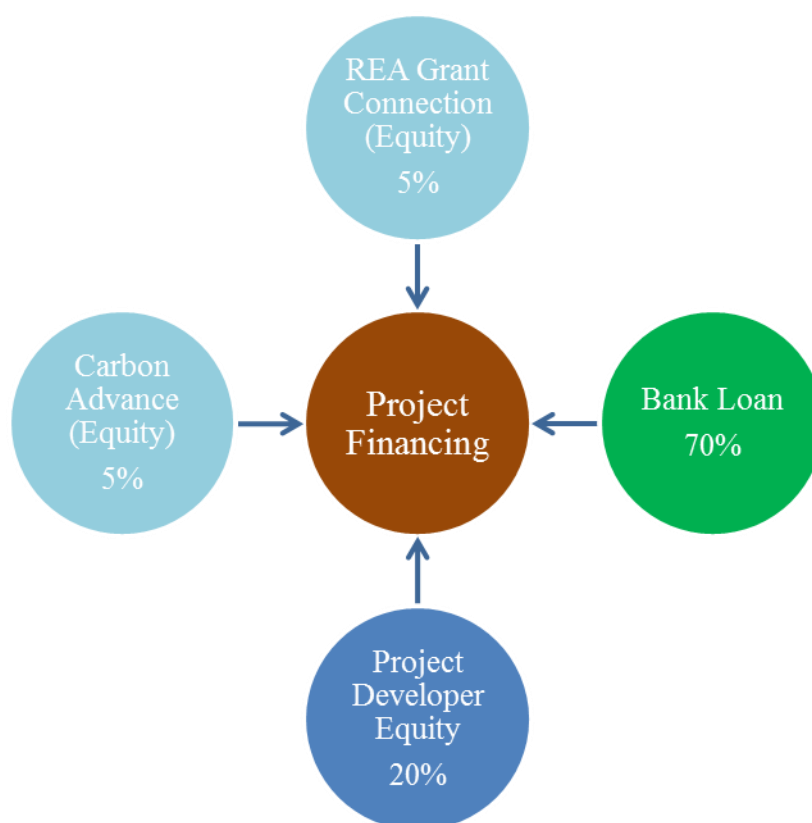


Figure 2: Typical Project Financing Arrangement Using Carbon Advance Equity

Such an arrangement to address the issue of equity gap will enhance the viability of small scale renewable energy projects, provide the much needed incentive to potential project developers to invest in renewable energy projects and ultimately contribute to achieve the objective of expanding rural electrification in Tanzania. This demonstrates clearly the additionality at the PoA level itself. As long as an individual CPA becomes part of this programme and uses the Carbon Equity Advance Scheme, its additionality will be automatically established.

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

Not applicable.

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

Not applicable.

B.2. Eligibility criteria for inclusion of a CPA in the PoA

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A CPA under the PoA is required to fulfill the eligibility criteria outlined in the below table for inclusion in the PoA. The developed eligibility criteria are consistent with the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 3, EB74.

#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
a	Geographical boundary of the CPA		
	The proposed CPA must be located within the geographic boundary of Tanzania.	Map of CPA and/or description of location indicating project within Tanzania boundary should be provided.	
b	Avoidance of double counting of emission reductions		
	Each CPA-DD shall be uniquely identified and defined in an unambiguous manner	Geographic information (GPS coordinates)	
	Avoidance of double counting: All CPAs under the PoA are neither registered as an individual CDM project activity nor included as a CPA of another registered PoA involving renewable energy technologies.	Based on the review of project list on UNFCCC website and project sites geographical coordinates	
	If electricity and/or steam/heat produced by the SSC-CPA 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.	Letter of intent or MOU or Contract between the supplier (CPA) and consumer of energy (facility)	
c	Specifications of technology/measure implemented by the CPA		
	The CPA should comprise one or more renewable energy power plants using one or more of the following renewable energy technologies: hydro, photovoltaic, wind and renewable biomass (except cogeneration and	Evidences should include any of the following: Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	without leakage) with a total installed capacity ≤ 15 MW.		
	SSC-CPA plant should be either (a) 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); or (b) Involve a capacity addition, In the case SSC-CPA involves the capacity 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.	Evidences should include any of the following: Project design documents, feasibility study, procurement documents, technical specifications, etc.	
	In the case that the project activity involves the construction of a new reservoir, the power density shall be larger than 4 W/m^2 . Reservoir surface and installed capacity or power density.	Topographical study or feasibility study, etc.	
	No generating equipment is transferred from another activity and no existing equipment is transferred to another activity.	Evidences could include contract for the equipment procurement, equipment order, etc.	
	For biomass power plants, no biomass other than renewable biomass is to be used in the project plant. (Refer “Definition of Renewable Biomass” as per Annex 18 of EB 23 (or latest) and “Glossary of CDM terms - Version 07.0 or latest”).	Survey or biomass availability study must be provided.	
	Biomass imported from outside Tanzania shall not be considered under the PoA.	Documentation of biomass supply/biomass availability study must be provided.	
d	Check the start date of the CPA through documentary evidence		
	The start data of the CPA is in line with CDM glossary, Version 07.	Evidences should include date of real actions such as loan contract, contract for construction, equipment procurement, equipment supply, etc.	
e	Compliance with applicability and other requirements of the methodology applied by CPAs		
	Each CPA is in compliance with applicability and other requirements of	Demonstration and documentation of the	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	the applicable approved methodologies for small scale project activities AMS-I.D.: Grid connected renewable electricity generation and/or AMS-I.F.: Renewable electricity generation for captive use and mini-grid.	applicability conditions should be provided by CPA implementer in the CPA-DD. Evidences could include project implementer declaration, technical specification, design document, feasibility study, business plan, etc.	
f	CPAs meet the requirements pertaining to the demonstration of additionality		
	Projects meeting the micro scale size limit are automatically additional as per the “Guidelines for demonstrating additionality of micro scale project activities”.	Any of the following could be provided: technical specification/manufacturer data/nameplate data/design document/feasibility study/equipment order or procurement, etc.	
	CPAs that include technologies and project activity types with total installed capacity larger than 5 MW and up to 15 MW are automatically additional as per the positive list in “Guidelines on the demonstration of additionality of small scale project activities”.	Technical specification, manufacturer data, nameplate data, feasibility study, etc.	
	Projects with installed capacity larger than 5 MW and Projects with installed capacity larger than 5 MW and up to 15 MW that face the following PoA level barriers are automatically additional: <ul style="list-style-type: none"> • Access to finance • Equity mobilization • Tariff setting issue • Technical barrier. 	As an evidence CPA owner should have signed carbon participation agreement (letters) for pre-identified barriers.	
	Projects with installed capacity larger than 5 MW and up to 15 MW that are facing different barriers than those listed above shall provide detailed demonstration of the additionality using “Guidelines on the demonstration of additionality of small scale project activities”.	The additionality demonstration shall be documented. Evidences could include feasibility study, business plan, offer for project construction, company benchmark for etc., market data (local lending rates, etc.), industry data and government or credible third party published data (taxes, electricity rates, grants, incentives, etc.).	
g	Local stakeholder consultations and environmental impact analysis		
	The project must have completed the	The relevant documents should	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	EIA and submitted it to the relevant authorities.	include inter alia the Environmental Impact Assessment (EIA) and any relevant permits (water rights, land right, etc.)	
	The project must have undertaken a stakeholder consultation as outlined in Section F.	Evidences could include the following : meetings/workshops minutes/reports, press release, list of participants and records of participants comments and project developers responses, pictures, etc.	
h	Affirmation of non diversion of official development assistance (ODA)		
	A letter from from Annex I parties should affirm that funding, if any, does not result in a diversion of ODA.	Participant from Annex I country LoA could be used. This evidence could be used for the inclusion of further CPAs	
i	Target group		
	The project should be connected to either the national grid or existing isolated grid or new isolated grid or a combination of these.	TANESCO letter of intent or power purchase agreement or EWURA License for power distribution	
j	Sampling requirements		
	Sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys.	Each CPA should confirm that sampling is not applied as all electricity to be generated will be measured at the connection point.	
k	CPA in aggregate meets the small-scale threshold		
	The installed capacity of individual CPA should not exceed 15 MW throughout the crediting period of the CPA. Evidences should include any of the following:	Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	
l	Requirements for the debundling check are met		
	Each SSC-CPA must satisfy de-bundling rules for PoA in accordance with the “Guidelines on assessment of de-bundling for SSC project activities”.	Confirmation by REA (CME)	
	Other Specific programme requirements		
	For CPAs comprising more than one power plants, project developers should designate a representative responsible for all CDM related communication and	Co-signed letter designating a representative/focal point.	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	decision.		
	The CPA implementer should have signed a cooperation agreement with REA to participate in the PoA	Signed a cooperation agreement with REA	

Provisions regarding the updating the CPA in case of on-hold or withdrawn methodology

1. If the approved methodology is put on hold or withdrawn, for any reason other than for the purpose of inclusion in a consolidated methodology, no new CPAs shall be included in the PoA, in accordance with the timelines indicated in the latest version of the “Procedures for the revision of an approved baseline and monitoring methodology by the Executive Board”.
2. If the methodology, subsequent to being placed on hold or withdrawn, is revised or replaced by inclusion in a consolidated methodology, the PoA shall be revised accordingly. The changes shall be subsequently documented in a new version of PoA (e.g. Version 2.1), validated by a DOE and approved by the Board. The Board’s approval defines a new version of the PoA and the PoA specific CDM-CPA-DD. Such revisions to the PoA are not required in cases where a methodology is revised without being placed on hold or withdrawn.
3. Once changes have been approved by the Executive Board, the inclusion of all new CPAs shall follow the latest version of the PoA specific CDM-CPA-DD.
4. CPAs that were included before the methodology was put on hold, shall apply the latest version of the PoA specific CDM-CPA-DD at the time of the renewal of the crediting period.

Provisions regarding the updating of eligibility criteria for inclusion of CPAs in the PoA

1. If the version of methodologies applied by the PoA is revised or replaced subsequent to being placed on hold, the CME shall update the eligibility criteria to the requirements of the revised or new methodologies with immediate effect, in accordance with “Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programmes of activities” Version 3.0.0. A new version of the PoA-DD (e.g. Version 1.1) and the generic CPA-DDs containing updated eligibility criteria validated by a DOE shall be submitted to the secretariat for approval by the Board.
2. Once the changes have been approved by the Board, the inclusion of all new CPAs shall be based on the updated eligibility criteria applying the corresponding new generic CPA-DDs;
3. CPAs that were included before the methodology was put on hold shall apply the revised version of the corresponding generic CPA-DDs only at the time of the renewal of their crediting periods.

B.3. Application of methodologies

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Since the PoA is developed to accommodate various renewable energy CPAs and three electricity evacuation options (isolated mini-grid, or national main grid or both), the project participants have opted for the use of the combination of two methodologies.

The following approved small-scale baseline and monitoring methodologies will be used as a single methodology or as a combination of the two methodologies⁸:

1. AMS-I.D.: Grid connected renewable electricity generation, Version 17, EB 61

Type I: Renewable energy projects

Category I.D.: Grid connected renewable electricity generation

Sectoral Scope: 01

Reference: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

2. AMS-I.F.: Renewable electricity generation for captive use and mini-grid, Version 02, EB 61

Type I: Renewable energy projects

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

Sectoral Scope: 01

Reference: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

The projects refer to the following methodological standards and tools:

- Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 3, EB 74.
- Tool to calculate the emission factor for an electricity system, Version 4, EB 75

SECTION C. Management system

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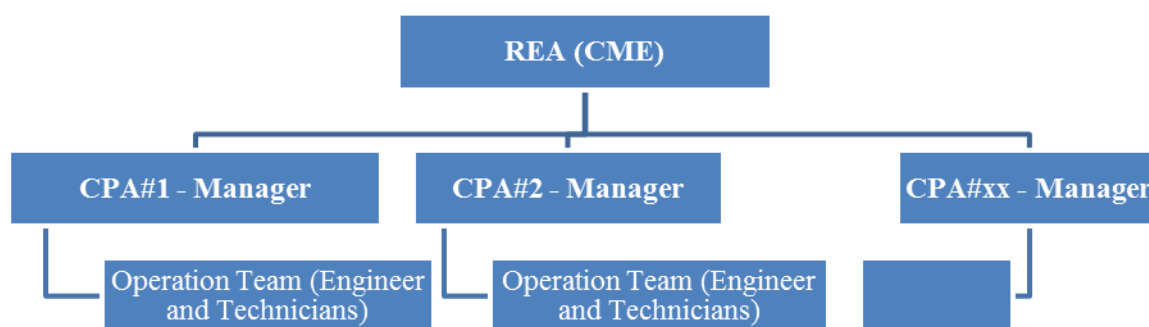
Operational and management structure

The management system is developed in accordance with the “Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 3, EB74.

REA will be the PoA managing entity. The operational and management arrangements established by the REA for the implementation of the PoA are described below. The operational and management structure set up a clear information and data flow channel between the CME and the CPA implementer. At CPA level, REA will ensure the actual involvement of field personnel (power plant operators/technicians) in the monitoring and data collection and record keeping activities. REA will request each CPA to designate a CPA manager at the project developer head office and an engineer in-charge of the power plant operation. However, the structure could vary slightly depending on the operation mode of the power plant (automatic operation will require less personnel and no log book).

The operational and management structure is presented in the following chart.

⁸ When applied in combination the “Guidelines for the consideration of interactive effects for the application of multiple CDM methodologies for a Programme of Activities” Version 01.0 will be considered.



The responsibilities of each actor will be as follows:

Team		Responsibilities
REA (CME)		<ul style="list-style-type: none"> Supervise all activities under the PoA Develop data recording formats and provide them to the CPA implementer in each region. Manage a centralised database system and maintain the data of each CPA. Carry out quality control and quality assurance of data and CPA operation. Supervise the data gathering process after project implementation to document emission reductions according to the Monitoring Plan. Calculate the emission reduction based on monitored parameters Prepare periodically monitoring reports Responsible for reviewing the monitoring parameters on a quarterly basis Maintain and manage PoA database .
CPA Implementer	CPA Manager	<ul style="list-style-type: none"> Responsible for all activities under the CPA Management, overall standard setting and supervision. In charge of suggesting immediate corrective actions and preparing a summary of the monthly data Manage database for CPA in line with CDM requirements under the supervision of REA. Report CPA data and monitoring information to REA (Quarterly reports). Database maintenance and management of the power plant in accordance with the monitoring plan. Ensure all relevant personnel are continuously trained on data recording and monitoring parameters.
	Operation team (Engineer and operators)	<ul style="list-style-type: none"> Responsible for power plant operation and field data record Check data record and compilation Send power plant data to CPA Manager Carry out operation and maintenance of the power plant. Capture hard copy data as per the data recording format (logbook), every month.

Procedures for technical review of inclusion of CPAs

The procedures for technical review of inclusion of CPAs are listed below:

Step 1: CPA in-charge personnel for each CPA will prepare the CPA-DD based on the generic CPA-DD and ensure that the Eligibility criteria stated under Section A.4.2 above is complied.

Step 2: CPA in-charge personnel for each CPA will submit the CPA-DD with supporting document to the Project Supervisor of all CPAs within the CME.

Step 3: Project Supervisor of all CPAs conducts technical review of the package against the Eligibility Criteria and ensure that the CPA-DD has all supporting document as required by the eligibility criteria.

Step 4: Project Supervisor of all CPAs submits the CPA-DD package to Project Manager of PoA.

Step 5: Project Manager of PoA within the CME carries out a final review of the CPA-DD package. If all eligibility criteria are met with necessary supporting document, the Project Manager of PoA issues an acceptant letter to include the CPA into the PoA.

Operational and management plan

The operation and management plan is describe below.

- (i) A record keeping system for each CPA under the PoA,

A record keeping system will be set up by REA, which contains the following details providing the unique identity for each SSC-CPA. The details include but are not limited to:

- Name of the CPA
- CPA number, (REA reference number)
- Name of CPA implementer
- Contact details of Implementing entity (Address / Contact person /Phone/e-mail/fax)
- Location of the CPA (GPS coordinates of the power house and the water intake)
- Type of renewable energy source
- Installed Capacity of the CPA
- The record of technical specification of each renewable energy plant participating in the PoA
- Type and name of the grid (national grid, existing isolated grid, new isolated grid) fed by the project
- Gross electricity generation
- Net electricity generation and electricity sales
- Meter calibration
- Commissioning date.

Two databases will be developed by REA for record keeping at CPA level and PoA level.

At the CPA level, CPA implementer will be responsible for the management of records and data associated with each SSC-CPA. They will maintain a proper electronic database for these records. A hard copy backup of all these records will also be made. In case of failure in the electronic data transfer system, manually recorded project details at the site will be collected and compiled, which will be sent to REA. The record keeping will be carried out by using the field instruments, hardware and software installed at every project site and/or manual data recording in the log book. The recorded data will be transferred to REA, which will have responsibility to archive the data as per individual CPAs. Each CPA implementer will carry out a periodic analysis (quarterly) of data.

At PoA level, REA will manage and maintain a record and a complete database on all CPAs and the PoA. The PoA level database will be fed from CPA level database and data from REA own supervision work. REA will cross-check all CPAs data to ensure completeness, accuracy, consistency and continuousness.

Paper and electronic records will be kept during the entire crediting period of each CPA and two years after the crediting period.

- (ii) A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA,

The following procedures will be followed at the time of CPAs inclusion in the PoA to avoid double counting:

- It will be checked and confirmed that the SSC CPA has not been already registered as a CDM project activity or as a CPA of another PoA.
- At time of CPA eligibility check, the coordinating and managing entity will confirm that the renewable energy power plants involved in the CPA is not accounted for in another CPA. The CME will also check any double counting using public information sources like UNFCCC website data, cd4cdm data and VCS website.
- Further, the project proponents will be made aware of the double accounting principle and will certify that the proposed CPA is not registered or included under the CDM of the UNFCCC. Should such a case occur then the coordinating entity will not proceed with inclusion of the corresponding CPA in the proposed PoA.
- The managing entity is the one having the rights to claim and own emission reductions under the Clean Development Mechanism of the UNFCCC.

Only CPAs which satisfy the above requirement will be submitted for inclusion in the PoA.

- (iii) The SSC-CPA included in the PoA is not a de-bundled component of another component programme activity (CPA) or CDM project activity.

The coordinating entity will follow the CDM EB 54, annex 13, version 03 “Guidance on assessment of de-bundling for SSC project activities”, in order to avoid registering a SSC-CPA that is a de-bundled component of another CPA or CDM Project.

For other grid-based CPAs, Paragraphs 8 and 9 of EB 54, Annex 13 will be followed:

8. For the purposes of registration of a Programme of Activities (PoA) , a proposed small-scale CPA of a PoA shall be deemed to be a de-bundled component of a large scale activity if there is already an activity, which,

(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 sectoral scope, and

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

9. If a proposed small-scale CPA of a PoA is deemed to be a de-bundled component in accordance with paragraph above, but the total size of such a CPA combined with a registered small-scale CPA of a PoA or a registered CDM project activity does not exceed the limits for small-scale CDM and small-scale A/R project activities as set out in Annex II of the decision 4/CMP.1 and 5/CMP.1 respectively, the CPA of a PoA can qualify to use simplified modalities and procedures for small-scale CDM and small-scale A/R CDM project activities.

In relation to the paragraph 8, if CPA does not satisfy both the condition 8 (a) & 8 (b), then the proposed small scale CPA of a PoA is not deemed to be de-bundled component of a large-scale activity. Therefore, it is eligible to use the simplified modalities and procedures for small-scale Project activities.

However, if the CPA satisfies the above conditions 8(a) & 8(b), in relation to paragraph 9, i.e., if the total size of such a CPA combined with a registered small-scale CPA of a PoA or a registered CDM Project activity does not exceed the limits for small-scale CDM Project activity, then the proposed small scale CPA of a PoA is deemed to be de-bundled component of a large-scale activity, but can qualify to use the simplified modalities and procedures for small-scale Project activities.

The electronic database described above shall be used to determine that a CPA is not a debundled component of another CDM project activity. Every new renewable energy power plants included as a CPA will be compared to the already existing database and the list of project activities under-validation or registered at the UNFCCC. Further, the project proponents will be made aware of the de-bundling rules and will certify that the proposed CPA is not a de-bundled part of a project. Should such a case occur then the coordinating entity would not proceed with inclusion of the corresponding CPA in the proposed PoA.

- (iv) The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;

REA is responsible for identifying, developing, registering and managing all SSC-CPAs included in the proposed PoA. These responsibilities are fulfilled in relation with CPA implementers. This means that those operating the SSC-CPA are aware and will have agreed that their activity is subscribed to the proposed PoA. Legal agreements have been put in place with project developers clearly stipulating that their activities are subscribed to the PoA and were not registered or submitted for registration under the Clean Development Mechanism of the UNFCCC.

Some of REA's staff are already trained in CDM and understand various aspects of CDM. By virtue of becoming the implementing agency for the IDA project, REA's staffs have also been trained to assess and evaluate the environmental and social issues in energy projects.

Records of arrangements for training and capacity development for personnel

REA will be responsible for keeping the record of training and capacity development activities provided to relevant personnel. Example of the record includes:

- Date, time, and venue of each training and capacity development events;
- Attendee records of each event; and
- Agenda and content of each training and capacity development events.

As described above in the operation and management structure, each CPA will appoint an operation engineer in charge supervising power plant operators. All relevant project staff will be trained on various aspects of the CPA operation and management. Operators will pursue on-site training.

Measures for continuous improvements of the PoA management system.

The Project Manager of PoA will organize a meeting with all his/her staff and CPA personnel to review the performance of the PoA management system on a semi-annual basis to identify issues that needs to be addressed in order to obtain continuous improvements of the PoA management system. The minutes of the meeting will be kept on file for record.

**SECTION D. Duration of PoA****D.1. Start date of PoA**

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10/12/2011

The date of the PoA-DD publication for global stakeholders consultation has been chosen as the starting date of the PoA

D.2. Length of the PoA

>>

28 years 0 months

SECTION E. Environmental impacts**E.1. Level at which environmental analysis is undertaken**

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- | | |
|--|-------------------------------------|
| 1. Environmental Analysis is done at PoA level | <input type="checkbox"/> |
| 2. Environmental Analysis is done at SSC-CPA level | <input checked="" type="checkbox"/> |

The environmental analysis would be carried out at the CPA level, as the individual CPA varies according to the specific location, capacity, type of renewable energy technologies used and some other specific concerns.

E.2. Analysis of the environmental impacts

>>

Not applicable at PoA level.

At CPA level: Any CPA must comply with regulatory requirements of EWURA. As per EWURA Rules 2010, a small power plant (SPP) developer shall obtain the following, among others, before starting to develop the SPP:

- Land title or right of use;
- For an SPP using hydro generation, water rights;
- As required, a building permit;
- An environmental and social clearance;
- A SPPA
- A licence, where applicable; and
- Any other relevant consent as may be required under applicable law.

As per the above list, an environmental and social clearance is required.

The provisions of the land title and water rights shall not apply to: (a) an SPP in which the right to use the fuel is wholly owned by the SPP developer; and (b) an SPP that uses only photovoltaic or wind power.

SECTION F. Local stakeholder comments**F.1. Solicitation of comments from local stakeholders**

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- | | |
|--|-------------------------------------|
| 1. Local stakeholder consultation is done at PoA level | <input type="checkbox"/> |
| 2. Local stakeholder consultation is done at SSC-CPA level | <input checked="" type="checkbox"/> |

The Local stakeholder consultations will be held at the 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 the surrounding. Stakeholder's consultation shall be done prior to inclusion of the each project activity at CPA level by following means:

1. Invitation to the local stakeholder - The local stakeholders will be invited through (i) Personal invitation and (ii) Open invitation notice pasted on public places / company entrance gate or newspaper advertisements.
2. The local stakeholder will be any of the below mentioned but not restricted to:
 - Local community leaders
 - Equipment manufacturers
 - Contract labourers
 - Equipment operators
 - Biomass & other material suppliers, if applicable
 - Neighbouring plant employees/owner(s)
 - Plant staff & employees
 - Government officials
 - Local residents
 - Nongovernmental organizations (NGOs)
3. Stakeholder consultation – The stakeholder consultation will be conducted to give opportunity to the stakeholders to understand the project, its role in GHGs emission reduction and to comment on the CDM initiative taken by the CPA implementer. The proposed agenda for the consultation is mentioned below:
 - Welcome address
 - Introduction about the program & purpose of the consultation
 - Introduction & explanation of the Project activity and its social, environmental impacts
 - CDM, benefits and discussions on applicability to various types of Projects.
 - Circulation of questionnaire to understand the stakeholder's / participant's views on Project
 - Closure of consultation with vote of thanks.

F.2. Summary of comments received

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Comments from the stakeholders will be summarized for each CPA. The comments will be received in the form of filled in questionnaire.

CME/CPA implementer will carry out the assessment of the comments by each filled in questionnaire and prepare an assessment summary of comments.

F.3. Report on consideration of comments received

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A summary of how due account was taken on the comments received will be provided for each CPA-DD.

SECTION G. Approval and authorization

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The LoA from the United Republic of Tanzania, approving the PoA and authorizing the CME is available. The LoA from the Government of Sweden – Swedish Energy Agency will be sought once the final validation report has been received.

PART II. Generic component project activity (CPA)

Following the Guidelines for completing the POA-DD (Annex 8 EB 74) all of Part II is repeated for each generic CPA-DD such that one completed Part II represents one generic CPA-DD.

Three CPA categories⁹ are defined under this PoA:

1. CPA Category 1: Renewable energy technology (hydro, wind, biomass or PV) connected to the national utility main grid avoiding generation from mix of fuels.
2. CPA Category 2: Renewable energy technology (hydro, wind, biomass or PV connected to existing or new isolated mini-grids replacing existing dedicated diesel based power generation
3. CPA Category 3: Renewable energy technology (hydro, wind, biomass or PV) supplies electricity to both national grid and existing or new isolated mini-grids.

⁹ Para 190 of the CDM Project Standard (Version 06.0) states “As part of the proposed CDM PoA, the coordinating/managing entity shall prepare generic CPA-DDs with generic information applicable to all CPAs that will be included in the PoA. For PoAs applying more than one technology/measure or more than one methodology, the coordinating/managing entity shall prepare a generic CPA for each technology/measure, each methodology and each combination thereof.”

Footnote 16 to Paragraph 190 also states: “...However, separate generic CPA-DDs are not required to cover cases that do not differ in terms of emission reduction calculations...”

Our understanding is that the requirement to prepare different generic CPAs was brought into practice to recognize the differences where there are different technologies with different outputs/services included. In the case of the “Tanzania Renewable Energy Program” the different technologies being employed provide the same outputs (metered electricity), and do not differ in terms of emission reduction calculations. In other words, the generated electricity is measured using energy meters and the emissions reductions are calculated as a product of the metered output and an emission factor determined from the applied methodologies (AMS-I.D and AMS-I.F) and combination of methodologies. Therefore, three (3) generic CPAs will need to be prepared for the following options:

1. Renewable energy technology (hydro, wind, biomass or PV) – grid connected (AMS-I.D) : emissions reductions depend on metered output (regardless of the renewable energy sources) and grid emission factor
2. Renewable energy technology (hydro, wind, biomass or PV) – captive use and mini-grid (AMS-I.F) : emissions reductions depend on metered output (regardless of the renewable energy sources) and default diesel emission factor
3. Renewable energy technology (hydro, wind, biomass or PV) – grid connected and captive use/mini-grid (AMS-I.D and AMS-I.F): emissions reductions depend on metered output (regardless of the renewable energy sources), grid emission factor and default diesel emission factor.

Part II. CPA Category 1: CPAs using AMS-I.D. Grid connected renewable electricity generation, version 17**SECTION A. General description of a generic CPA****A.1. Purpose and general description of generic CPA**

>>

A typical CPA (Category 1) will install one or more renewable energy technologies at one or more depending on resources availability in different locations and project developers' technology choice. The cumulative installed capacity of all units and/or individual projects (different sites) included in a typical CPA will be less or equal to 15 MW. CPAs will generate electricity from hydro, photovoltaic, wind and biomass (excluding projects with leakage and cogeneration) technologies.

The CPAs under Category 1 will supply the generated electricity to the main national grid operated by the national utility (TANESCO). The generated electricity would reduce GHG emissions from a mix of power plants on the national grid.

SECTION B. Application of a baseline and monitoring methodology**B.1. Reference of the approved baseline and monitoring methodology(ies) selected**

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CPA Category 1:

AMS-I.D.: Grid connected renewable electricity generation, Version 17, EB 61

Type I: Renewable energy projects

Category I.D.: Grid connected renewable electricity generation

Sectoral Scope: 01

Reference: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

CPAs refer to the following methodological standards and tools:

- Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities", Version 3, EB 74.
- Tool to calculate the emission factor for an electricity system, Version 4, EB 75

B.2. Application of methodology(ies)

>>

CPA Category 1: CPAs using AMS-I.D. Grid connected renewable electricity generation" (version 17, EB 61).

Applicability criteria as per AMS-I.D., Version 17	Justification
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	CPAs under this PoA can comprise renewable energy generation units (hydro, wind, renewable biomass and photovoltaic), that supply electricity to the Tanzanian national grid or an identified consumer via the national grid.
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	The CPA can involve installation of new renewable energy power plant at the site where there is no renewable energy power plant operating prior to the implementation of the

Applicability criteria as per AMS-I.D., Version 17	Justification
(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).	project activity (Greenfield plant) or a capacity addition to existing plants.
Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: <ul style="list-style-type: none"> 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/m²; The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m². 	The hydro project will satisfy all methodology requirements. This will be demonstrated in each relevant CPA. <ul style="list-style-type: none"> Hydro power CPAs will be either a run-of-river small hydro power plant/unit or with new or existing reservoir. The hydro power could be a hydro power plant on existing reservoir with no change in volume or with increase in volume. In case the project activity is implemented in existing reservoir with increase in volume than the power density will be more than 4 W per m². In case CPA is a project activity with new reservoir the power density of the power plant will be more than 4 W/m²
If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM 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.	The CPAs involve renewable energy sources only. The capacity of the individual CPAs will be less than 15 MW.
Combined heat and power (co-generation) systems are not eligible under this category.	No CPA with heat generation will be included in this PoA.
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 involving capacity addition of renewable energy generation units at an existing renewable power generation facility will ensure that the added capacity of the units added by the CPA is lower than 15 MW and be physically distinct from the existing units.
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	The project activity involves new installation of renewable energy generation units at the site where there is no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant) or a capacity addition to existing plants. Hence, this is not applicable.
In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues only or biomass from dedicated plantations complying with the applicability conditions of AM0042.	The fuel used in the biomass power plant is wood and agricultural residues, which satisfies the definition of renewable biomass.

B.3. Sources and GHGs

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CPA Category I

The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

CPA Category I – Gases included in the boundary:

Source		Gas	Included?	Justification/Explanation
Baseline	Power plants servicing the national electricity grid	CO ₂	Yes	Main emissions source
		CH ₄	No	Minor emission source. Excluded for simplification
		N ₂ O	No	Minor emission source. Excluded for simplification
Project Activity	Renewable energy Project	CO ₂	No	Minor emission source, according to AMS-I.D.
		CH ₄	No	Minor emission source, according to AMS-I.D.
		N ₂ O	No	Minor emission source, according to AMS-I.D.
	For hydro power plants with reservoir, emissions of CH ₄ from the reservoir	CO ₂	No	Minor emission source according to ACM0002
		CH ₄	Yes	Main emission source according to ACM0002
		N ₂ O	No	Minor emission source according to ACM0002

B.4. Description of baseline scenario

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The baseline scenario is identified in accordance with the project categories and the provisions in AMS-I.D. Version 17. The identified baseline scenario and the description are presented in the table below.

CPA Category	Baseline scenario as per the methodology	Justification
Category 1: CPAs using AMS-I.D. Grid connected renewable electricity generation" (version 17, EB 61).	The baseline scenario is established as per provisions in AMS-I.D. Version 17. The baseline is the electricity delivered to the grid by the project activity that would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid. The baseline emissions are the product of electrical energy baseline expressed in MWh of electricity produced by the renewable generating unit multiplied by the grid emission factor.	For all part of electricity supplied to the national grid, an emission factor for the grid will be established as per provisions in AMS-I.D and the "Tool to calculate the emission factor for an electricity system". The national grid will be the baseline system.

B.5. Demonstration of eligibility for a generic CPA

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Eligibility criteria, and justification of how the criterion is met, is shown in the tables below.

CPA Category I



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
a	Geographical boundary of the CPA		
	The proposed CPA must be located within the geographic boundary of Tanzania.	Map of CPA and/or description of location indicating project within Tanzania boundary should be provided.	
b	Avoidance of double counting of emission reductions		
	Each CPA-DD shall be uniquely identified and defined in an unambiguous manner	Geographic information (GPS coordinates)	
	Avoidance of double counting: All CPAs under the PoA are neither registered as an individual CDM project activity nor included as a CPA of another registered PoA involving renewable energy technologies.	Based on the review of project list on UNFCCC website and project sites geographical coordinates	
	If electricity and/or steam/heat produced by the SSC-CPA 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.	Letter of Intent, or MOU or contract between the supplier (CPA) and consumer of energy (facility)	
c	Specifications of technology/measure implemented by the CPA		
	The CPA should comprise one or more renewable energy power plants using one or more of the following renewable energy technologies: hydro, photovoltaic, wind and renewable biomass (except cogeneration and without leakage) with a total installed capacity ≤ 15 MW.	Evidences should include any of the following: Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	
	SSC-CPA plant should be either (a) 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); or (b) Involve a capacity addition, In the case SSC-CPA involves the capacity 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.	Evidences should include any of the following: Project design documents, feasibility study, procurement documents, technical specifications, etc.	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	In the case that the project activity involves the construction of a new reservoir, the power density shall be larger than 4 W/m ² . Reservoir surface and installed capacity or power density.	Topographical study or feasibility study, etc.	
	No generating equipment is transferred from another activity and no existing equipment is transferred to another activity.	Evidences could include contract for the equipment procurement, equipment order, etc.	
	For biomass power plants, no biomass other than renewable biomass is to be used in the project plant. (Refer “Definition of Renewable Biomass” as per Annex 18 of EB 23 (or latest) and “Glossary of CDM terms - Version 07.0 or latest”).	Survey or biomass availability study must be provided.	
	Biomass imported from outside Tanzania shall not be considered under the PoA.	Documentation of biomass supply/biomass availability study must be provided.	
d	Check the start date of the CPA through documentary evidence		
	The start data of the CPA is in line with CDM glossary, Version 07.	Evidences should include date of real actions such as loan contract, contract for construction, equipment procurement, equipment supply, etc.	
e	Compliance with applicability and other requirements of the methodology applied by CPAs		
	Each CPA is in compliance with applicability and other requirements of the applicable approved methodologies for small scale project activities AMS-I.D.: Grid connected renewable electricity generation.	Demonstration and documentation of the applicability conditions should be provided by CPA implementer in the CPA-DD. Evidences could include project implementer declaration, technical specification, design document, feasibility study, business plan, etc.	
f	CPAs meet the requirements pertaining to the demonstration of additionality		
	Projects meeting the micro scale size limit are automatically additional as per the “Guidelines for demonstrating additionality of micro scale project activities”.	Any of the following could be provided: technical specification/manufacturer data/nameplate data/design document/feasibility study/equipment order or	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
		procurement, etc.	
	CPAs that include technologies and project activity types with total installed capacity larger than 5 MW and up to 15 MW are automatically additional as per the positive list in “Guidelines on the demonstration of additionality of small scale project activities”.	Technical specification, manufacturer data, nameplate data, feasibility study, etc.	
	Projects with installed capacity larger than 5 MW and Projects with installed capacity larger than 5 MW and up to 15 MW that face the following PoA level barriers are automatically additional: <ul style="list-style-type: none"> • Access to finance • Equity mobilization • Tariff setting issue • Technical barrier. 	As an evidence CPA owner should have signed carbon participation agreement (letters) for pre-identified barriers.	
	Projects with installed capacity larger than 5 MW and up to 15 MW that are facing different barriers than those listed above shall provide detailed demonstration of the additionality using “Guidelines on the demonstration of additionality of small scale project activities”.	The additionality demonstration shall be documented. Evidences could include feasibility study, business plan, offer for project construction, company benchmark for etc., market data (local lending rates, etc.), industry data and government or credible third party published data (taxes, electricity rates, grants, incentives, etc.).	
g	Local stakeholder consultations and environmental impact analysis		
	The CPA must have secured all required and applicable environmental clearances as outlined in Section E.2.	The relevant documents should include inter alia approved Environmental Impact Assessment (EIA) and relevant permits (water rights, land right, etc.)	
	The project must have undertaken a stakeholder consultation as outlined in Section F.	Evidences could include the following : meetings/workshops minutes/reports, press release, list of participants and records of participants comments and project developers responses, pictures, etc.	
h	Affirmation of non diversion of official development assistance (ODA)		
	A letter from from Annex I parties should affirm that funding, if any, does	Participant from Annex I country LoA could be used. This	

#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	not result in a diversion of ODA.	evidence could be used for the inclusion of further CPAs	
i	Target group		
	The project should be connected to the national grid.	TANESCO Letter of Intent or power purchase agreement and/or EWURA License for power distribution	
j	Sampling requirements		
	Sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys.	Each CPA should confirm that sampling is not applied as all electricity to be generated will be measured at the connection point.	
k	CPA in aggregate meets the small-scale threshold		
	The installed capacity of individual CPA should not exceed 15 MW throughout the crediting period of the CPA. Evidences should include any of the following:	Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	
l	Requirements for the debundling check are met		
	Each SSC-CPA must satisfy de-bundling rules for PoA in accordance with the “Guidelines on assessment of de-bundling for SSC project activities”.	Confirmation by REA (CME)	
	Other Specific programme requirements		
	For CPAs comprising more than one power plants, project developers should designate a representative responsible for all CDM related communication and decision.	Co-signed letter designating a representative/focal point.	
	The CPA implementer should have signed a cooperation agreement with REA to participate in the PoA	Signed a cooperation agreement with REA	

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

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CPA Category 1

AMS-I.D. Version 17 is applicable to a renewable energy system which delivers to grid. This methodology requires that baseline emissions are calculated by multiplying the generated electricity quantity by the grid emission factor.

In accordance with the provisions in AMS-I.D version 17, the emission factor can be calculated in a transparent and conservative manner as follows:

- (a) A combined margin (CM), consisting of the combination of the operating margin (OM) and build margin (BM) according to the procedures prescribed in “Tool to calculate the emission factor for an electricity system”. OR
- (b) The weighted average emissions (in kg CO₂e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations will be based on data from an official source made publicly available.

The option (a) approach has been selected for the CPA by the project proponent, i.e. the combined margin emission factor.

The OM emission factor will be established according to one of the following methods: the simple OM, the simple adjusted OM or the average OM as defined in the “Tool to calculate the emission factor for an electricity system”. Ex-ante option will be applied, i.e. the OM emission factor is determined once at the validation/inclusion stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required. For grid power plants, use a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CPA-DD to the DOE for validation/inclusion. Depending on the availability of data, Option A or Option B could be used to calculate the OM. Each CPA should justify the selection of the relevant options. Option B should only be used if the necessary data for Option A is not available. The choice of the options will be specified in the respective CPA-DDs.

The BM emission factor will be calculated using Option 1. Hence, for the first crediting period, the BM will be calculated ex ante based on the most recent information available on units already built for sample group m at the time of CPA-DD submission to the DOE for validation/inclusion. 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.

B.6.2. Data and parameters that are to be reported ex-ante

CPA Category1: CPAs supplying the national grid (AMS-I.D. Grid connected renewable electricity generation)

Data / Parameter	$EF_{CO_2,grid,y}$
Unit	tCO ₂ e/MWh
Description	CO ₂ emission factor of the grid in year y
Source of data	Published value from official source or calculated as described in B.6.3.
Value(s) applied	Specific value for each CPA
Choice of data or Measurement methods and procedures	<p>The data is officially published by the host country and publicly available.</p> <p>The SSC-CPA owner shall apply the latest grid emission factor database available in the official source of the host country or calculate the grid emission factor using the latest version of the “Tool to calculate the emission factor for an electricity system”.</p>
Purpose of data	Calculation of baseline emissions.
Additional comment	The official published grid emission factor will be used if available at the time of CPA submission. Otherwise, each CPA will calculate the emission factor using the latest version of the “Tool to calculate the emissions factor for an electricity system”

Data / Parameter	$EF_{CO_2,m,i,y}$
Unit	tCO ₂ /GJ
Description	CO ₂ emissions factor of fossil fuel type i used in power unit m in year y
Source of data	IPCC default values at the lower limit of uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of the 2006 IPCC Guidelines on National GHG inventories
Value(s) applied	Gas Oil/Diesel Oil (0.0726 tCO ₂ /GJ) , Natural Gas (0.0543 tCO ₂ /GJ)
Choice of data or Measurement methods and procedures	<p>No data for the fuels used in Tanzania is available hence IPCC defaults are used.</p> <p>For the calculation of the Simple Adjusted OM these figures shall be updated once, at the start of each crediting period in accordance with the applicable IPCC data at the time.</p> <p>For the BM these figures shall be updated once, at the start of each crediting period with the applicable IPCC data at the time.</p>
Purpose of data	Calculation of baseline emissions
Additional comment	Reported only if the grid emission factor is calculated

Data / Parameter	$EF_{EL,m,y}$
Unit	tCO ₂ /MWh
Description	CO ₂ emissions factor of power unit m considered in grid emission factor calculation in year
Source of data	TANESCO
Value(s) applied	Specific value for each CPA.
Choice of data or Measurement methods and procedures	Calculated based on approach provided under Option A2 of the Simple OM method, using annual electricity generation, fuel type and efficiency for each power unit, m.
Purpose of data	Calculation of baseline emissions.
Additional comment	This data will be used if available from TANESCO. Otherwise, it should be calculated.

Data / Parameter	$\eta_{m,y}$		
Unit	-		
Description	Average net energy conversion efficiency of power unit m in year y		
Source of data	TANESCO or default values of “Tool to calculate the emissions factor for an electricity system”, version 04.0.0		
Value(s) applied	Default values as per Tool to calculate the emissions factor for an electricity system		
	Fuel type	Old units (before and in 2000)	New units (after 2000)
	Oil		
	Steam turbine	37.5%	39%
	Open cycle	30%	39.5%
	Combined cycle	46%	46%
	Natural gas		
	Steam turbine	37.5%	37.5%
	Open cycle	30%	39.5%
	Combined cycle	46%	60%
Choice of data or Measurement methods and procedures	Data from the Tanzania grid company will be used if available		
Purpose of data	Calculation of baseline emissions.		
Additional comment	Reported only if the grid emission factor is calculated. Relevant values will be specified in each CPA.		

Data / Parameter	$EG_{m,y}$
Unit	MWh
Description	Net quantity of electricity generated and delivered to the grid by power unit m in year y
Source of data	TANESCO
Value(s) applied	Specific value for each CPA.
Choice of data or Measurement methods and procedures	As per “Tool to calculate the emission factor for an electricity system” method for Simple Adjusted OM.
Purpose of data	Calculation of baseline emissions
Additional comment	Reported only if the grid emission factor is calculated

Data / Parameter	$EG_{k,y}$
Unit	MWh
Description	Net quantity of electricity generated and delivered to the grid by power unit k in year y
Source of data	TANESCO
Value(s) applied	Specific value for each CPA.
Choice of data or Measurement methods and procedures	As per “Tool to calculate the emission factor for an electricity system” method for Simple Adjusted OM.
Purpose of data	Calculation of baseline emissions
Additional comment	Reported only if the grid emission factor is calculated

Data / Parameter	$EG_{Historical}$
Unit	MWh
Description	Annual average historical net electricity generation by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data	Calculated for capacity addition projects
Value(s) applied	To be specified in each CPA, if applicable
Choice of data or Measurement methods and procedures	Use in the specific case of retrofit/capacity addition in hydro, photovoltaic and wind plants where power generation to capture the uncertainty related to the variability of the renewable source. The baseline electricity generation is established in a conservative manner and that the calculated emission reductions are attributable to the project activity. Calculated using the three last calendar years (five calendar years for hydro project) prior to the project implementation.
Purpose of data	Calculation of baseline emissions.
Additional comment	



Data / Parameter	$\sigma_{\text{Historical}}$
Unit	MWh
Description	Standard deviation of the annual average historical net electricity generation by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data	Calculated for capacity addition projects
Value(s) applied	To be specified in each CPA, if applicable
Choice of data or Measurement methods and procedures	Use in the specific case of retrofit/capacity addition in hydro, photovoltaic and wind plants where power generation to capture the uncertainty related to the variability of the renewable source. The baseline electricity generation is established in a conservative manner and that the calculated emission reductions are attributable to the project activity. Calculated using the three last calendar years (five calendar years for hydro project) prior to the project implementation.
Purpose of data	Calculation of baseline emissions.
Additional comment	

Data / Parameter	Cap _{BL}
Unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity
Source of data	Nameplate or project technical specifications
Value(s) applied	To be specified in each CPA. For new hydro power plants, this value is zero.
Choice of data or Measurement methods and procedures	Determine the installed capacity based on recognized standards/nameplate data.
Purpose of data	Calculation of project emissions
Additional comment	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²

Data / Parameter	A_{BL}
Unit	m^2
Description	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full
Source of data	Feasibility study/design document
Value(s) applied	To be specified in each CPA. For new hydro power plants, this value is zero.
Choice of data or Measurement methods and procedures	Measured from topographical surveys, maps, satellite pictures, etc.
Purpose of data	Calculation of project emissions
Additional comment	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²

Data / Parameter	EF_{Resy}
Unit	kgCO ₂ e/MWh
Description	Default emission factor for emissions from reservoirs
Source of data	Decision by EB 23
Value(s) applied	90
Choice of data or Measurement methods and procedures	Default factor
Purpose of data	Calculation of project emissions
Additional comment	Considered if project emission is applicable for hydro projects.

Data / Parameter	$MC_{Biomass}$
Unit	% of water
Description	Moisture content of the biomass (wet basis).
Source of data	Lab records. Ex-ante estimates will be used during the crediting period.
Value(s) applied	To be specified for each CPA.
Choice of data or Measurement methods and procedures	On-site measurements. The moisture content of biomass of homogenous quality shall be determined ex ante. The weight average should be calculated and used in the calculations.
Purpose of data	Calculation of project emissions
Additional comment	Fixed <i>ex-ante</i> . If other biomass types are used, the moisture content will be tested and used.

B.6.3. Ex-ante calculations of emission reductions

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CPA Category 1: CPA supplying the national grid (AMS-I.D. Grid connected renewable electricity generation)

For project activities connected to the national grid, the CPA shall use the AMS-I.D. (Version 17) and relevant equations. Moreover, all CPAs under this PoA are new power plants (Greenfield projects) or addition of new units to existing power plants.

1. Emission reductions

The emission reduction by a typical Category 1 CPA is calculated as follows:

$$ER_{y,(Category1)} = BE_{y,(Category1)} - PE_{y,(Category1)} - LE_{y,(Category1)}$$

Where:

$ER_{y,(Category1)}$	Emission reductions in year y (t CO ₂ /y) for national grid connected projects
$BE_{y,(Category1)}$	Baseline emissions in year y (tCO ₂) for national grid connected projects
$PE_{y,(Category1)}$	Project emissions in year y (t CO ₂ /y) for national grid connected projects
$LE_{y,(Category1)}$	Leakage emissions in year y (t CO ₂ /y) for national grid connected projects

2. Baseline emissions

For new power plants at site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant)

$$BE_{y,(Category1)} = EG_{BL,y,(Category1)} * EF_{CO2,grid,y}$$

Where:

$BE_{y,(Category1)}$	Baseline emissions in year y (tCO ₂) for electricity supplied to the national grid
$EG_{BL,y,(Category1)}$	Quantity of net electricity supplied to the national grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{CO2,grid,y}$	CO ₂ emission factor of the grid in year y (t CO ₂ /MWh)

For capacity addition of hydro, photovoltaic and wind plants

The baseline emissions ($BE_{Capacity\ addition,CO2,y}$) are thus calculated as follows:

$$BE_{Capacity\ addition,CO2,y} = EG_{Capacityaddition,BL,y} * EF_{CO2}$$

Where:

$$EG_{Capacity\ addition,BL,y} = EG_{PJ,Facility,y} - (EG_{Historical} + \sigma_{Historical})$$

$EG_{Capacity\ addition,BL,y}$	Quantity of net electricity generation that is supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
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$EG_{PJ,Facility,y}$	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh)
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$EG_{Historical}$

Annual average historical net electricity generation by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity (MWh)

To determine $EG_{Historical}$, project participants may choose between the following two historical periods (This allows some flexibility; the use of the longer time period may result in a lower standard deviation and the use of the shorter period may allow a better reflection of the (technical) circumstances observed during the more recent years):

- (a) The three last calendar years (five calendar years for hydro project) prior to the capacity addition.
- (b) The time period from the calendar year following $DATE_{hist}$, up to the last calendar year prior to the implementation of the project, as long as this time span includes at least three calendar years (five calendar years for hydro project), where $DATE_{hist}$ is latest point in time between:
 - (i) The commercial commissioning of the plant/unit;
 - (ii) If applicable: the last capacity addition to the plant/unit; or
 - (iii) If applicable: the last retrofit of the plant/unit

 $\sigma_{Historical}$

Standard deviation of the annual average historical net electricity generation by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity (MWh)

In the case of wind, photovoltaic, wave or tidal power plants, it is assumed that the addition of new capacity or retrofitting of existing unit to increase capacity does not significantly affect the electricity generated by existing plant(s) or unit(s). In this case, the electricity produced by the added power plant(s) or unit(s) could be directly metered and used to determine $EG_{BL,y}$, provided that the electricity produced by the added power plant(s) or unit(s) addition is separately metered.

For capacity addition with renewable energy units other than photovoltaic, wind plants, i.e. for biomass power plants under this PoA

For CPAs that involve the addition of renewable energy generation units at an existing renewable power generation facility, where the existing and new units share the use of common and limited renewable resources (e.g. biomass residues), the potential for the project activity to reduce the amount of renewable resource available to, and thus electricity generation by, existing units must be considered in the determination of Baseline Emissions, project emissions, and/or leakage, as relevant.

The baseline emissions ($BE_{add,CO2,y}$) are calculated as:

$$BE_{add,CO2,y} = (EG_{PJ,add,y} - EG_{BL,existing,y}) * EF_{CO2}$$

Where

 $EG_{PJ,add,y}$

The total net electrical energy supplied to a grid in year y by all units, existing and new project units; (MWh)

 $EG_{BL,existing,y}$

The estimated net electrical energy that would have been produced and supplied to a grid by existing units (installed before the project activity) in year y in the absence of the project activity, (MWh)

Where:

$$EG_{BL,existing,y} = MAX(EG_{actual,y}, EG_{estimated,y}) \text{ until } DATE_{BaselineRetrofit}$$

And,

$$EG_{BL,existing,y} = 0 ; \text{ on/after } DATE_{BaselineRetrofit}$$

Where:

$EG_{actual,y}$ The actual, measured net electrical energy produced and supplied to the grid by the existing units in year y (MWh)

Grid emission factor

In accordance with the provisions in AMS-IDD version 17, the emission factor can be calculated in a transparent and conservative manner as follows:

- (a) A combined margin (CM), consisting of the combination of the operating margin (OM) and build margin (BM) according to the procedures prescribed in ‘Tool to calculate the emission factor for an electricity system’. OR
- (b) The weighted average emissions (in kg CO₂e/kWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculations will be based on data from an official source made publicly available.

The option ‘a’ approach has been selected for the CPA by the project proponent, i.e. the combined margin emission factor with the *ex-ante* approach. This requires the use of the “Tool to calculate the emission factor for an electricity system”. According to the tool, the baseline emission factor has to be determined using the following steps:

- Step 1: Identify the relevant electric power system.
- Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)
- Step 3: Select an operating margin (OM) method.
- Step 4: Calculate the operating margin emission factor according to the selected method.
- Step 5: Calculate the build margin emission factor.
- Step 6: Calculate the combined margin (CM) emission factor.

The steps will be detailed in CPAs depending on available data.

3. Project emissions

No project emissions ($PE_{y(Category1)}$) are expected from the implementation of the biomass, wind and photovoltaic renewable energy power plants. Hence,

$$PE_{y(Category1)} = 0$$

For Hydro projects

For hydro power CPAs that result in new reservoirs and/or the increase of existing reservoirs, the power density (PD) of the CPA shall be calculated as per Approved Consolidated Methodology ACM0002, version 13.

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

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

PD = Power density of the project activity (W/m²)

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

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

A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m²)

A_{BL} = Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m²). For new hydro power plants, this value is zero.

(a) If the power density of the project activity (PD) is greater than 4 W/m² and less than or equal to 10 W/m²:

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000}$$

Where:

$PE_{HP,y}$ = Project emissions from water reservoirs (tCO₂e/yr)

EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year y (kgCO₂e/MWh)

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

(b) If the power density of the project activity (PD) is greater than 10 W/m²:

$$PE_{HP,y} = 0$$

4. Leakage

As per AMS-I.D. methodology, leakage has to be considered, if there is any energy generating equipment transfer from another activity. The CPAs under this PoA will not involve any transfer of equipment from another activity. All systems will consist in newly procured equipment. Hence, the leakage emission due to equipment transfer is not considered for the CPAs under this PoA.

However, leakage may occur for biomass project activities. The leakage occurrence should be assessed as outlined below.

Leakage for biomass projects

The main potential source of leakage for biomass project activities is due to the diversion of biomass residues from other uses to the project plant as a result of the project activity. i.e., the competing use of the biomass residues according to the Attachment C to Appendix B indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories “General guidance on leakage in biomass project activities” Version 03, EB 47. According to the above guidance, for small-scale energy CDM project activities involving renewable biomass, there are three types of emission

sources that are potentially significant (>10% of emission reductions) and attributable to the project activities. .

In this regard, the following three aspects as per Table 1 of “General guidance on leakage in biomass project activities” (Version 03 EB 47, Annex 28) are evaluated for leakage emission at SSC-CPA level.

Parameter	Guidance on leakage	Project activity status
Shift of pre-project activities	Shifts of pre-project activities are relevant where, in the absence of the project activity, the land areas would be used for other purposes (i.e., agriculture).	Project activities use the biomass residues. Hence, this leakage is not applicable.
Emissions from the production of the renewable biomass	Potentially significant emission sources from the production of renewable biomass can be: (a) Emissions from application of fertilizer; and (b) Project emissions from clearance of lands.	Project activities use only biomass residues. Hence, this leakage is not applicable.
Competing uses for the biomass	The CPA Operator shall evaluate <i>ex-ante</i> if there is a surplus of the biomass in the region of the project activity, which is not utilised. If it is demonstrated (e.g., using published literature, official reports, surveys, etc.) that the quantity of available biomass in the region (e.g., within 50 km radius), is at least 25% more than the quantity of biomass that is utilised including the project activity, then this source of leakage can be neglected. Otherwise, this leakage shall be estimated and deducted from the emission reductions.	Biomass availability will be assessed at the beginning of the crediting period of each CPA, if the CPA involves biomass power plant. In case the surplus of biomass in the region (e.g. within 50 km radius) is less than 25 %, the leakage due to competitive use of biomass need to be accounted

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

CPA Category1: CPAs supplying the national grid (AMS-I.D. Grid connected renewable electricity generation)



Data / Parameter	$EG_{actual,y}/EG_{add,y} (EG_{BL,y})$
Unit	MWh/year
Description	Quantity of net electricity supplied to the national grid in year y.
Source of data	Measured by energy meters.
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	<p>Measurements are undertaken using energy meters.</p> <p>If applicable, measurement results will be cross checked with records for sold/purchased electricity (e.g., invoices/receipts).</p> <p>The net electricity export/supplied to a grid is the difference between the measured quantities of the grid electricity export and the import. If applicable, cross check net electricity supplied to a grid as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes.</p>
Monitoring frequency	<p>Continuous monitoring, hourly measurement and at least monthly recording.</p> <p>The data will be archived for two years after the crediting period.</p>
QA/QC procedures	<p>The device will be calibrated and tested by the Buyer (national utility) according to the instructions (schedules, procedures) for QA of the technology provider and EWURA's standard. There will be strict compliance with the maintenance schedule recommended by the Utility and EWURA. The quality control is ensured by EWURA's SPPA that mandates monthly readings, with rated error no greater than 0.5%.</p> <p>Quality control and assurance will be achieved through a monthly check of the monitoring log sheet, which will be signed to acknowledge that the parameters are correct.</p>
Purpose of data	Calculation of baseline emissions
Additional comments	



Data / Parameter	Biomass consumption
Unit	Tonnes/year
Description	Quantity of biomass consumed in year y.
Source of data	The fuel consumed by the power plant will be measured at the fuel delivery system or taken from plant records and log books.
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Use mass or volume based measurements. Adjust for the moisture content in order to determine the quantity of dry biomass. If more than one type of biomass fuel is consumed, each will be monitored separately.
Monitoring frequency	The quantity of biomass will be measured continuously or in batches.
QA/QC procedures	Quality control and assurance will be achieved through a daily check of the monitoring log sheet, which will be signed to acknowledge that the parameters are correct. Cross-check the measurements with an annual energy balance that is based on purchased quantities (e.g. with sales/receipts) and stock changes. The consistency of measurements ex post will be checked with annual data on energy generation, fossil fuels and biomass used and the efficiency of energy generation as determined ex ante.
Purpose of data	Calculation of baseline emissions
Additional comments	Equipment will be maintained in accordance with manufacturer's specification. The monitoring will be done by means of a daily log sheet, on which the daily parameters will be recorded.

Data / Parameter	NCV _{Biomass}
Unit	GJ/tonne
Description	Net calorific value of biomass residue
Source of data	To be specified in each CPA.
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. Measure the NCV based on dry biomass.
Monitoring frequency	Determine once in the first year of the crediting period
QA/QC procedures	Check the consistency of the measurements by comparing the measurement results with, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, conduct additional measurements
Purpose of data	Calculation of baseline emissions
Additional comments	The data will be archived for two years after the crediting period.



Data / Parameter	TEGy
Unit	MWh/yr
Description	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y
Source of data	Energy meter readings
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Measurements are undertaken using energy meters.
Monitoring frequency	
QA/QC procedures	<p>There will be strict compliance with the maintenance schedule recommended by the Buyer and EWURA. The quality control is ensured by EWURA's SPPA that mandates monthly readings, with rated error no greater than 0.5%.</p> <p>The measurement device will be calibrated and tested by the Buyer (national utility) according to the instructions (schedules, procedures) for QA of Utility's standard.</p> <p>Quality control and assurance will be achieved through a monthly check of the monitoring log sheet, which will be signed to acknowledge that the parameters are correct.</p>
Purpose of data	Calculation of project emissions
Additional comments	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²

Data / Parameter	Cap _{PJ}
Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Nameplate or project technical specifications
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Determine the installed capacity based on recognized standards/nameplate data.
Monitoring frequency	-
QA/QC procedures	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²
Purpose of data	Calculation of project emissions
Additional comments	

Data / Parameter	A_{PJ}
Unit	m ²
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data	Project site
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Measured from topographical surveys, maps, satellite pictures, etc.
Monitoring frequency	Once per crediting period
QA/QC procedures	-
Purpose of data	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²
Additional comments	

B.7.2. Description of the monitoring plan for a generic CPA

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The monitoring plan of the CPA Category 1 is consistent with the methodology AMS-I.D. (version 17). The monitoring structure and plan for a SSC-CPA is an integrated part of in the management plan and monitoring plan of the PoA.

The CPA implementer will monitor the parameters with respect to the project. The various data used for the estimation of emission reduction will be monitored. The data will be archived electronically and be stored for 2 years after the end of the crediting period of the CPA. REA as the CME will supervise the implementation of the monitoring plan. REA will ensure that all relevant staff of the CPAs as well as its own personnel will be trained adequately in this task.

To ensure that the data is reliable and transparent, the CME will also 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 data

Depending on the type of renewable energy source used and the nature of the baseline grid, the following are the parameters to be monitored:

- Gross electricity generation, if possible
- Net electricity generation measured separately for electricity fed to the grid and distributed electricity (mini-grids)
- Type and quantity of Biomass consumption

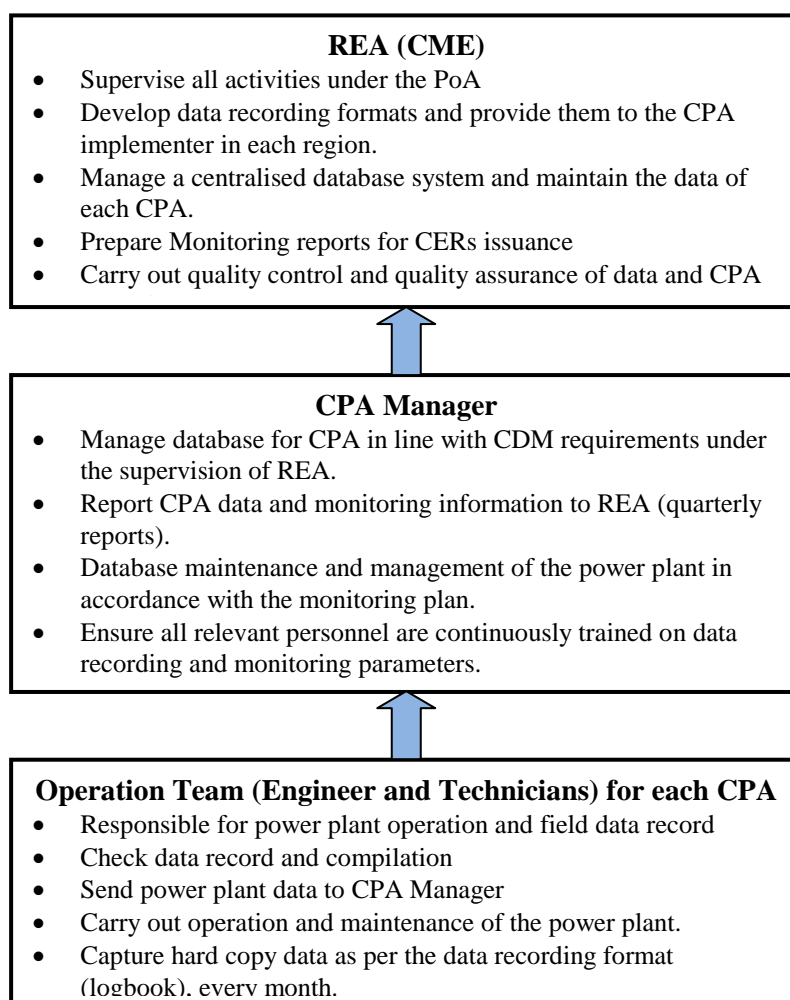


Figure 4: Planned operational and management structure for monitoring

The above parameters are monitored by the Plant Operator at each project site and will be entered in data sheets. Data will be recorded daily by the Plant Operator and any data outages will be recorded in an operational log and reported to the Plant Engineer. The Plant Engineer at each project site will prepare a report consisting of above parameters in electronic format. Both, the hard copy of data as well as the electronic report, will be forwarded to CPA Manager, who manage database for CPA in line with CDM requirements under the supervision of REA.

After the quality control, the CPA manager will send the consolidated data collected from the CPA to REA. Being the coordinating entity, REA will be responsible for the management of records and data associated with each SSC-CPA. They will maintain overall programme database for these records. The Project Manager of the PoA will manage the overall programme database and maintain the records of all CPAs under this programme.

Monitoring procedure

The gross electricity generation, if possible, and the quantity of net electricity supplied to the grid will be continuously measured using energy meters with a maximum rated error of 0.5% as mandated by EWURA. For CPAs supplying both national grid and mini-grids, the electricity flow to different grids will be measured separately. The biomass projects, biomass consumption and the net calorific value shall be measured at the frequencies specified in above Section B.7.1.

Accumulative measurements will be entered into an electronic database at the end of each month. Any problems occurring with the monitoring equipment will be entered into the database. CPA implementers will be produced quarterly monitoring reports containing the monthly monitoring data files and details of any equipment faults and/or loss of data. The quarterly report will be submitted to the CME and project participants for review and acceptance. All records will be retained for at least two years after the end of the crediting period.

Quality assurance and quality control

QA & QC procedures for recording, maintaining and archiving data shall be implemented as a part of this component project activity. The CPA owner will implement QA & QC measures to calibrate and guarantee the accuracy of metering and safety of project operation to the extent of the requirements by the national regulation.

Specifically For CPA Category 1 – Grid-connected projects

The Standardized Power Purchased Agreement (SPPA)¹⁰ in its Article 4 defines the responsibility of metering and calibration for grid-connected projects. The following requirements shall be applied in each CPA of Category 1:

- **Metering:** The Buyer (in most case the Utility) shall own and maintain the primary metering equipment employed for purposes of measurement and billing. Metering and telemetering equipment shall comply with all the Buyer standards and guidelines, be capable of registering and recording the instantaneous and bidirectional transfer of energy, and capable of transmitting such data to such location(s) as may be specified by the Buyer. The Seller (CPA implementer) shall provide a suitable location for the metering and telemetering equipment if the Interconnection Point is at the facility.
- **Meter Reading.** The Buyer shall read the meters at the end of each month.
- **Meter Accuracy.** All metering equipment measuring the output of the Facility shall be tested at least annually, at the Buyer's expense. At any time, any metering equipment is found to be inaccurate by more than 0.5%, the Buyer shall cause such metering equipment to be made accurate or replaced as soon as possible.
- **Meter Calibration.** Testing and calibration of meters, and any verification of meter accuracy, shall be performed pursuant to the Buyer metering standards. Calibration shall occur before use of the meters to first record the output of the Facility. All meters shall be caused to be sealed and locked by their owner after calibration.

As it can be seen from the SPPA, the CPA has no control on the metering equipment and their calibration.

However, in addition to the metering requirements mandated by the SPPA, the CPA implementer may install its own electricity meters to record the net electricity supplied to the grid and the gross electricity produced.

The following measures will be taken relating to the monitoring equipment owned by the CPA implementer and its installation and operation:

- All meters will be designed and manufactured to accepted standards (Regulator standards shall be followed for electricity meter). Each CPA shall provide all information regarding the metering devices including accuracy class and calibration frequency required, at least annually.
- All monitoring equipment will be located in secure locations free from the possibility of accidental damage.

¹⁰ Ministry of Energy and Minerals. 2009. Standardized Power Purchase Agreement for Purchase of Grid-Connected Capacity and Associated Electric Energy. Pages 10 to 12

- Routine maintenance and calibration of all monitoring equipment will be performed in accordance with Utility standards, Regular Standards or the manufacturer's specification (biomass), whenever applicable, to ensure that the data remains accurate.

To ensure the quality of the recorded data, all personnel will be trained in accordance with this monitoring plan.

The following quality assurance measures will be taken relating to the storage of the monitored data:

- A paper backup of the monthly electronic data file will be stored in a secure location on-site.
- The monthly data files will be included as part of the quarterly monitoring report and an electronic backup of the report will be emailed to a separate location.

When all produced electricity is delivered to the national grid, the amount of electricity measured by the Buyer will be used for ERs calculation. The project records will be used primarily for cross-checking and secondary for ERs calculation in case the Buyer could not measure the purchased electricity. In all cases, the agreed amount of electricity used for billing purposes will be the main basis for ER calculation.

If applicable, the net electricity supplied to a grid will be cross-checked as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes.

PART II. CPA Category 2: CPAs using AMS-I.F. Renewable electricity generation for captive use and mini-grid, version 02

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPA

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A typical CPA (Category 2) will install one or more renewable energy technologies at one or more locations depending on resources availability in different locations and project developers' technology choice. The cumulative installed capacity of all units and/or individual projects (different sites) included in a typical CPA will be less or equal to 15 MW. CPAs will generate electricity from hydro, photovoltaic, wind and biomass (excluding projects with leakage and cogeneration) technologies.

The CPAs will supply the generated electricity to either existing isolated mini-grids being operated by the national utility (TANESCO), or to new isolated mini-grids to serve new areas. The generated electricity would displace fossil fuel (diesel) based power plants on the isolated mini grids.

SECTION B. Application of a baseline and monitoring methodology

B.1. Reference of the approved baseline and monitoring methodology(ies) selected

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CPA Category 2:

AMS-I.F.: Renewable electricity generation for captive use and mini-grid, Version 02, EB 61

Type I: Renewable energy projects

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

Sectoral Scope: 01

Reference: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

CPA Category 2 all refer to the following methodological standards and tools:

- Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 3, EB 74.
- Tool to calculate the emission factor for an electricity system, Version 3, EB 70

B.2. Application of methodology(ies)

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CPA Category 2: CPAs using AMS-I.F. Renewable electricity generation for captive use and mini-grid (version 02, EB 61).

Applicability criteria	Justification
<p>This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). 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. in the absence of the project activity, the users would have been supplied electricity from one or more sources listed below:</p> <p>(a) A national or a regional grid (grid hereafter); (b) Fossil fuel fired captive power plant; (c) A carbon intensive mini-grid.</p>	<p>CPAs under this PoA comprise renewable energy generation units (hydro, wind, renewable biomass and photovoltaic). The CPA will displace electricity from an electricity distribution system that is or would have been supplied by at least one diesel or fossil fuel fired generating unit or the national grid.</p> <p>In the absence of the CPA, the users would have been supplied electricity from a carbon intensive (fossil fuel based) mini-grid or the national grid.</p>
<p>For the purpose of this methodology, a mini-grid is defined as small-scale power system with a total capacity not exceeding 15 MW (i.e., the sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW) which is not connected to a national or a regional grid.</p>	<p>Under a typical CPA, the sum of installed capacities of all generators connected to the mini-grid would be equal to or less than 15 MW.</p> <p>Under this PoA, a CPA may supply both mini-grid and national grid. In that case, AMS-I.F. will be combined with AMS-I.D. for the portion of electricity fed to the grid. See CPA Category 3.</p>
<p>Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <ul style="list-style-type: none"> • 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/m²; • The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m². 	<p>The hydro project will satisfy all methodology requirements. This will be demonstrated in each relevant CPA.</p> <ul style="list-style-type: none"> • Hydro power CPAs will be either a run-of-river small hydro power plant/unit or with new or existing reservoir. • The hydro power could be a hydro power plant on existing reservoir with no change in volume or with increase in volume. • In case the project activity is implemented in existing reservoir with increase in volume than the power density will be more than 4 W per m². • In case CPA is a project activity with new reservoir the power density of the power plant will be more than 4 W/m²
<p>For biomass power plants, no other biomass other than renewable biomass is to be used in the project plant.</p>	<p>The fuel used in the biomass power plant is wood and agricultural residues, which satisfies</p>



Applicability criteria	Justification
	the definition of renewable biomass.
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 ⁵ of (an) existing plant(s).	The CPA can involve installation of new renewable energy power plant at the site where there is no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant) or a capacity addition to existing plants.
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 involving capacity addition of renewable energy generation units at an existing renewable power generation facility will ensure that the added capacity of the units added by the CPA is lower than 15 MW and be physically distinct from the existing units.
In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	The project activity involves new installation of renewable energy generation units at the site where there is no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant) or a capacity addition to existing plants.. Hence, this is not applicable.
If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM 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.	The CPAs involve renewable energy sources only. The installed capacity of the individual CPAs will be less than 15 MW.
Combined heat and power (co-generation) systems are not eligible under this category.	No CPA with heat generation will be included in this PoA.
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.	CPAs delivering electricity produced to another facility or facilities within the project boundary will enter into a contract between the supplier and consumer(s) of the electricity specifying that only the facility generating the electricity can claim emission reductions from the electricity displaced.
In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues only or biomass from dedicated plantations complying with the applicability conditions of AM0042.	The fuel used in the biomass power plant is wood and agricultural residues, which satisfies the definition of renewable biomass.

B.3. Sources and GHGs

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CPA Category II

For off-grid CPAs, the spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system. In the case of electricity generated and supplied to distributed users (e.g. residential users) via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of renewable generating units. The boundary also extends to the project power

plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

CPA Category II – Gases included in the boundary:

Source		Gas	Included?	Justification/Explanation
Baseline	Power plants servicing isolated mini-grids	CO ₂	Yes	Main emissions source
		CH ₄	No	Minor emission source. Excluded for simplification
		N ₂ O	No	Minor emission source. Excluded for simplification
Project Activity	Renewable energy Project	CO ₂	No	Minor emission source, according to AMS-I.F.
		CH ₄	No	Minor emission source, according to AMS-I.F.
		N ₂ O	No	Minor emission source, according AMS-I.F.
	For hydro power plants with reservoir, emissions of CH ₄ from the reservoir	CO ₂	No	Minor emission source according to ACM0002
		CH ₄	Yes	Main emission source according to ACM0002
		N ₂ O	No	Minor emission source according to ACM0002

B.4. Description of baseline scenario

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The baseline scenario is identified in accordance with the project categories and the provisions in AMS-I.F. Version 02. The identified baseline scenario and description is presented in the table below.

CPA Category	Baseline scenario as per the methodology	Justification
Category 2: CPAs using AMS-I.F. Renewable electricity generation for captive use and mini-grid (version 02, EB 61).	For a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel, the baseline emissions is the annual electricity generated by the renewable energy unit times an emission factor for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table I.F.1.	CPAs under this PoA shall be designed to supply electricity to either the national or mini-grids. In Tanzania, all existing isolated mini-grids are operated by TANESCO and are diesel generating units. Diesel-based mini-grids are the common practice in the country, the baseline emissions for all mini-grids CPA developed under this PoA will be the annual electricity generated by the renewable energy unit times an emission factor for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table I.F.1 as provided in AMS-I.F.

B.5. Demonstration of eligibility for a generic CPA

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CPA Category II

#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
a	Geographical boundary of the CPA		
	The proposed CPA must be located within the geographic boundary of Tanzania.	Map of CPA and/or description of location indicating project within Tanzania boundary should be provided.	
b	Avoidance of double counting of emission reductions		
	Each CPA-DD shall be uniquely identified and defined in an unambiguous manner	Geographic information (GPS coordinates)	
	Avoidance of double counting: All CPAs under the PoA are neither registered as an individual CDM project activity nor included as a CPA of another registered PoA involving renewable energy technologies.	Based on the review of project list on UNFCCC website and project sites geographical coordinates	
	If electricity and/or steam/heat produced by the SSC-CPA 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.	Letter of Intent or MOU or contract between the supplier (CPA) and consumer of energy (facility)	
c	Specifications of technology/measure implemented by the CPA		
	The CPA should comprise one or more renewable energy power plants using one or more of the following renewable energy technologies: hydro, photovoltaic, wind and renewable biomass (except cogeneration and without leakage) with a total installed capacity ≤ 15 MW.	Evidences should include any of the following: Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	
	SSC-CPA plant should be either (a) 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); or (b) Involve a capacity addition, In the case SSC-CPA involves the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the	Evidences should include any of the following: Project design documents, feasibility study, procurement documents, technical specifications, etc.	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	project should be lower than 15 MW and should be physically distinct from the existing units.		
	In the case that the project activity involves the construction of a new reservoir, the power density shall be larger than 4 W/m ² . Reservoir surface and installed capacity or power density.	Topographical study or feasibility study, etc.	
	No generating equipment is transferred from another activity and no existing equipment is transferred to another activity.	Evidences could include contract for the equipment procurement, equipment order, etc.	
	For biomass power plants, no biomass other than renewable biomass is to be used in the project plant. (Refer “Definition of Renewable Biomass” as per Annex 18 of EB 23 (or latest) and “Glossary of CDM terms - Version 07.0 or latest”).	Survey or biomass availability study must be provided.	
	Biomass imported from outside Tanzania shall not be considered under the PoA.	Documentation of biomass supply/biomass availability study must be provided.	
d	Check the start date of the CPA through documentary evidence		
	The start data of the CPA is in line with CDM glossary, Version 07.	Evidences should include date of real actions such as loan contract, contract for construction, equipment procurement, equipment supply, etc.	
e	Compliance with applicability and other requirements of the methodology applied by CPAs		
	Each CPA is in compliance with applicability and other requirements of the applicable approved methodologies for small scale project activities AMS-I.F.: Renewable electricity generation for captive use and mini-grid.	Demonstration and documentation of the applicability conditions should be provided by CPA implementer in the CPA-DD. Evidences could include project implementer declaration, technical specification, design document, feasibility study, business plan, etc.	
f	CPAs meet the requirements pertaining to the demonstration of additionality		
	Projects meeting the micro scale size limit are automatically additional as per the “Guidelines for demonstrating	Any of the following could be provided: technical specification/manufacture	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	additionality of micro scale project activities”.	data/nameplate data/design document/feasibility study/equipment order or procurement, etc.	
	CPAs that include technologies and project activity types with total installed capacity larger than 5 MW and up to 15 MW are automatically additional as per the positive list in “Guidelines on the demonstration of additionality of small scale project activities”.	Technical specification, manufacturer data, nameplate data, feasibility study, etc.	
	Projects with installed capacity larger than 5 MW and Projects with installed capacity larger than 5 MW and up to 15 MW that face the following PoA level barriers are automatically additional: <ul style="list-style-type: none"> • Access to finance • Equity mobilization • Tariff setting issue • Technical barrier. 	As an evidence CPA owner should have signed carbon participation agreement (letters) for pre-identified barriers.	
	Projects with installed capacity larger than 5 MW and up to 15 MW that are facing different barriers than those listed above shall provide detailed demonstration of the additionality using “Guidelines on the demonstration of additionality of small scale project activities”.	The additionality demonstration shall be documented. Evidences could include feasibility study, business plan, offer for project construction, company benchmark for etc., market data (local lending rates, etc.), industry data and government or credible third party published data (taxes, electricity rates, grants, incentives, etc.).	
g	Local stakeholder consultations and environmental impact analysis		
	The CPA must have secured all required and applicable environmental clearances as outlined in Section E.2.	The relevant documents should include inter alia approved Environmental Impact Assessment (EIA) and relevant permits (water rights, land right, etc.)	
	The project must have undertaken a stakeholder consultation as outlined in Section F.	Evidences could include the following : meetings/workshops minutes/reports, press release, list of participants and records of participants comments and project developers responses, pictures, etc.	
h	Affirmation of non diversion of official development assistance		

#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	(ODA)		
	A letter from from Annex I parties should affirm that funding, if any, does not result in a diversion of ODA.	Participant from Annex I country LoA could be used. This evidence could be used for the inclusion of further CPAs	
i	Target group		
	The project should be connected to either an existing isolated grid or new isolated grid or a combination of these.	TANESCO Letter of Intent or power purchase agreement and/or EWURA License for power distribution	
j	Sampling requirements		
	Sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys.	Each CPA should confirm that sampling is not applied as all electricity to be generated will be measured at the connection point.	
k	CPA in aggregate meets the small-scale threshold		
	The installed capacity of individual CPA should not exceed 15 MW throughout the crediting period of the CPA. Evidences should include any of the following:	Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	
l	Requirements for the debundling check are met		
	Each SSC-CPA must satisfy de-bundling rules for PoA in accordance with the “Guidelines on assessment of de-bundling for SSC project activities”.	Confirmation by REA (CME)	
	Other Specific programme requirements		
	For CPAs comprising more than one power plants, project developers should designate a representative responsible for all CDM related communication and decision.	Co-signed letter designating a representative/focal point.	
	The CPA implementer should have signed a cooperation agreement with REA to participate in the PoA	Signed a cooperation agreement with REA	

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

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CPA Category 2

AMS-I.F. Version 02 is applicable to a renewable energy system which delivers to mini-grids. For mini-grids, this methodology requires that baseline emissions are calculated by multiplying the produced

electricity quantity by an emission factor for a modern diesel generating unit of the relevant capacity operating at optimal load as indicated in AMS-I.F.

B.6.2. Data and parameters that are to be reported ex-ante

CPA Category2: CPAs supplying a mini-grid (AMS-I.F. Renewable electricity generation for captive use and mini-grid)

Data / Parameter	$EF_{CO_2,y}$
Unit	tCO ₂ e/MWh
Description	CO ₂ emission factor for displacement of electricity in the grid, the mini-grid and/or the captive power plant.
Source of data	For a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel, value in Table I.F.1. of AMS-I.F. For captive power plant, calculated as per as per the procedures described in the latest version of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”
Value(s) applied	Specific value for each CPA. For a mini-grid system where all generators use exclusively fuel oil and/or diesel fuel, value in Table I.F.1. of AMS-I.F.
Choice of data or Measurement methods and procedures	The SSC-CPA owner shall apply the relevant emission factor.
Purpose of data	Calculation of baseline emissions
Additional comment	

Data / Parameter	$EG_{Historical}$
Unit	MWh
Description	Annual average historical net electricity generation by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data	Calculated for capacity addition projects
Value(s) applied	To be specified in each CPA, if applicable
Choice of data or Measurement methods and procedures	Use in the specific case of retrofit/capacity addition in hydro, photovoltaic and wind plants where power generation to capture the uncertainty related to the variability of the renewable source. The baseline electricity generation is established in a conservative manner and that the calculated emission reductions are attributable to the project activity. Calculated using the three last calendar years (five calendar years for hydro project) prior to the project implementation.
Purpose of data	Calculation of baseline emissions
Additional comment	



Data / Parameter	$\sigma_{\text{Historical}}$
Unit	MWh
Description	Standard deviation of the annual average historical net electricity generation by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data	Calculated for capacity addition projects
Value(s) applied	To be specified in each CPA, if applicable
Choice of data or Measurement methods and procedures	Use in the specific case of retrofit/capacity addition in hydro, photovoltaic and wind plants where power generation to capture the uncertainty related to the variability of the renewable source. The baseline electricity generation is established in a conservative manner and that the calculated emission reductions are attributable to the project activity. Calculated using the three last calendar years (five calendar years for hydro project) prior to the project implementation.
Purpose of data	Calculation of baseline emissions
Additional comment	

Data / Parameter	Cap_{BL}
Unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity
Source of data	Nameplate or project technical specifications
Value(s) applied	To be specified in each CPA. For new hydro power plants, this value is zero.
Choice of data or Measurement methods and procedures	Determine the installed capacity based on recognized standards/nameplate data.
Purpose of data	Calculation of project emissions
Additional comment	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²

Data / Parameter	A_{BL}
Unit	m^2
Description	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full
Source of data	Feasibility study/design document
Value(s) applied	To be specified in each CPA. For new hydro power plants, this value is zero.
Choice of data or Measurement methods and procedures	Measured from topographical surveys, maps, satellite pictures, etc.
Purpose of data	Calculation of project emissions
Additional comment	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²

Data / Parameter	EF_{Resy}
Unit	kgCO ₂ e/MWh
Description	Default emission factor for emissions from reservoirs
Source of data	Decision by EB 23
Value(s) applied	90
Choice of data or Measurement methods and procedures	Default factor
Purpose of data	Calculation of project emissions
Additional comment	Considered if project emission is applicable for hydro projects.

Data / Parameter	$MC_{Biomass}$
Unit	% of water
Description	Moisture content of the biomass (wet basis).
Source of data	Lab records. Ex-ante estimates will be used during the crediting period.
Value(s) applied	To be specified for each CPA.
Choice of data or Measurement methods and procedures	On-site measurements. The moisture content of biomass of homogenous quality shall be determined ex ante. The weight average should be calculated and used in the calculations.
Purpose of data	Calculation of project emissions
Additional comment	Fixed <i>ex-ante</i> . If other biomass types are used, the moisture content will be tested and used.

B.6.3. Ex-ante calculations of emission reductions

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CPA Category 2: For CPAs supplying a mini-grid (AMS-I.F. Renewable electricity generation for captive use and mini-grid)

For the electricity fed to isolated mini-grids, the CPA should use the AMS-I.F. (Version 02) and relevant equations. Moreover, all CPAs under this PoA are new power plants (Greenfield projects) or addition of new units to existing power plants.

1. Emission reductions

The emission reduction by a typical CPA is calculated as follows:

$$ER_{y(Category2)} = BE_{y(Category2)} - PE_{y(Category2)} - LE_{y(Category2)}$$

Where:

$ER_{y(Category2)}$ Emission reductions in year y (t CO₂/y) for mini-grids

$BE_{y(Category2)}$ Baseline emissions in year y (tCO₂) for mini-grids

$PE_{y(Category2)}$ Project emissions in year y (t CO₂/y) for mini-grids

$LE_{y(Category2)}$ Leakage emissions in year y (t CO₂/y) for mini-grids

2. Baseline emissions

For new power plants at site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant)

$$BE_{y(Category2)} = EG_{BL,y(Category2)} * EF_{CO2,grid,y}$$

Where:

$BE_{y(Category2)}$ Baseline emissions in year y (tCO₂) for mini-grids

$EG_{BL,y(Category2)}$ Quantity of net electricity supplied to the mini-grid as a result of the implementation of the CDM project activity in year y (MWh)

$EF_{CO2,y}$ CO₂ emission factor (t CO₂/MWh)

Emission factor of a grid shall be calculated as per the procedures provided in AMS-I.D.

For mini-grids, emission factor is for a modern diesel generating unit of the relevant capacity operating at optimal load as given in Table I.F.1. of AMS-I.F.

For capacity addition with renewable energy units at an existing plant

For CPAs that involve capacity addition at an existing facility, the baseline emissions shall be calculated following the applicable procedures prescribed in AMS-I.D (Category 1 above) with the exception that emission factor ($EF_{CO2,y}$) is calculated as described above.

3. Project emissions

No project emissions ($PE_{y(Category2)}$) are expected from the implementation of the biomass, wind and photovoltaic renewable energy power plants. Hence,

$$PE_{y(Category2)} = 0$$

For Hydro projects

For hydro power CPAs that result in new reservoirs and/or the increase of existing reservoirs, the power density (PD) of the CPA shall be calculated as per Approved Consolidated Methodology ACM0002, version 13.

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

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

PD = Power density of the project activity (W/m²)

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

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

A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m²)

A_{BL} = Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m²). For new hydro power plants, this value is zero.

(a) If the power density of the project activity (PD) is greater than 4 W/m² and less than or equal to 10 W/m²:

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000}$$

Where:

$PE_{HP,y}$ = Project emissions from water reservoirs (tCO₂e/yr)

EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year y (kgCO₂e/MWh)

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

(b) If the power density of the project activity (PD) is greater than 10 W/m²:

$$PE_{HP,y} = 0$$

4. Leakage

As per AMS-I.F., leakage has to be considered, if there is any energy generating equipment transfer from another activity. The CPAs under this PoA will not involve any transfer of equipment from another activity. All systems will consist in newly procured equipment. Hence, the leakage emission due to equipment transfer is not considered for the CPAs under this PoA.

However, the leakage has to be considered for biomass project activities. The leakage occurrence should be assessed as described for Category 1 above.

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

CPA Category 2: CPAs supplying a mini-grid (AMS-IF. Renewable electricity generation for captive use and mini-grid)

Data / Parameter	EG _{BL,y}
Unit	MWh/year
Description	Quantity of net electricity displaced in year y
Source of data	Measured by energy meters.
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	<p>Measurements are undertaken using energy meters.</p> <p>In the case of electricity sold to a third party, measurement results will be cross-checked with records of sold/purchased electricity (e.g. invoices/receipts).</p> <p>The net electricity displaced is the gross energy generation by the project activity power plant minus the auxiliary/station electricity consumption.</p>
Monitoring frequency	<p>Continuous monitoring, hourly measurement and at least monthly recording.</p> <p>The data will be archived for two years after the crediting period.</p>
QA/QC procedures	<p>The device will be calibrated and tested by CPA implementer according to the instructions (schedules, procedures) for QA of the technology provider and EWURA's standard.</p> <p>There will be strict compliance with the maintenance schedule recommended by the technology provider and EWURA. The quality control is ensured by EWURA's SPPA that mandates monthly readings, with rated error no greater than 0.5%.</p> <p>Quality control and assurance will be achieved through a monthly check of the monitoring log sheet, which will be signed to acknowledge that the parameters are correct.</p>
Purpose of data	Calculation of baseline emissions
Additional comments	

Data / Parameter	Biomass consumption
Unit	Tonnes/year
Description	Quantity of biomass consumed in year y.
Source of data	The fuel consumed by the power plant will be measured at the fuel delivery system or taken from plant records and log books.
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Use mass or volume based measurements. Adjust for the moisture content in order to determine the quantity of dry biomass. If more than one type of biomass fuel is consumed, each will be monitored separately.
Monitoring frequency	The quantity of biomass will be measured continuously or in batches.
QA/QC procedures	Quality control and assurance will be achieved through a daily check of the monitoring log sheet, which will be signed to acknowledge that the parameters are correct. Cross-check the measurements with an annual energy balance that is based on purchased quantities (e.g. with sales/receipts) and stock changes. The consistency of measurements ex post will be checked with annual data on energy generation, fossil fuels and biomass used and the efficiency of energy generation as determined ex ante.
Purpose of data	Calculation of baseline emissions
Additional comments	Equipment will be maintained in accordance with manufacturer's specification. The monitoring will be done by means of a daily log sheet, on which the daily parameters will be recorded.

Data / Parameter	NCV _{Biomass}
Unit	GJ/tonne
Description	Net calorific value of biomass residue
Source of data	To be specified in each CPA.
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Measurement in laboratories according to relevant national/international standards. Measure quarterly, taking at least three samples for each measurement. The average value can be used for the rest of the crediting period. Measure the NCV based on dry biomass.
Monitoring frequency	Determine once in the first year of the crediting period
QA/QC procedures	Check the consistency of the measurements by comparing the measurement results with, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, conduct additional measurements
Purpose of data	Calculation of baseline emissions
Additional comments	The data will be archived for two years after the crediting period.



Data / Parameter	TEGy
Unit	MWh/yr
Description	Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y
Source of data	Energy meter readings
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Measurements are undertaken using energy meters.
Monitoring frequency	
QA/QC procedures	<p>There will be strict compliance with the maintenance schedule recommended by the Buyer and EWURA. The quality control is ensured by EWURA's SPPA that mandates monthly readings, with rated error no greater than 0.5%.</p> <p>The measurement device will be calibrated and tested by the Buyer (national utility) according to the instructions (schedules, procedures) for QA of Utility's standard.</p> <p>Quality control and assurance will be achieved through a monthly check of the monitoring log sheet, which will be signed to acknowledge that the parameters are correct.</p>
Purpose of data	Calculation of project emissions
Additional comments	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²

Data / Parameter	Cap _{PJ}
Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Nameplate or project technical specifications
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Determine the installed capacity based on recognized standards/nameplate data.
Monitoring frequency	-
QA/QC procedures	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²
Purpose of data	Calculation of project emissions
Additional comments	

Data / Parameter	A_{PJ}
Unit	m ²
Description	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data	Project site
Value(s) applied	To be specified in each CPA.
Measurement methods and procedures	Measured from topographical surveys, maps, satellite pictures, etc.
Monitoring frequency	Once per crediting period
QA/QC procedures	-
Purpose of data	Applicable to hydro power project activities with a power density of the project activity (PD) greater than 4 W/m ² and less than or equal to 10 W/m ²
Additional comments	

B.7.2. Description of the monitoring plan for a generic CPA

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The monitoring plan of the CPA Category 2 is consistent with the methodology AMS-IF. (version 02). The monitoring structure and plan for a SSC-CPA is an integrated part of in the management plan and monitoring plan of the PoA.

The CPA implementer will monitor the parameters with respect to the project. The various data used for the estimation of emission reduction will be monitored. The data will be archived electronically and be stored for 2 years after the end of the crediting period of the CPA. REA as the CME will supervise the implementation of the monitoring plan. REA will ensure that all relevant staff of the CPAs as well as its own personnel will be trained adequately in this task.

To ensure that the data is reliable and transparent, the CME will also 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 data

Depending on the type of renewable energy source used and the nature of the baseline grid, the following are the parameters to be monitored:

- Gross electricity generation, if possible
- Net electricity generation measured separately for electricity fed to the grid and distributed electricity (mini-grids)
- Type and quantity of Biomass consumption

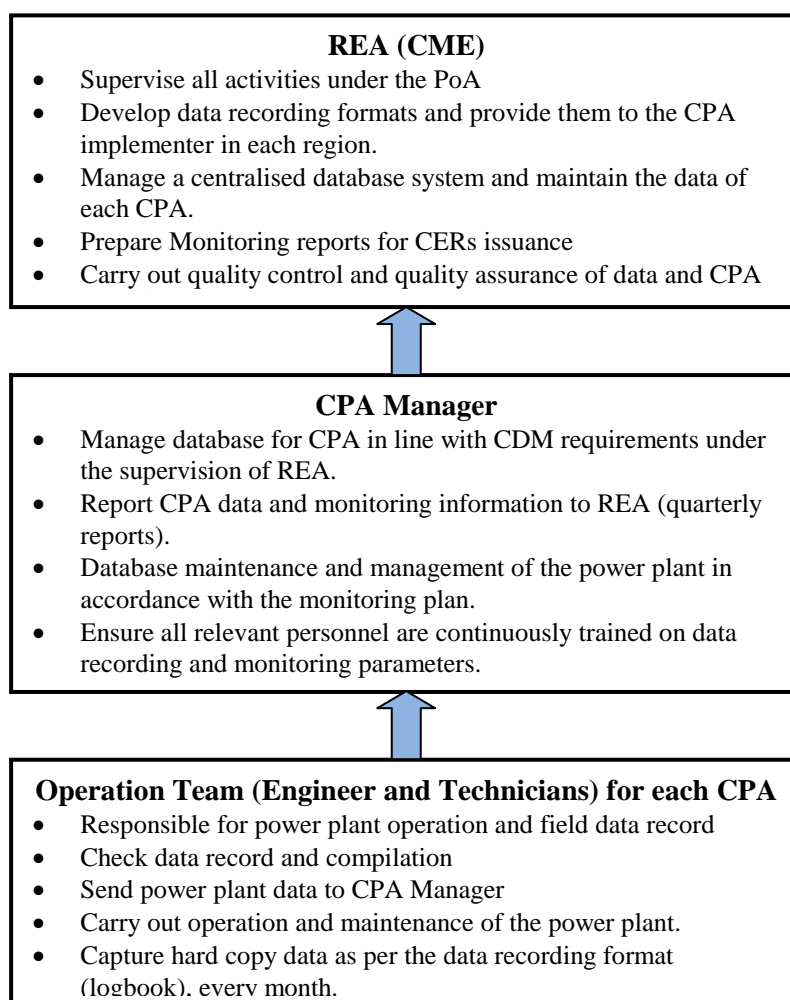


Figure 4: Planned operational and management structure for monitoring

The above parameters are monitored by the Plant Operator at each project site and will be entered in data sheets. Data will be recorded daily by the Plant Operator and any data outages will be recorded in an operational log and reported to the Plant Engineer. The Plant Engineer at each project site will prepare a report consisting of above parameters in electronic format. Both, the hard copy of data as well as the electronic report, will be forwarded to CPA Manager, who manage database for CPA in line with CDM requirements under the supervision of REA.

After the quality control, the CPA manager will send the consolidated data collected from the CPA to REA. Being the coordinating entity, REA will be responsible for the management of records and data associated with each SSC-CPA. They will maintain overall programme database for these records. The Project Manager of the PoA will manage the overall programme database and maintain the records of all CPAs under this programme.

Monitoring procedure

The gross electricity generation, if possible, and the quantity of net electricity supplied to the grid will be continuously measured using energy meters with a maximum rated error of 0.5% as mandated by EWURA. For CPAs supplying both national grid and mini-grids, the electricity flow to different grids will be measured separately. The biomass projects, biomass consumption and the net calorific value shall be measured at the frequencies specified in above Section B.7.1.

Accumulative measurements will be entered into an electronic database at the end of each month. Any problems occurring with the monitoring equipment will be entered into the database. CPA implementers will be produced quarterly monitoring reports containing the monthly monitoring data files and details of any equipment faults and/or loss of data. The quarterly report will be submitted to the CME and project participants for review and acceptance. All records will be retained for at least two years after the end of the crediting period.

Quality assurance and quality control

QA & QC procedures for recording, maintaining and archiving data shall be implemented as a part of this component project activity. The CPA owner will implement QA & QC measures to calibrate and guarantee the accuracy of metering and safety of project operation to the extent of the requirements by the national regulation.

Specifically For CPA Category 2 – Mini-Grid projects

The metering procedures for isolated mini-grids are governed by the SPPA for isolated mini-grid¹¹. The following requirements shall be applied in each CPA of Category 1:

- **Metering.** The Seller (CPA) shall own and maintain the primary metering equipment employed for purposes of measurement and billing. Metering and telemetering equipment shall comply with all the all Regulator standards and guidelines, be capable of registering and recording the instantaneous and bidirectional transfer of energy, and capable of transmitting such data to such location(s) as may be specified by the Buyer.
- **Meter Reading.** The Seller shall read the meters at the end of each month.
- **Meter Accuracy.** All metering equipment measuring the output of the Facility shall be tested at least annually, at the Seller's expense. At any time, any metering equipment is found to be inaccurate by more than 0.5%, the Seller shall cause such metering equipment to be made accurate or replaced as soon as possible.
- **Meter Calibration.** Testing and calibration of meters, and any verification of meter accuracy, shall be performed pursuant to metering standards set by the Regulator. Calibration shall occur before use of the meters to first record the output of the Facility. All meters shall be caused to be sealed and locked by their owner after calibration.

However, in addition to the metering requirements mandated by the SPPA, the CPA implementer may install its own electricity meters to record the net electricity supplied to the grid and the gross electricity produced.

The following measures will be taken relating to the monitoring equipment owned by the CPA implementer and its installation and operation:

- All meters will be designed and manufactured to accepted standards (Regulator standards shall be followed for electricity meter). Each CPA shall provide all information regarding the metering devices including accuracy class and calibration frequency required, at least annually.
- All monitoring equipment will be located in secure locations free from the possibility of accidental damage.
- Routine maintenance and calibration of all monitoring equipment will be performed in accordance with Utility standards, Regular Standards or the manufacturer's specification (biomass), whenever applicable, to ensure that the data remains accurate.

To ensure the quality of the recorded data, all personnel will be trained in accordance with this monitoring plan.

¹¹ Ministry of Energy and Minerals. 2009. Standardized Power Purchase Agreement for Purchase of Capacity and Associated Electric Energy to Isolated Mini-Grid. Pages 11-12

The following quality assurance measures will be taken relating to the storage of the monitored data:

- A paper backup of the monthly electronic data file will be stored in a secure location on-site.
- The monthly data files will be included as part of the quarterly monitoring report and an electronic backup of the report will be emailed to a separate location.

The amount of electricity measured by the Seller will be used for ERs calculation. The agreed amount of electricity used for billing purpose will be the main based for ER calculation.

If applicable, the net electricity supplied to a grid will be cross-checked as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes.

PART II. CPA Category 3: CPAs using both AMS-I.D. (Version 17) and AMS-I.F. (Version 02)

SECTION A. General description of a generic CPA

A.1. Purpose and general description of generic CPAs

>>

A typical CPA (Category 3) will install one or more renewable energy technologies at one or more depending on resources availability in different locations and project developers' technology choice. The cumulative installed capacity of all units and/or individual projects (different sites) included in a typical CPA will be less or equal to 15 MW. CPAs will generate electricity from hydro, photovoltaic, wind and biomass (excluding projects with leakage and cogeneration) technologies.

The CPAs will supply the generated electricity to the main national grid and the existing isolated mini-grids being operated by the national utility (TANESCO), and/or to new isolated mini-grids to serve new areas. The generated electricity would displace fossil fuel (diesel) based power plants on the isolated mini grids and reduce GHG emissions from a mix of power plants on the national grid.

SECTION B. Application of a baseline and monitoring methodology

B.1. Reference of the approved baseline and monitoring methodology(ies) selected

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CPA Category 3:

AMS-I.D.: Grid connected renewable electricity generation, Version 17, EB 61

Type I: Renewable energy projects

Category I.D.: Grid connected renewable electricity generation

Sectoral Scope: 01

Reference: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

And

AMS-I.F.: Renewable electricity generation for captive use and mini-grid, Version 02, EB 61

Type I: Renewable energy projects

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

Sectoral Scope: 01

Reference: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved>

CPA Category 3 refer to the following methodological standards and tools:

- Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities”, Version 3, EB 74.
- Tool to calculate the emission factor for an electricity system, Version 3, EB 70

Note: Both AMS-I.D. and AMS-I.F. are approved for application to CPAs under PoAs by the CDM Executive Board.

B.2. Application of methodology(ies)

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CPA Category 3: CPAs using both AMS-I.D. (Version 17) and AMS-I.F. (Version 02)

In that case, the production and transport of electricity will serve villages (mini-grids) that are located along the route of the power lines to the connection point to the national grid. The applicability criteria will be assessed according to the portion of electricity supplied to the national grid (AMS-I.D.) and to the isolated grid (AMS-I.F.). Justification for each applicability criteria is as appears for CPA Category 1 and CPA Category 2.

The amount of electricity supplied to the national grid and the quantity supplied to the mini-grid may change over years with the cumulative not exceeding the generated electricity at the power plant site. Electricity supplied to all grids connected to the project power plants will be measured separately.

B.3. Sources and GHGs

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CPA Category 3

The project boundary passes the physical and geographical site of the renewable generation source. The spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system. In the case of electricity generated and supplied to distributed users (e.g. residential users) via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of renewable generating units. The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

CPA Category III –Gases included in the boundary:

Source		Gas	Included?	Justification/Explanation
Baseline	Power plants servicing the national electricity grid	CO ₂	Yes	Main emissions source
		CH ₄	No	Minor emission source. Excluded for simplification
		N ₂ O	No	Minor emission source. Excluded for simplification
	Power plants servicing isolated mini-grids	CO ₂	Yes	Main emissions source
		CH ₄	No	Minor emission source. Excluded for simplification
		N ₂ O	No	Minor emission source. Excluded for simplification
Project Activity	Renewable energy Project	CO ₂	No	Minor emission source, according to AMS-I.D. and AMS-I.F.
		CH ₄	No	Minor emission source, according to AMS-I.D. and AMS-I.F.
		N ₂ O	No	Minor emission source, according to AMS-



Source	Gas	Included?	Justification/Explanation
			I.D. and AMS-I.F.
For hydro power plants with reservoir, emissions of CH ₄ from the reservoir	CO ₂	No	Minor emission source according to ACM0002
	CH ₄	Yes	Main emission source according to ACM0002
	N ₂ O	No	Minor emission source according to ACM0002

B.4. Description of baseline scenario

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The baseline scenario is identified in accordance with the project categories and the provisions in AMS-I.D. Version 17 and AMS-I.F. Version 02. The identified baseline scenario and the description are presented for each CPA Category in the table below.

CPA Category	Baseline scenario as per the methodology	Justification
Category 3: CPAs using both AMS-I.D. (version 17) and AMS-I.F. (Version 02)	The baseline scenario defined in two above methodologies will be applied to portions of electricity delivered to the national grid (See Section B.4 of Part II. for CPA Category 1) and the mini-grid (See Section B.4 of Part II for CPA Category 2). In other words, the baseline for the amount of electricity supplied to the grid will determine using AMS-I.D. Relevant baseline emissions for the quantity of electricity delivered to a mini-grid will be calculated as per AMS-I.F.	Grid emission factor and an emission factor for a modern diesel generating unit will be used to establish baseline emissions for electricity supplied to the grid and electricity delivered to mini-grids. The quantity of electricity will be metered separately and may change over years.

B.5. Demonstration of eligibility for a generic CPA

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CPA Category III

#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
a	Geographical boundary of the CPA		
	The proposed CPA must be located within the geographic boundary of Tanzania.	Map of CPA and/or description of location indicating project within Tanzania boundary should be provided.	
b	Avoidance of double counting of emission reductions		
	Each CPA-DD shall be uniquely identified and defined in an unambiguous manner	Geographic information (GPS coordinates)	
	Avoidance of double counting: All CPAs under the PoA are neither registered as an individual CDM project	Based on the review of project list on UNFCCC website and project sites geographical	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	activity nor included as a CPA of another registered PoA involving renewable energy technologies.	coordinates	
	If electricity and/or steam/heat produced by the SSC-CPA 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.	Letter of intent or MOU or contract between the supplier (CPA) and consumer of energy (facility)	
c	Specifications of technology/measure implemented by the CPA		
	The CPA should comprise one or more renewable energy power plants using one or more of the following renewable energy technologies: hydro, photovoltaic, wind and renewable biomass (except cogeneration and without leakage) with a total installed capacity ≤ 15 MW.	Evidences should include any of the following: Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	
	SSC-CPA plant should be either (a) 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); or (b) Involve a capacity addition, In the case SSC-CPA involves the capacity 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.	Evidences should include any of the following: Project design documents, feasibility study, procurement documents, technical specifications, etc.	
	In the case that the project activity involves the construction of a new reservoir, the power density shall be larger than 4 W/m^2 . Reservoir surface and installed capacity or power density.	Topographical study or feasibility study, etc.	
	No generating equipment is transferred from another activity and no existing equipment is transferred to another activity.	Evidences could include contract for the equipment procurement, equipment order, etc.	
	For biomass power plants, no biomass other than renewable biomass is to be used in the project plant. (Refer "Definition of Renewable	Survey or biomass availability study must be provided.	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	Biomass” as per Annex 18 of EB 23 (or latest) and “Glossary of CDM terms - Version 07.0 or latest”).		
	Biomass imported from outside Tanzania shall not be considered under the PoA.	Documentation of biomass supply/biomass availability study must be provided.	
d	Check the start date of the CPA through documentary evidence		
	The start data of the CPA is in line with CDM glossary, Version 07.	Evidences should include date of real actions such as loan contract, contract for construction, equipment procurement, equipment supply, etc.	
e	Compliance with applicability and other requirements of the methodology applied by CPAs		
	Each CPA is in compliance with applicability and other requirements of the applicable approved methodologies for small scale project activities AMS-I.D.: Grid connected renewable electricity generation and/or AMS-I.F.: Renewable electricity generation for captive use and mini-grid.	Demonstration and documentation of the applicability conditions should be provided by CPA implementer in the CPA-DD. Evidences could include project implementer declaration, technical specification, design document, feasibility study, business plan, etc.	
f	CPAs meet the requirements pertaining to the demonstration of additionality		
	Projects meeting the micro scale size limit are automatically additional as per the “Guidelines for demonstrating additionality of micro scale project activities”.	Any of the following could be provided: technical specification/manufacturer data/nameplate data/design document/feasibility study/equipment order or procurement, etc.	
	CPAs that include technologies and project activity types with total installed capacity larger than 5 MW and up to 15 MW are automatically additional as per the positive list in “Guidelines on the demonstration of additionality of small scale project activities”.	Technical specification, manufacturer data, nameplate data, feasibility study, etc.	
	Projects with installed capacity larger than 5 MW and Projects with installed capacity larger than 5 MW and up to 15 MW that face the following PoA level barriers are automatically additional:	As an evidence CPA owner should have signed carbon participation agreement (letters) for pre-identified barriers.	



#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
	<ul style="list-style-type: none"> Access to finance Equity mobilization Tariff setting issue Technical barrier. 		
	Projects with installed capacity larger than 5 MW and up to 15 MW that are facing different barriers than those listed above shall provide detailed demonstration of the additionality using “Guidelines on the demonstration of additionality of small scale project activities”.	The additionality demonstration shall be documented. Evidences could include feasibility study, business plan, offer for project construction, company benchmark for etc., market data (local lending rates, etc.), industry data and government or credible third party published data (taxes, electricity rates, grants, incentives, etc.).	
g	Local stakeholder consultations and environmental impact analysis		
	The CPA must have secured all required and applicable environmental clearances as outlined in Section E.2.	The relevant documents should include inter alia approved Environmental Impact Assessment (EIA) and relevant permits (water rights, land right, etc.)	
	The project must have undertaken a stakeholder consultation as outlined in Section F.	Evidences could include the following : meetings/workshops minutes/reports, press release, list of participants and records of participants comments and project developers responses, pictures, etc.	
h	Affirmation of non diversion of official development assistance (ODA)		
	A letter from from Annex I parties should affirm that funding, if any, does not result in a diversion of ODA.	Participant from Annex I country LoA could be used. This evidence could be used for the inclusion of further CPAs	
i	Target group		
	The project should be connected to either the national grid or existing isolated grid or new isolated grid or a combination of these.	TANESCO Letter of Intent or power purchase agreement and/or EWURA License for power distribution	
j	Sampling requirements		
	Sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys.	Each CPA should confirm that sampling is not applied as all electricity to be generated will be measured at the connection point.	

#	Eligibility criteria as per requirements of the standard	Evidence needed in the CPA	Eligibility criterion met?
k	CPA in aggregate meets the small-scale threshold		
	The installed capacity of individual CPA should not exceed 15 MW throughout the crediting period of the CPA. Evidences should include any of the following:	Technical specification/Manufacturer data/nameplate data/design document/feasibility study, etc.	
l	Requirements for the debundling check are met		
	Each SSC-CPA must satisfy de-bundling rules for PoA in accordance with the “Guidelines on assessment of de-bundling for SSC project activities”.	Confirmation by REA (CME)	
	Other Specific programme requirements		
	For CPAs comprising more than one power plants, project developers should designate a representative responsible for all CDM related communication and decision.	Co-signed letter designating a representative/focal point.	
	The CPA implementer should have signed a cooperation agreement with REA to participate in the PoA	Signed a cooperation agreement with REA	

B.6. Estimation of emission reductions of a generic CPA

B.6.1. Explanation of methodological choices

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CPA Category 3

Projects in Category 3, where electricity generated from the project is fed to the national grid as well as to the mini grid(s) will apply both AMS-I.D and AMS-I.F. The baselines are defined separately according to these two methodologies for part of electricity that is supplied to the national grid and for part of electricity that is distributed through isolated mini-grids.

The methodological choices outlined for Category 1 should be applied for the grid emission factor calculation as per AMS-I.D.

Default emission factors of modern diesel generating unit will be used as per AMS-I.F for the baseline emissions of the part of electricity fed to mini-grids.

The relevant baseline systems (national grid, diesel generating unit or combination of national grid and mini-grid) and monitoring will shall be defined in each CPA-DD.

B.6.2. Data and parameters that are to be reported ex-ante

CPA Category 3: CPAs supplying both national grid and mini-grid (AMS-I.D. and AMS-I.F.)

For Category 3, the listed parameters for Category 1 (see Section B.6.2 in Part II for CPA Category 1) and Category 2 (see Section B.6.2 in Part II for CPA Category 2) should be reported.

B.6.3. Ex-ante calculations of emission reductions

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CPA Category 3: For CPAs supplying both national grid and mini-grid (AMS-I.D. and AMS-I.F.)

The two above categories shall be applied to portions electricity to the national grid and the mini-grid. In other words, the baseline emissions for the amount of electricity supplied to the grid will determine using Category 1 (see Section B.6.3 in Part II for CPA Category 1). Relevant baseline emission factors of Category 2 (see Section B.6.3 in Part II for CPA Category 2) will be multiplied to the quantity of electricity delivered to a mini-grid.

$$ER_{y(Category\ 3)} = ER_{y(Category\ 1)} + ER_{y(Category\ 2)}$$

Where:

$ER_{y(Category\ 3)}$ Emission reductions in year y (t CO₂/y) resulting from both part of electricity fed to the national grid and part supplied to the mini-grid

$ER_{y(Category\ 1)}$ Emission reductions in year y (t CO₂/y) resulting from part of electricity fed to the national grid calculated using equations described for CPA Category 1 (see Section B.6.3 in Part II for CPA Category 1).

$ER_{y(Category\ 2)}$ Emission reductions in year y (t CO₂/y) resulting from part of electricity fed to the mini-grid calculated using equations described for CPA Category 2 (see Section B.6.3 in Part II for CPA Category 2).

B.7. Application of the monitoring methodology and description of the monitoring plan

B.7.1. Data and parameters to be monitored by each generic CPA

CPA Category 3: CPAs using both AMS-I.D. (Version 17) and AMS-I.F. (Version 02)

The parameters identified for both Category 1 (see Section B.7.1 in Part II) and Category 2 (see Section B.7.1 in Part III).

B.7.2. Description of the monitoring plan for a generic CPA

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The monitoring plan of the CPA is consistent with the methodology AMS-I.D. (version 17) and AMS-I.F. (Version 02). The monitoring structure and plan for a SSC-CPA is an integrated part of in the management plan and monitoring plan of the PoA.

The CPA implementer will monitor the parameters with respect to the project. The various data used for the estimation of emission reduction will be monitored. The data will be archived electronically and be stored for 2 years after the end of the crediting period of the CPA. REA as the CME will supervise the implementation of the monitoring plan. REA will ensure that all relevant staff of the CPAs as well as its own personnel will be trained adequately in this task.

To ensure that the data is reliable and transparent, the CME will also 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 data

Depending on the type of renewable energy source used and the nature of the baseline grid, the following are the parameters to be monitored:

- Gross electricity generation, if possible
- Net electricity generation measured separately for electricity fed to the grid and distributed electricity (mini-grids)
- Type and quantity of Biomass consumption

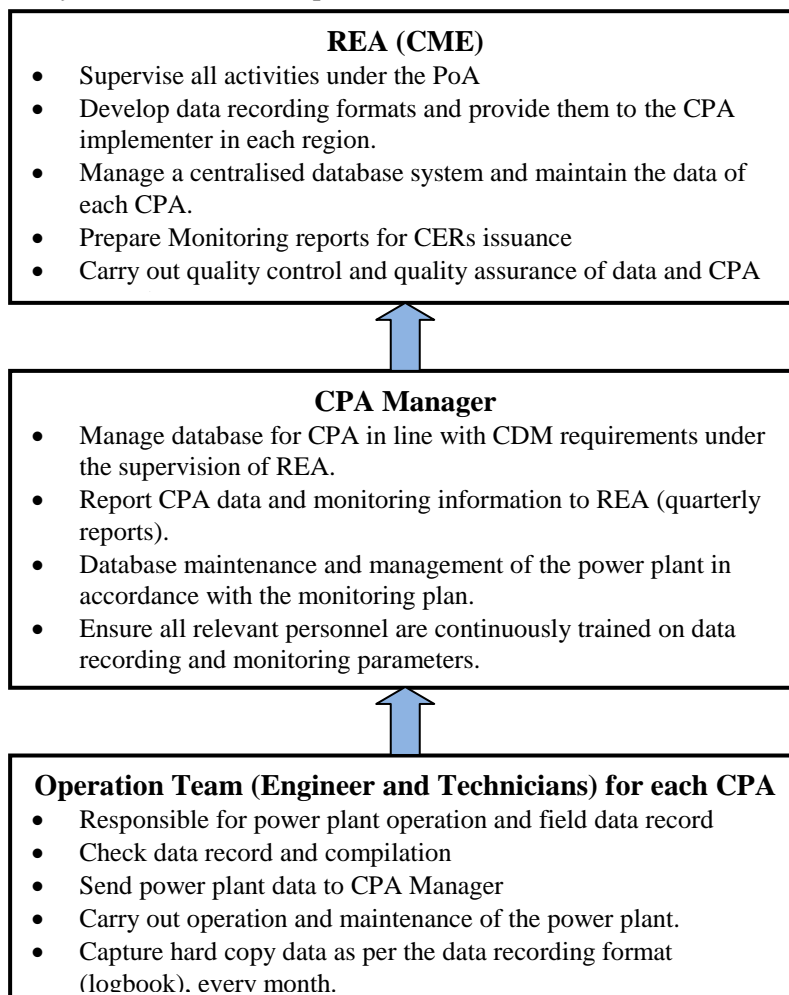


Figure 4: Planned operational and management structure for monitoring

The above parameters are monitored by the Plant Operator at each project site and will be entered in data sheets. Data will be recorded daily by the Plant Operator and any data outages will be recorded in an operational log and reported to the Plant Engineer. The Plant Engineer at each project site will prepare a report consisting of above parameters in electronic format. Both, the hard copy of data as well as the electronic report, will be forwarded to CPA Manager, who manage database for CPA in line with CDM requirements under the supervision of REA.

After the quality control, the CPA manager will send the consolidated data collected from the CPA to REA. Being the coordinating entity, REA will be responsible for the management of records and data associated with each SSC-CPA. They will maintain overall programme database for these records. The Project Manager of the PoA will manage the overall programme database and maintain the records of all CPAs under this programme.

Monitoring procedure

The gross electricity generation, if possible, and the quantity of net electricity supplied to the grid will be continuously measured using energy meters with a maximum rated error of 0.5% as mandated by EWURA. For CPAs supplying both national grid and mini-grids, the electricity flow to different grids will be measured separately. The biomass projects, biomass consumption and the net calorific value shall be measured at the frequencies specified in above Section B.7.1.

Accumulative measurements will be entered into an electronic database at the end of each month. Any problems occurring with the monitoring equipment will be entered into the database. CPA implementers will be produced quarterly monitoring reports containing the monthly monitoring data files and details of any equipment faults and/or loss of data. The quarterly report will be submitted to the CME and project participants for review and acceptance. All records will be retained for at least two years after the end of the crediting period.

Quality assurance and quality control

QA & QC procedures for recording, maintaining and archiving data shall be implemented as a part of this Component project activity. The CPA owner will implement QA & QC measures to calibrate and guarantee the accuracy of metering and safety of project operation to the extend of the requirements by the national regulation.

Specifically For CPA Category 3

The metering requirements under Category 1 (See Section B.7.2 in Part II for CPA Category 1) and Category 2 (See Section B.7.2 in Part II for CPA Category 1) will be cumulatively applied.

The following measures will be taken relating to the monitoring equipment owned by the CPA implementer and its installation and operation:

- All meters will be designed and manufactured to accepted standards (Regulator standards shall be followed for electricity meter). Each CPA shall provide all information regarding the metering devices including accuracy class and calibration frequency required, at least annually.
- All monitoring equipment will be located in secure locations free from the possibility of accidental damage.
- Routine maintenance and calibration of all monitoring equipment will be performed in accordance with Utility standards, Regular Standards or the manufacturer's specification (biomass), whenever applicable, to ensure that the data remains accurate.

To ensure the quality of the recorded data, all personnel will be trained in accordance with this monitoring plan.

The following quality assurance measures will be taken relating to the storage of the monitored data:

- A paper backup of the monthly electronic data file will be stored in a secure location on-site.
- The monthly data files will be included as part of the quarterly monitoring report and an electronic backup of the report will be emailed to a separate location.

When all produced electricity is delivered to the national grid, the amount of electricity measured by the Buyer will be used for ERs calculation. The project records will be used primarily for cross-checking and secondary for ERs calculation in case the Buyer could not measured the purchased electricity. In all case, the agreed amount of electricity used for billing purpose will be the main based for ER calculation.



If applicable, the net electricity supplied to a grid will be crosschecked as gross energy generation in the project activity power plant minus the auxiliary/station electricity consumption, technical losses and electricity import from the grid to the project power plant measured at the grid interface/connection used for billing purposes.

**Appendix 1: Contact information on entity/individual responsible for the PoA**

Organization	Rural Energy Agency (REA)
Street/P.O. Box	PO Box 7990
Building	Mwasiliano Towers, Sam Nujoma Road
City	Dar es Salam
State/Region	
Postcode	
Country	Tanzania
Telephone	+255 732 997981
Fax	+255 732 997981
E-mail	lmwakahesya@rea.go.tz
Website	
Contact person	
Title	Director General
Salutation	Mr.
Last name	Mwakahesya
Middle name	U.A.
First name	Lutengano
Department	Ministry of Energy and Minerals
Mobile	
Direct fax	+255 732 997981
Direct tel.	+255 732 997981
Personal e-mail	lmwakahesya@rea.go.tz



Organization	Government of Sweden - Swedish Energy Agency
Street/P.O. Box	P.O. Box 310
Building	
City	Eskilstuna
State/Region	
Postcode	SE-631 04
Country	Sweden
Telephone	(46) 16 544 2081
Fax	(46) 16 544 2099
E-mail	dna-dfp.sweden@energimyndigheten.se
Website	
Contact person	Mr. Bengt Boström
Title	
Salutation	Mr.
Last name	Boström
Middle name	
First name	Bengt
Department	
Mobile	
Direct fax	
Direct tel.	
Personal e-mail	bengt.bostrom@energimyndigheten.se



Organization	International Bank for Reconstruction and Development (IBRD) as the Trustee of the Carbon Partnership Facility
Street/P.O. Box	1818H Street NW
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State/Region	District of Columbia
Postcode	20433
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Fax	+1-202-522-7432
E-mail	Ibrd-carbonfinance@worldbank.org
Website	www.carbonfinance.org
Contact person	
Title	Manager
Salutation	Ms.
Last name	Chassard
Middle name	
First name	Joelle
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Mobile	
Direct fax	+1-202-522-7432
Direct tel.	+1-202-458-1873
Personal e-mail	

Appendix 2: Affirmation regarding public funding

Appendix 3: Application of methodology(ies)

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

Appendix 5: Further background information on the monitoring plan

History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities" (EB 66, Annex 13).
01	EB33, Annex43 27 July 2007	Initial adoption.



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