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

CONTENTS

Annexes

NOTE:

(i) This form is for submission of CPAs that apply a small scale approved methodology using the provision of the proposed small scale CDM PoA.

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

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

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

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

A.1. Title of the small-scale CPA:

Title: [XXX]
Version: [XXX]
Date: [XXX]

A.2. Description of the small-scale CPA:

[The CPA] is [type of renewable energy project] and involves the construction of a [capacity] MW power plant, which is located in [commune] commune, [district] district, [province] province of PNG. The CPA's estimated annual gross power generation is and [XXX] MWh.

[Describe CPA project location]. The power generated from [name of project] will be transmitted [information on areas where electricity will be supplied/ utilized]. The CPA will thus displace electricity from [name of grid/ mini –grid/ off-grid system] which is currently being powered through [existing source of electricity].

[CPA description]

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

[Contributions to sustainable development]

A.3. Entity/individual responsible for the small-scale CPA:

[XXX] is the project owner and implementer of the [Name of the CPA].

A.4. Technical description of the small-scale CPA:

[Project description]

[Key Technical Parameters of the Proposed CPA]

Figure 1: [CPA name] scheme

A.4.1. Identification of the small-scale CPA:

A.4.1.1. Host Party:

Independent State of Papua New Guinea

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

[
The project is located in [Village name] Village, [commune] commune, [district] district, [province] province of PNG. The project unique identification is its physical co-ordinates at [latitude] and [longitude] (see below figure).

[Figure]

Figure 2: Project Location. Source: [source]

A.4.2. Duration of the small-scale CPA:

A.4.2.1. Starting date of the small-scale CPA:

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

[Justification]

A.4.2.2. Expected operational lifetime of the small-scale CPA:

[XXX] Years

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

[Fixed Crediting Period] or [Renewable crediting period];

A.4.3.1. Starting date of the crediting period:

[Date], Later of [XXX] or date of inclusion of the CPA in the PoA

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

[7] years

NOTE: Please note that the duration of crediting period of any *CPA* shall be limited to the end date of the *PoA* regardless of when the CPA was added.

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

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

Years	Annual Estimation of Emission Reduction in tCO_{2e}
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
[dd/mm/yyyy] to [dd/mm/yyyy]	[XXXXXX]
Total emission reductions (tCO_{2e})	[XXXXXX]
Total number of crediting years	[total number of crediting years]
Annual average over the crediting period of estimated reductions (tCO_{2e})	[XXXXXX]

A.4.5. Public funding of the CPA:

The [Name of the Project] does not involve any diversion of Official Development Assistance.

A.4.6. Information to confirm that the proposed small-scale CPA is not a de-bundled component

As described in A.4.4.1 of the PoA DD, The De-bundling check for the CPAs will be carried out according to the *Guidelines on Assessment of De-bundling for SSC Project Activities, Version 3,Annex 13*, EB 54, section II: Guidance for Determining the Occurrence of De-bundling under a Programme of Activities (PoA).

According to the guidelines, 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 satisfies both conditions (a) and (b) below:
(a) Has the same activity implementer as the proposed small scale CPA or has a coordinating or managing entity, which also manages a large scale PoA of the same technology/measure, and;

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

[Justification]

The electronic database described in the PoA DD and the precise geographical coordinates of the [CPA] has been used to determine that a CPA is not a de-bundled component of another CDM project activity.

Therefore, the project is not a de-bundled component.

A.4.7. Confirmation that small-scale CPA is neither registered as an individual CDM project activity or is part of another Registered PoA:

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

SECTION B. Eligibility of small-scale CPA and Estimation of emissions reductions

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

Programme of Activities (PoA) for Sustainable Renewable Energy Power Generation in Papua New Guinea (PNG)

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

CPA title is eligible to be included to the Programme of Activities (PoA) for Sustainable Renewable Energy Power Generation in Papua New Guinea (PNG) as the CPA meets the eligibility criteria of the programme as below :

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
1	The CPA shall either be a new renewable energy power plant that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition, (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s) OR a renewable energy plant under expansion or retrofit.	The following documents shall be provided ☐ Feasibility Study Report of the CPA that describes the CPA technology/ technologies, users of electricity generated and also the existing site/scenario, in case expansion or retrofit.	☐ Yes / ☐ No ☐ Not Applicable
2	The CPA shall include only renewable power plants which utilize a single technology – wind, solar, hydro, geothermal, tidal, wave, renewable biomass and biomass gasification.	The following documents shall be provided ☐ Feasibility Study Report of the CPA that describes the CPA technology or technologies involved	☐ Yes / ☐ No ☐ Not Applicable
3	The CPA shall be located within the geographical boundary of Papua New Guinea	At least one of the following documents shall be provided ☐ Business license of the CPA Implementer issued by PNG authorities. ☐ Declaration from the CPA implementer confirm that the boundary of the implemented CPA is within the geographical territory of PNG and including information regarding geographic reference (latitude and longitude), name and address of the SSC-CPA. ☐ Location of the project (s) on map with geographical coordinate's e.g Google maps or other appropriate maps. ☐ Feasibility Study Report of	☐ Yes / ☐ No ☐ Not Applicable

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		the CPA	
4	The CPA shall meet the applicability requirements of all the relevant CDM methodologies - AMS I.F. version 02 EB 61, AMS I.D version 17 EB 60, AMS I.A. version 14 EB 54 - as determined in section E.1 for the technologies included in the CPA.	The following document shall be provided ☐ The CPA implementer will provide the necessary documents as per application of the relevant methodology as defined in the section E.2 below.	☐ Yes / ☐ No ☐ Not Applicable
5	The CPA shall have an installed capacity of $\leq$ 15 MWe[3]	One of the following documents shall be provided ☐ Feasibility Study Report of the CPA describing the CPA technology, capacity, location, etc. ☐ Award of contract to equipment provider for the CPA detailing technology, capacity, etc. ☐ Purchase order placed for key project related equipment (like generator) determining the project capacity.	☐ Yes / ☐ No ☐ Not Applicable
6	Component (project) of the CPA shall supply the renewable electricity generated to : Option 1 - The relevant and clearly identified electricity distribution system -national/regional/mini grid. OR	For component (project) included in the CPA one of the two options shall be followed: ☐ For Option 1, confirm that a component of the CPA meets all the applicability conditions for AMS I.D version 17/AMS I.F version 02	☐ Yes / ☐ No ☐ Not Applicable

[3] If a unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the 15 MW applies only to the renewable component.

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
	Option 2 - Individual households/users or groups of households/users included in the project boundary of the CPA.	☐ For Option 2, confirm that a component of the CPA meets all the applicability conditions for AMS I.A version 14. For the individual households/users or groups of households/users included in the project boundary of CPA the baseline would be decided at the respective CPA level depending on the appropriate methodology. For confirming eligibility under Option 1 one of the following documents shall be provided: ☐ Details on name and type of grid (national/regional/mini) system to which the electricity generated in the CPA shall be supplied should be provided in each CPA-DD. ☐ Power purchase agreement with the grid company (if available at the time of inclusion). The grid type and structure shall be justified by one of the following: ☐ Certificate by utility company clarifying the type of grid. ☐ Officially published data ☐ Published literature / journal/articles/ reliable websites For confirming eligibility under Option 2 the following	

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		documents shall be provided: ☐ Feasibility Study Report of the CPA that describes the CPA technology, users of electricity generated and also the existing site/scenario, in case expansion or retrofit. ☐ Govt. Approvals or approval from local authorities or any other related documents	
7	The CPA shall in case of hydro power plants, not result in the construction of new reservoirs or in an increase in the capacity of existing reservoirs where the power density of the power plant is less than 4 W/m^2.	This criterion is only applicable for CPA's involving hydro power plants with reservoirs. The following documents shall be provided: ☐ Feasibility Study Report and/or other document for CPA mentioning the surface area of reservoir, technology, etc. Or ☐ Project reports submitted to Govt. authorities for approval. and ☐ Calculation of power density described in the SSC-CPA-DD.	☐ Yes / ☐ No ☐ Not Applicable
8	The CPA shall in case of biomass power plants; no other biomass other than renewable biomass is used in the project plant.	This criterion is only applicable for CPA's involving biomass power plant. The following documents shall be provided ☐ Declaration from CPA implementer on the types of biomass that will be utilized in the CPA. ☐ The biomass type	☐ Yes / ☐ No ☐ Not Applicable

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		(renewable /non renewable) shall be confirmed based on Biomass assessment survey[4] carried out for the region and 'Definition of renewable biomass' EB 23, Annex 18'.	
9	The CPA shall in the case of project activities that involve capacity addition of renewable energy generation units at an existing renewable power generation facility; the added capacity of the units added by the project is lower than 15 MW and should be physically distinct from the existing units.	One of the following documents shall be provided: ☐ Feasibility Study Report of the CPA that describes the CPA technology/ technologies/ project capacities etc. ☐ Power purchase agreement with the grid company. ☐ Applicable Govt. approval and clearances (if applicable)	☐ Yes / ☐ No ☐ Not Applicable
10	In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit is not exceeding the limit of 15 MW.	This criterion is only applicable for CPA's involving retrofit or replacement. One of the following documents shall be provided: ☐ Power purchase agreement with the grid company. ☐ Feasibility Study Report of the CPA that describes the CPA technology/ technologies/ project capacities etc. ☐ Applicable Govt. approval and clearances (if applicable)	☐ Yes / ☐ No ☐ Not Applicable
11	If the unit added has both renewable and non-renewable components, the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable	This criterion is only applicable for CPA's involving capacity addition/expansion. The following document shall be provided	☐ Yes / ☐ No ☐ Not Applicable

[4] Also refer 'General Guidance on Leakage in biomass project activities (Attachment C to Appendix B of 4/CMP.1 Annex II)'

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
	component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	☐ Feasibility Study Report of the CPA that describes the CPA technology/ technologies/ project capacities etc. ☐ Applicable Govt. approval and clearances (if applicable)	
12	The CPA shall demonstrate additionality by meeting at least one of the criteria (criteria a – h) listed below :		☐ Yes / ☐ No ☐ Not Applicable
A	The project activity involves technologies which are listed under the positive list of grid-connected/off grid renewable electricity generation technologies of Guidelines on the demonstration of additionality of small scale project activities (version 09, EB 68) and thus the project activity is considered automatically additional. The grid connected technologies currently listed under positive list are: A. (i) Solar technologies (solar and solar thermal electricity generation) (ii) Off-shore wind technologies (iii) Marine technologies (wave, tidal) (iv) Building-integrated wind turbines or household rooftop wind turbines of a size up to 100 kW B. The following off-grid electricity generation technologies where the individual units do not exceed the thresholds indicated in parentheses with the aggregate project installed capacity not	The technology type used under the CPA can be confirmed from one of the following documents ☐ Feasibility Study Report of the CPA that describes the CPA technology, users of electricity generated and also the existing scenario, in case expansion or retrofit. ☐ Government approvals/clearances obtained for the projects under the CPA ☐ Award of contract to equipment provider (or Purchase order) for the CPA detailing technology, capacity, etc.	

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
	exceeding the 15 MW threshold are considered automatically additional : (v) Micro/pico-hydro (with power plant size up to 100 kW); (vi) Micro/pico-wind turbine (up to 100 kW); (vii) PV-wind hybrid (up to 100 kW); (viii) Geothermal (up to 200 kW); (ix) Biomass gasification/biogas (up to 100 kW) C. Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds. D. Rural electrification[2] project activities using renewable energy sources in countries with rural electrification rates less than 20%; the most recent available data on the electrification rates shall be used to demonstrate compliance with the 20 per cent threshold. In no case shall data be used if older than three years from the date of commencement of validation of the project activity		
B	As per 'Guidelines for Demonstrating Additionality of	According to the United Nations, PNG is classified as	☐ Yes / ☐ No

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
	Microscale Project Activities'(Version 04)' Project activities up to five megawatts that employ renewable energy technology are additional if - The geographic location of the project activity is in one of the least developed countries or the small island developing States (LDCs/SISDS) or in a special underdeveloped zone (SUZ) of the host country.	Small Island Developing State (SIDS)[5]. One of the following documents shall be provided to demonstrate that the project activity will have installed capacity upto 5MW: ☐ Feasibility Study Report of the CPA that describes the CPA technology, users of electricity generated and also the existing scenario, in case expansion or retrofit. ☐ Government approvals/clearances obtained for the projects under the CPA ☐ Award of contract to equipment provider (or Purchase order) for the CPA detailing technology, capacity, etc.	☐ Not Applicable
C	As per 'Guidelines for Demonstrating Additionality of Microscale Project Activities'(Version 04)' The project activity employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country.	In case this criteria is applicable, the following document shall be provided: ☐ Relevant approval from the CDM EB board for specific renewable energy technologies/measures recommended by the host country designated national authority (DNA).	☐ Yes / ☐ No ☐ Not Applicable
D	As per the Guidelines on the	One or more of the following	☐ Yes /

[5] http://www.un.org/special-rep/ohrlls/sid/list.htm

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
	demonstration of additionality of small scale project activities (version 09, EB 68) Investment barrier: a financially more viable alternative to the project activity would have led to higher emissions	information, shall be provided in the CPA-DD to demonstrate the component of CPA faces investment barrier: ☐ The Project IRR for component/sub-project of the CPA ☐ The project IRR is lower than applicable benchmark of the component/sub-project of the CPA ☐ All the key parameters for calculating Project IRR along with benchmark adhere to criteria listed in Appendix 5. CPA implementer will provide calculation spreadsheet wherein all the calculation algorithm and formula can be followed. The spread sheet will not be a protected sheet.	☐ No ☐ Not Applicable
E	As per the Non-binding best practice examples to demonstrate additionality for SSC project activities (EB 35– Annex 34) Access-to-finance barrier- The project activity could not access appropriate capital without consideration of the CDM revenue.	One of the following documents shall be provided to demonstrate the access-to finance barrier to component of the CPA. ☐ Statement from at least two financing banks that the revenue from the CDM is critical in the approval of the loan. ☐ Loan agreement demonstrating that the investment is done by a company which also purchases the CERs. ☐ Loan agreement	☐ Yes / ☐ No ☐ Not Applicable

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		demonstrating that a significant part of the project investment is provided upfront by a company as a pre-payment for expected CERs. ☐ Government / Bank / Development finance institute report indicating difficulty in access to finance or another document that is considered to be an appropriate evidence by the DOE	
F	As per the Guidelines on the demonstration of additionality of small scale project activities (version 09, EB 68) 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.	One of the following documents shall be provided to demonstrate the technology barrier. . ☐ Analysis or assessment reports or other suitable evidence from relevant agency demonstrating non-availability of human capacity to operate and maintain the technology. ☐ Analysis or assessment reports or other suitable evidence from relevant agency demonstrating uunavailability of the technology and high level of technology risk.	☐ Yes / ☐ No ☐ Not Applicable
G	As per the Guidelines on the demonstration of additionality of small scale project activities (version 09, EB 68) Barrier due to prevailing practice: prevailing practice or existing regulatory or policy requirements would have led to implementation of a technology with higher emissions.	One of the following options shall be followed to demonstrate the prevailing practice barrier. Option 1 ☐ Letter/report or other suitable evidence from relevant agency demonstrating a history of non- implementation of the technology/measures over a	☐ Yes / ☐ No ☐ Not Applicable

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		long time period. Option 2 ☐ Demonstrate that component of the CPA is not a common practice as per 'Guidelines on Common Practice' version 02, EB 69, Annex 08. The following criteria shall be met - The factor F ((penetration rate of the measure/technology) is greater than 0.2 and N_{all}[6] -N_{diff}[7] is greater than 3	
H	Component of the CPA is a 'First of it's kind' project in the geographical area.	☐ Justification that the project is a 'First-of-its-kind' in the applicable geographical area, based on publicly available information and/or confirmation from government departments/ industry association/ international association on market penetration of technology ,, in accordance with criteria's mentioned in paragraph 5a,5b and 5c of 'Guidelines of First-of - its- kind project activities', EB 69, version 02. The criteria's are listed below: ☐ The project is the first in the applicable geographical area that applies a technology that is different from technologies that are implemented by any other project, which are able to	☐ Yes / ☐ No ☐ Not Applicable

[6] Similar projects that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation

[7] Similar projects that apply technologies that are different to the technology applied in the proposed project activity

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		deliver the same output and have started commercial operation in the applicable geographical area before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of the proposed project activity, whichever is earlier; ☐ The project implements one or more of the measures; ☐ The project participants selected a crediting period for the project activity that is "a maximum of 10 years with no option of renewal".	
13	Implement a record keeping system and a procedure to avoid double accounting as described in A 4.4.1 (ii) of PoA-DD	☐Confirmation that recording keeping system is in place and the CPA does not lead to double accounting of emission reductions.	☐ Yes / ☐ No ☐ Not Applicable
14	The CPA shall establish procedures for De-bundling check for the CPAs as described in A 4.4.1 (iii)	The following should be done ☐Confirmation that the SSC-CPA is not a de-bundled component of another SSC-CPA or CDM project activity as per guidance provided in section A.4.4.1 below or ☐Declaration from the CPA Implementer confirming that the CPA is not a de-bundled component of another CPA or CDM project activity as per	☐ Yes / ☐ No ☐ Not Applicable

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		latest guidance given by the CDM Executive Board	
15	The CPA shall develop provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA as described in A 4.4.1 (iv)	☐Declaration from the CPA implementer that it is aware and has agreed that their activity is being subscribed to the PoA.	☐ Yes / ☐ No ☐ Not Applicable
16	The CPA shall have a start date after the commencement of PoA validation, which is 12/07/2011.	One of the following documents shall be provided ☐Earliest date of award of contract to equipment supplier/contractor for the CPA ☐ Earliest purchase order placed for the project ☐Earliest construction contract for the project. ☐ If the project is at early stage (i.e. none of the above or other similar documents reflecting real action is available have been issued) undertaking from the CPA implementer that the start date of the CPA is after 12/07/2011.	☐ Yes / ☐ No ☐ Not Applicable
17	Conduct local stakeholder consultation at CPA level and environmental analysis as required by the Host country regulations.	The following document shall be provided: ☐ Meeting minutes of the stakeholder consultation ☐ Photographs of the stakeholder consultation meeting conducted. ☐ Newspaper advertisement	☐ Yes / ☐ No ☐ Not Applicable

Sr. No	Eligibility Criteria	Justification and comments	Criteria Met?
		for stakeholder consultation meeting. ☐ Environmental permit or EIA report, only if required as per the Host Country regulations	
18	Confirm that funding from Annex I parties, if any, does not result in a diversion of official development assistance.	The following document shall be provided: ☐ Declaration from the CPA Implementer regarding the involvement of public funding or ODA from Annex I Parties Declaration from the CPA implementer. ☐ In case ODA is involved, confirmation from funding agency that this do not result in diversion of ODA. ☐ Confirmation in the SSC-CPA-DD regarding no involvement of public funding or ODA from Annex I Parties.	☐ Yes / ☐ No ☐ Not Applicable
19	Confirm that the technology will not be substituted within the project period	☐Declaration from the CPA implementer that technology will not be substituted within the project period.	☐ Yes / ☐ No ☐ Not Applicable
20	For CPA's requiring sampling, a sample plan shall be provided in the SSC-CPA-PDD	☐Confirmation that a sampling plan has been included in SSC-CPA-DD in line with Annex 4 of PoA-DD (only where applicable).	☐ Yes / ☐ No ☐ Not Applicable

[CPA title] fulfils also all eligibility requirements of the following methodologies:

[Provide list of methodology applied in this CPA]

[Keep only eligibility conditions of the methodologies which are applicable to CPA]

AMS I.F. 'Renewable electricity generation for captive use and mini-grid'(I.F/version 02, Sectoral scope:01, EB 61).

Para No	Applicability Criteria as per AMS I.F. ver 02	Project Scenario
1	This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s).	[XXXXXX]
2	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: a) A national or a regional grid (grid hereafter); b) Fossil fuel fired captive power plant; c) A carbon intensive mini-grid.	[XXXXXX]
3	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.	[XXXXXX]
4	Illustration of respective situations under which each of the methodology (AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2.	[XXXXXX]
5	Hydro power plants with reservoirs that	[XXXXXX]

	satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/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 4W/m2.	
6	For biomass power plants, no other biomass other than renewable biomass is to be used in the project plant.	[XXXXXX]
7	This methodology is applicable for project activities that: a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); b) involve a capacity addition c) involve a retrofit of (an) existing plant(s); or d) involve a replacement of (an) existing plant(s).	[XXXXXX]

8	In the case of project activities that involve 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.	[XXXXXX]
9	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.	[XXXXXX]
10	If the unit added 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 unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	[XXXXXX]
11	Combined heat and power (co-generation) systems are not eligible under this category.	[XXXXXX]
12	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.	[XXXXXX]
13	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.	[XXXXXX]
14	In the specific case of biomass project activities the determination of leakage	[XXXXXX]

	shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042.	
15	In case the project activity involves the replacement of equipment, and the leakage from the use of the replaced equipment in another activity is neglected because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	[XXXXXX]

And/Or

AMS I.D. 'Grid connected renewable electricity generation' (I.D/version 17, Sectoral scope:01, EB 61).

Para No	Applicability Criteria as per AMS I.D. ver 17	Project Scenario
1	This category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable	[XXXXXX]

	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	
2	Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A) applies is included in Table 2.	[XXXXXX]
3	This methodology is applicable to project activities that (a) install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) involve a capacity addition; (c) involve a retrofit of (an) existing plant(s); or (d) involve a replacement of (an) existing plant(s).	[XXXXXX]
4	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/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 4W/m2.	[XXXXXX]
5	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	[XXXXXX]

	renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	
6	Combined heat and power (co-generation) systems are not eligible under this category.	[XXXXXX]
7	In the case of project activities that involve 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.	[XXXXXX]
8	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.	[XXXXXX]
9	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.	[XXXXXX]
10	In the specific case of biomass project activities the determination of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042.	[XXXXXX]
11	In case the project activity involves the replacement of equipment, and the leakage from the use of the replaced equipment in another activity is neglected because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this	[XXXXXX]

	purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	

And/Or

For CPA's with Option C: AMS I.A. 'Electricity generation by the user' (I.A/version 14, Sectoral scope:01, EB 54).

Para No	Applicability Criteria as per AMS I.A. ver 14	Project Scenario
1	This category comprises renewable electricity generation units that supply individual households/users or groups of households/users included in the project boundary.	[XXXXXX]
2	The applicability is limited to individual households and users that do not have a grid connection except when; a) A group of households or users are supplied electricity through a standalone minigrid powered by renewable energy generation unit(s) where the capacity of the generating units does not exceed 15 MW (i.e., the sum of installed capacities of all renewable energy generators connected to the mini-grid is less than 15 MW) e.g., a community based stand-alone off-the-grid renewable electricity systems; or b) The emissions reduction per renewable energy based lighting system is less than 5 tonnes of	[XXXXXX]

	CO_{2e} a year and where it can be shown that fossil fuel would have been used in the absence of the project activity by; ➢ A representative sample survey (90% confidence interval, ±10% error margin) of target households; or ➢ Official statistics from the host country government agencies.	
3	The renewable energy generation units include technologies such as solar, hydro, wind, biomass gasification and other technologies that produce electricity all of which is used on-site/locally by the user, e.g., solar home systems, wind battery chargers . The renewable generating units may be new installations (Greenfield) or replace existing onsite fossil-fuel-fired generation. To qualify as a small-scale project, the total output of the unit(s) shall not exceed the limit of 15 MW.	[XXXXXX]
4	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: • The project activity is implemented in an existing reservoir with no change in the volume of reservoir; • The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section,	[XXXXXX]

	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 4W/m2.	
5	Combined heat and power (co-generation) systems are not eligible under this category.	[XXXXXX]
6	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.	[XXXXXX]
7	Project activities that involve retrofit or replacement of an existing facility for renewable energy generation are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	[XXXXXX]
8	In the case of project activities that involve 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.	[XXXXXX]
9	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.	[XXXXXX]

10	In the specific case of biomass project activities the determination of leakage shall be done following the general guidance for leakage in small-scale biomass project activities (attachment C of Appendix B of simplified modalities and procedures for small-scale clean development mechanism project activities;) or following the procedures included in the leakage section of AM0042.	[XXXXXX]
11	In case the project activity involves the replacement of equipment, and the leakage from the use of the replaced equipment in another activity is neglected because the replaced equipment is scrapped, an independent monitoring of scrapping of replaced equipment needs to be implemented. The monitoring should include a check if the number of project activity equipment distributed by the project and the number of scrapped equipment correspond with each other. For this purpose scrapped equipment should be stored until such correspondence has been checked. The scrapping of replaced equipment should be documented and independently verified.	[XXXXXX]

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

Prior consideration of the CDM:

[Table of Chronology of Events and On-going CDM consideration]

Date	Activity	Type of Evidence

The project activity involves technology which is listed under the positive list as defined in Guidelines on the demonstration of additionality of small scale project activities (version 09, EB 68, Annex 27), the project activity is considered automatically additional. The technologies currently listed under positive list are:

a) The following grid-connected and off-grid renewable electricity generation technologies
1. Solar technologies (solar and solar thermal electricity generation)
2. Off-shore wind technologies
3. Marine technologies (wave, tidal)
4. Building-integrated wind turbines or household rooftop wind turbines of a size
   a. up to 100 kW;

b) The following off-grid electricity generation technologies where the individual units do not exceed the thresholds indicated in parentheses with the aggregate project installed capacity not exceeding the 15 MW threshold:
(i) Micro/pico-hydro (with power plant size up to 100 kW);
(ii) Micro/pico-wind turbine (up to 100 kW);
(iii) PV-wind hybrid (up to 100 kW);
(iv) Geothermal (up to 200 kW);
(v) Biomass gasification/biogas (up to 100 kW);

c) Project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size[1] of each unit is no larger than 5% of the small-scale CDM thresholds;

d) Rural electrification[2] project activities using renewable energy sources in countries with rural electrification rates less than 20%; the most recent available data on the electrification rates shall be used to demonstrate compliance with the 20 per cent threshold. In no case shall data be used if older than three years from the date of commencement of validation of the project activity.

[In case the project activity does not fall under the positive list, the project activity shall follow the section below]

Pursuant to the PoA-DD (section E.5.) for the Programme of Activities (PoA) for Sustainable Renewable Energy Power Generation in Papua New Guinea (PNG) the demonstration and assessment of additionality for a CPA has been demonstrated based on one of the below applicable options :

[Only relevant / applicable option to be mentioned in specific CPA]

Option 1: For CPAs in the capacity range up-to 5 MW - As per "Guidelines for demonstrating additionality of Micro-scale project activities" EB 63 (version 3)**.**

The CPA Title is a renewable energy project activity of capacity [XX] MW. As per the section E.5. of the PoA-DD, the additionality of the CPA is demonstrated as per "Guidelines for demonstrating additionality of Micro-scale project activities" EB 63 (version 3).

As per the paragraph 2 of the guidelines:

Project activities up to 5 megawatts that employ renewable energy technology are additional if any one of the below conditions are satisfied:

a) The geographic location of the project activity is in one of the least developed countries or the small island developing States (LDCs/SIDS) or in a special underdeveloped zone (SUZ)of the host country

(i) SUZ is a region in the host country (zone, municipality or any other designated official administrative unit) identified by the Government in official notifications for development assistance including for planning, management, and investment satisfying any one of the following conditions using most recent available data:

- The proportion of population with income less than USD 2 per day (PPP) in the region is greater than 50%;
- The GNI per capita in the country is less than USD 3000 and the population of the region is among the poorest 20% in the poverty ranking of the host country as per the applicable national policies and procedures;

(ii) In cases where, based on the recommendation of the designated national authority of the host country, the SUZ in the host country has been approved by Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM), the list of such SUZ shall be maintained on the UNFCCC website (e.g. at <http://cdm.unfccc.int/DNA/submissions/index.html>). In the case of these SUZ listed on the CDM website there is no need for the project proponents to provide proofs as indicated in paragraph (a) above.

b) The project activity is an off grid activity supplying energy to households/communities (less than 12 hrs grid availability per 24 hrs day is also considered as .off grid. for this assessment);

c) The project activity is designed for distributed energy generation (not connected to a national or regional grid) with both conditions (i) and (ii) satisfied;

(i) Each of the independent subsystem/measure in the project activity is smaller than or equal to 1500 kW electrical installed capacity;

(ii) End users of the subsystem or measure are households/communities/ SMEs.

d) The project activity employs specific renewable energy technologies/measures recommended by the host country designated national authority (DNA) and approved by the Board to be additional in the host country.

The following conditions shall apply for DNA recommendations:

(i) Specific renewable energy technologies/measures refers to grid connected renewable energy technologies of installed capacity equal to or smaller than 5 MW;

(ii) The ratio of installed capacity of the specific grid connected renewable energy technology in the total installed grid connected power generation capacity in the host country shall be equal to or less than 3 per cent;

(iii) Most recent available data on the percentage of contributions of specific renewable energy technologies shall be provided to demonstrate compliance with the 3 per cent threshold. In no case shall data older than three years from the date of submission be used;

(iv) Technologies/measures recommended by DNAs and approved by the Board to be additional in the host country remain valid for three years from the date of approval. However, additionality of eligible project activities applying the guidelines remains valid for the entire crediting period;

(v) DNA submissions shall include the specific grid connected renewable electricity generation technologies that are being recommended and provide the required data as indicated above (e.g. wind power, biomass power, geothermal power, hydropower).

According to the United Nations, PNG is classified as Small Island Developing State (SIDS)[8]. Hence proposed CPA, which is having installed capacity of [XX] MW is considered to be additional as per the above EB guidelines and further demonstration of the additionality with investment analysis or barrier analysis or both is deemed not necessary.

Option* 2: For CPAs in the capacity range 5-15 MW - *as per Guidelines on the demonstration of additionality of small scale project activities (version 09, EB 68)

The CPA Title is a renewable energy project activity of capacity [XX] MW. The project activity falls in the capacity range of 5 – 15 MW. Pursuant to the PoA-DD (section E.5.), the additionality of the CPA will be demonstrated according to Guidelines on the demonstration of additionality of small scale project activities (version 09, EB 68).

[Discuss the additionality analysis in accordance with Guidelines on the demonstration of additionality of small scale project activities (version 09, EB 68) and PoA-DD section E.5.1]

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

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

[8] http://www.un.org/special-rep/ohrlls/sid/list.htm

Source		Gas	Included ?	Justification / Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity [Name of the grid]	CO_2	[Yes/No]	[Provide Justification]
		CH_4	[Yes/No]	[Provide Justification]
		N_2O	[Yes/No]	[Provide Justification]
Project activity	CO_2 emissions from combustion of fossil fuels for electricity generation	CO_2	[Yes/No]	[Provide Justification]
		CH_4	[Yes/No]	[Provide Justification]
		N_2O	[Yes/No]	[Provide Justification]
	For Geothermal Power Plants, Fugitive emissions of CH_4 and CO_2 from non condensable gases contained in geothermal steam	CO_2	[Yes/No]	[Provide Justification]
		CH_4	[Yes/No]	[Provide Justification]
		N_2O	[Yes/No]	[Provide Justification]
	On site fossil fuel consumption	CO_2	[Yes/No]	[Provide Justification]
		CH_4	[Yes/No]	[Provide Justification]
		N_2O	[Yes/No]	[Provide Justification]
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	[Yes/No]	[Provide Justification]
		CH_4	[Yes/No]	[Provide Justification]
		N_2O	[Yes/No]	[Provide Justification]

The [XXX] renewable energy power plant is located within the boundaries of the Independent State of Papua New Guinea as specified in A.4.1.2.

A schematic view of the boundary for the CPA is shown in figure below

[Diagram]

[Provide additional description if needed]

B.5. Emission reductions:

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

Only the applicable ex-ante parameters are chosen from the exhaustive list in the PoA-DD and in accordance with the methodology selected.

Data / Parameter:	$EF_{CO2, y,grid/mini-grid/captive}$
Data unit:	tCO2e/MWh
Description:	Emission factor of the grid/mini-grid/captive where the renewable power is exporting (or would have exported) its electricity to..
Source of data used:	[XXX]
Value applied:	[XXX]
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	[XXX]

Data / Parameter:	$EF_{CO2,y,grid}$
Data unit:	tCO2e/MWh
Description:	CO_2 emission factor of the grid (national or regional) in year y
Source of data used:	[XXX]
Value applied:	[XXX]
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	[XXX]

Data / Parameter:	$EF_{CO2,diesel}$
Data unit:	tCO2e/MWh
Description:	CO_2 emission factor in year y for the baseline energy e.g diesel or other fossil fuel
Source of data used:	[XXX]
Value applied:	[XXX]
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	[XXX]

Data / Parameter:	EF_{Res}
Data unit:	kg CO_2e/MWh
Description:	Default emission factor for emissions from reservoirs
Source of data used:	Default value as per EB23

Value applied:	90 kgCO2e/MWh.
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	For calculation of project emission (PE); For CPAs that result in new reservoirs and/or the increase of existing reservoirs

Data / Parameter:	GWP_{CH4}
Data unit:	tCO2e/tCH4
Description:	Global warming potential of methane valid for the relevant commitment period
Source of data used:	IPCC
Value applied:	For the first commitment period: 21 tCO2e/tCH4.
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	$EG_{historical}$
Data unit:	MWh
Description:	Historical electricity generation
Source of data used:	[xxxx]
Value applied:	[xxxx]
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

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

The total emission reductions of the CPA are calculated on the basis of the equations and parameters presented and explained in the section E.6.1 of the PoA-DD and B.5.1 of this document.

In case of [XXX] emission reductions are calculated as discussed in section E.4 of the PoA-DD for [methodology selected].

[Description of procedure for calculating baseline emissions as described in PoA-DD section E.4 as per the methodology followed]:

Baseline Emissions

Baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity, calculated as follows:

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

Where:

BE_y = Baseline Emissions in year y (tCO_2)
$EG_{BL, y}$ = Quantity of net electricity displaced as a result of the implementation of the CDM project activity in year y (MWh) [XXXX]
$EF_{CO2, y}$ = Emission factor (tCO_2/MWh) [XX tCO_2/MWh] $EF_{CO2, y}$ can be emission factor would be $EF_{CO2, minigrid}$, $EF_{CO2, grid}$, $EF_{CO2, diesel}$

[In case of retrofit/capacity addition provide justification for net electricity displaced as per section E.4 of the PoA-DD]

[Provide justification for the emission factor as per the section E.4 of the PoA-DD]

BEy = [XXXX] × [XX] = [XXXXX] tCO2e

Project emissions *(PE_y)*

In case of [XXX] CPA, the potential sources of project emissions are:

1. Emission from hydro power project.
2. Emissions due to electricity consumption
3. Emissions from geothermal project

1. Emissions from Hydro Power project

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 ACM0002, version 12.2.2, as follows:

Table XX: Installed capacity and respective reservoir area of CPA

Parameter	Notation	Unit	Value
Installed Capacity	W	CAP_{PJ}	[XX]
Reservoir Area	m^2	A_{PJ}	[XX]

The power density (*PD*) is derived as:

[XXX]

[Calculation of PE_Y]

2. CO_2 emissions from electricity consumption by the project activity

In case of exigencies/plant maintenance/shut down, [XXXX] will act as a back-up. The project emissions related to electricity consumed from [XXXX] will be calculated as per the "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption*" Version 1.

As per the "*Tool to calculate baseline, project and/or leakage emissions from electricity consumption"*

The tool is only applicable if one out of the following three scenarios applies to the sources of electricity consumption:

Scenarios	**Applicability**
Scenario A: Electricity consumption from the grid. The electricity is purchased from the grid only. Either no captive power plant is installed at the site of electricity consumption or, if any onsite captive power plant exists, it is not operating or it can physically not provide electricity to the source of electricity consumption.	[XXXX]
Scenario B: Electricity consumption from (an) off-grid fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants are installed at the site of the electricity consumption source and supply the source with electricity. The captive power plant(s) is/are not connected to the electricity grid.	[XXXX]
Scenario C: Electricity consumption from the grid and (a) fossil fuel fired captive power plant(s). One or more fossil fuel fired captive power plants operate at the site of the electricity consumption source. The captive power plant(s) can provide electricity to the electricity consumption source. The captive power plant(s) is/are also connected to the electricity grid.	[XXXX]

As per the tool, project emissions from consumption of electricity are calculated based on the quantity of electricity consumed, an emission factor for electricity generation and a factor to account for transmission losses, as follows:

$$PE_{EC,y} = \sum_{j} EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

Where;

$PE_{EC,y}$	=	Project emissions from electricity consumption in year y (tCO2/yr)
$EC_{PJ,j,y}$	=	Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr)
$EF_{EL,j,y}$	=	Emission factor for electricity generation for source j in year y (tCO2/MWh)
$TDL_{j,y}$	=	Average technical transmission and distribution losses for providing electricity to source j in year y

The emission factor is calculated as per Option [XXX] of the tool.

[Provide relevant equation and emission calculation as per Option selected from the tool]

3. Emissions from Geothermal project

For Geothermal CPA's, project emissions have to be considered following the procedure described in the most recent version of ACM0002.

$PE_y = PE_{FF,y} * PE_{GP,y}$

Where:
PE_y Emission from reservoir expressed as tCO2e/year
$PE_{FF,y}$ Project emissions from fossil fuel consumption in year y (tCO2/yr)
$P_{GPF,y}$ Project emissions from the operation of geothermal power plants due to the release of non-condensable gases in year y (tCO2e/yr)

$PE_{FF,y}$ shall be calculated as per the latest version of the .Tool to calculate project or leakage CO2 emissions from fossil fuel combustion.

[Provide project emission calculation]

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

$PE_{GP,y} = (W_{steam,CO2,y} + W_{steam,CH4,y} + GWP_{CH4}) . M_{steam,y}$

Table XX: Average mass fraction of CO_2 &CH_4 in steam & quantity of steam produced by CPA

Parameter	Notation	Unit	Value

Average mass fraction of carbon dioxide in the produced steam	$W_{steam,CO2,y}$	tCO2/t steam	[XX]
Average mass fraction of methane in the produced steam	$W_{steam,CH4,y}$	tCH4/t steam	[XX]
Quantity of steam produced	$M_{steam,y}$	t steam/yr	[XX]

Hence, Total Project Emissions PEy =[XXX]tCO_{2e}

Leakage *(L_y)*

As described in the PoA-DD, section E.6.2, L_y (Leakage) is calculates as below:

[XXX] CPA is [not transferring] energy generating equipment from another activity. Hence, the leakage is considered as zero.

[For biomass projects provide the procedure followed to calculate leakage as per PoA-DD section E.6.2]

Emission reductions *(ER_y)*

Emission reductions are calculated as follows:

$ER_y = BE_y - PE_y - L_y$

= [XXX] (tCO_{2e})

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

Table XX: Ex-ante estimation of emission reductions

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**
[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**
[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**
[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**

[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**
[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**
[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**
[dd/mm/yyyy to dd/mm/yyyy]	**[XX]**	**[XX]**	**[XX]**	**[XX]**
Total estimated emissions and emission reductions in tonnes of CO_2 e	**[XX]**	**[XX]**	**[XX]**	**[XX]**

B.6.1. Description of the monitoring plan:

As described in PoA-DD, section E.7.2, the monitoring plan is described below:

Monitoring Plan Objective and Organisation

To ensure that the data is reliable and transparent, PNG Power Ltd 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.

[XXXXX]

Monitoring procedures have been elaborated in the Operational and Management System for the Programme of Activities (PoA) for Sustainable Renewable Energy Power Generation in Papua New Guinea (PNG)'document which includes responsibilities, Management, Quality Assurance, Means of Verification of data, data transferring and data trails. The procedures ensure that no double accounting occurs and that the status of verification can be determined anytime for the CPA.

Monitoring Data

[XXXXX]

Quality Assurance and Quality Control

[XXXXX]

Verification of Monitoring Results
[XXXXX]

The parameters to be monitored will be determined as per the methodology (ies) selected for the CPA from the list of parameters provided in PoA-DD section E.7.1.
The parameters to be monitored are:

Data / Parameter:	$EG_{BL,y}$
Data unit:	MWh/y
Description:	Quantity of net electricity displaced in year *y*
Source of data to be used:	Measured by energy meter(s)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Continuous monitoring by instruments having class accuracy acceptable by national standards meter integrated hourly and recorded monthly and yearly. Data archiving would be done both electronically and on paper records. The Data will be stored for atleast 2 years after last crediting period
QA/QC procedures to be applied:	If applicable, measurement results will be cross checked with records for sold/purchased electricity (e.g., invoices/receipts). Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years.
Any comment:	-

Data / Parameter:	$EF_{CO2,i,y}$
Data unit:	t CO_2/GJ
Description:	Weighted average CO_2 emission factor of fuel type i in year y
Source of data to be used:	The following data sources to be used a) Supplier data b) If (a) is not available, measurement by PP c) If (a)is not available, regional or national default values will be taken for liquid fuels d) If (a) is not available, IPCC default values at the upper limit of the uncertainty at a 95% confidence interval.
Value of data applied	To be specified in each SSC-CPA

for the purpose of calculating expected emission reductions in section B.5	
Description of measurement methods and procedures to be applied:	For a) and b): Measurements should be undertaken in line with national or international fuel standards at each fuel delivery. In case of (c), appropriateness of the values will be reviewed annually. In case of (d), any revisions of the IPCC Guidelines will be taken into account. The Data will be stored for atleast 2 years after last crediting period
QA/QC procedures to be applied:	For a) and b): Measurements should be undertaken in line with national or international fuel standards. For a): If the fuel supplier does provide the NCV value and the CO2 emission factor on the invoice and these two values are based on measurements for this specific fuel, this CO2 factor should be used. If another source for the CO_2 emission factor is used or no CO_2 emission factor is provided, options b), c) or d) should be used.
Any comment:	-

Data / Parameter:	COEF i
Data unit:	t CO2/MJ
Description:	CO_2 emission factor of fossil fuel type i
Source of data to be used:	Calculated
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Calculated as per the .Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion The Data will be stored for atleast 2 years after last crediting period
QA/QC procedures to be applied:	--
Any comment:	-

Data / Parameter:	NCV_i
Data unit:	GJ per unit volume or mass unit
Description:	Weighted average net calorific value of fuel type i in year y
Source of data to be	The following data sources to be used

used:	a) Supplier data b) If (a) is not available, measurement by PP c) If (a) is not available, regional or national default values will be taken for liquid fuels d) If (a) is not available, IPCC default values at the upper limit of the uncertainty at a 95% confidence interval.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	For (a) and (b) Measurements to be undertaken in line with national or international fuel standards and at each fuel delivery. In case of (c), appropriateness of the values will be reviewed annually. In case of (d), any revisions of the IPCC Guidelines will be taken into account. The Data will be stored for atleast 2 years after last crediting period
QA/QC procedures to be applied:	Verify if the values under (a),(b) and (c) are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in a), b) or c) should have ISO17025 accreditation or justify that they can comply with similar quality standards.
Any comment:	

Data / Parameter:	$Q_{Biomass}$
Data unit:	Ton/y
Description:	Quantity of biomass consumed in year y
Source of data to be used:	Calculated
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Use mass or volume based measurements. Adjust for the moisture content in order to determine the quantity of dry biomass. The quantity of biomass will be measured continuously or in batches. If more than one type of biomass fuel is consumed, each will be

	monitored separately. Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	Cross-checks on the measurements will be done 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. Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years.
Any comment:	

Data / Parameter:	$MC_{Biomass}$
Data unit:	% water
Description:	Moisture content of the biomass residues
Source of data to be used:	Measured
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	On-site measurements Ex ante estimates will be provided in the CPA-DD and used during the crediting period. In case of dry biomass, monitoring of this parameter is not necessary The moisture content of biomass of homogeneous quality shall be monitored for each batch of biomass. The weighted average should be calculated for each monitoring period and used in the calculations Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years.

Any comment:	-

Data / Parameter:	$NCV_{Biomass, k}$
Data unit:	GJ/mass or volume unit
Description:	Net calorific value of biomass residue type k
Source of data to be used:	Measured
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Measurement in laboratories according to relevant national/international standards. Measured 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. Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	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.
Any comment:	Determined once in the first year of the crediting period

Data / Parameter:	$W_{steam,CO2,y}$
Data unit:	tCO_2/t steam
Description:	Average mass fraction of carbon dioxide in the produced steam in year y
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Non-condensable gases sampling should be carried out in production wells and at the steam field-power plant interface using ASTM Standard Practice E1675 for Sampling 2-Phase Geothermal Fluid for Purposes of Chemical Analysis (as applicable to sampling single phase steam only). The CO_2 and CH_4 sampling and

	analysis procedure consists of collecting non-condensable gases samples from the main steam line with glass flasks, filled with sodium hydroxide solution and additional chemicals to prevent oxidation. Hydrogen sulphide (H2S) and carbon dioxide (CO_2) dissolve in the solvent while the residual compounds remain in their gaseous phase. The gas portion is then analyzed using gas chromatography to determine the content of the residuals including CH_4. All alkanes concentrations are reported in terms of methane. The measurements shall be performed at least every 3 months and more frequently, if necessary Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	Following ASTM Standard Practice E1675
Any comment:	

Data / Parameter:	$W_{steam,CH4,y}$
Data unit:	tCH_4/t steam
Description:	Average mass fraction of methane in the produced steam in year y
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	As per the procedures outlined for $w_{steam,CO2,y}$ Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	As per the procedures outlined for $w_{steam,CO2,y}$
Any comment:	Applicable to geothermal power projects

Data / Parameter:	Msteam,y
Data unit:	t steam/yr
Description:	Quantity of steam produced in year y
Source of data to be used:	Project activity site
Value of data applied for the purpose of calculating expected emission reductions in	To be specified in each SSC-CPA

section B.5	
Description of measurement methods and procedures to be applied:	The steam quantity discharged from the geothermal wells should be measured with a venture flow meter (or other equipment with at least the same accuracy). Measurement of temperature and pressure upstream of the venture meter is required to define the steam properties. The calculation of steam quantities should be conducted on a continuous basis and should be based on international standards. The measurement results should be summarized transparently in regular production reports. Data will be stored for at least 2 years after last crediting period.
QA/QC procedures to be applied:	Calibration: following the technical specification/requirement of the manufacturer but a least every three years.
Any comment:	Daily monitoring. Applicable to geothermal power projects

Data / Parameter:	$FC_{i,j,y}$
Data unit:	Mass or volume unit/y
Description:	Quantity of fuel type i combusted in process j during the year y
Source of data to be used:	On-site measurements
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	As per the .Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion. • Use either mass or volume meters. In cases where fuel is supplied from small daily tanks, rulers can be used to determine mass or volume of the fuel consumed, with the following conditions: The ruler gauge must be part of the daily tank and calibrated at least once a year and have a book of control for recording the measurements (on a daily basis or per shift); • Accessories such as transducers, sonar and piezoelectronic devices are accepted if they are properly calibrated with the ruler gauge and receiving a reasonable maintenance; • In case of daily tanks with pre-heaters for heavy oil, the calibration will be made with the system at typical operational conditions The Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	The consistency of metered fuel consumption quantities will be cross-checked by an annual energy balance that is based on purchased quantities and stock change. The calibrations would be done as per manufacturer's specifications The measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC

	standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years.
Any comment:	

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Source of data to be used:	Project Site
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in SSC-CPA
Description of measurement methods and procedures to be applied:	Measured from topographical surveys, maps, satellite pictures, etc. The parameter is determined on a yearly basis. Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	-
Any comment:	For calculating the power density (PD)

Data / Parameter:	$EC_{PJ,j,y}$
Data unit:	MWh/y
Description:	Quantity of electricity consumed by the project electricity consumption source j in year y (Onsite electricity consumption of the project activity imported from the grid/min grid/off grid system during the year y)
Source of data to be used:	Electric meter readings located at the project site
Value of data applied for the purpose of calculating expected emission reductions in section B.	To be specified in each SSC-CPA
Description of measurement methods and	Continuous monitoring by instruments having class accuracy acceptable by national standardsmeter integrated hourly and recorded monthly and yearly. Data archiving would be done both electronically and on paper records.

procedures to be applied:	
QA/QC procedures to be applied:	If applicable, measurement results will be cross checked with records for purchased electricity (e.g., invoices/receipts). Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years. Data will be stored for atleast 2 years after last crediting period.
Any comment:	Applicable to wind/solar/hydro/geothermal/tidal/wave/renewable biomass/ biomass gasification power plant(s) or unit(s)

Data / Parameter:	**$TDL_{j,y}$**
Data unit:	-
Description:	Average technical transmission and distribution losses for providing electricity to source j in year y
Source of data to be used:	In case of Scenario A, one of the following option will be chosen – • Use recent, accurate and reliable data available within the host country; • Use as default values of 20% for (a) project electricity consumption sources; (b) baseline electricity consumption sources if the electricity consumption by all project and leakage electricity consumption sources to which scenario A or scenario C (cases C.I or C.III) applies is larger than the electricity consumption of all baseline electricity consumption sources to which scenario A or scenario C (cases C.I or C.III) applies. • Use as default values of 3% for (a) baseline electricity consumption sources; (b) project and leakage electricity consumption sources if the electricity consumption by all project and leakage electricity consumption sources to which scenario A or scenario C (cases C.I or C.III) applies is smaller than the electricity consumption of all baseline electricity consumption sources to which scenario A or scenario C (cases C.I or C.III) applies.
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and	For a): $TDL_{j,y}$ will be estimated for the distribution and transmission networks of the electricity grid of the same voltage as the connection where the proposed CDM project activity is connected to. The technical

procedures to be applied:	distribution losses should not contain other types of grid losses (e.g. commercial losses/theft). The distribution losses can either be calculated by the project participants or be based on references from utilities, network operators or other official documentation. Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	Annually. In the absence of data from the relevant year, most recent figures should be used, but not older than 5 years.
Any comment:	The parameter will be used to calculate relevant project emissions, if electricity is imported from the grid in case of a plant shutdown.

Data / Parameter:	$EG_{facility,\ y}$ /
Data unit:	MWh/y
Description:	Quantity of net electricity supplied to the grid in year *y*
Source of data to be used:	Measured by energy meter(s)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Continuous monitoring instruments having class accuracy acceptable by national standardsmeter integrated hourly and recorded monthly and yearly. Data archiving would be done both electronically and on paper records. 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. The Data will be stored for atleast 2 years after last crediting period
QA/QC procedures to be applied:	If applicable, measurement results will be cross checked with records for sold/purchased electricity (e.g., invoices/receipts). Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC

	standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years.
Any comment:	Applicable to wind/solar/hydro/geothermal/tidal/wave/renewable biomass/ biomass gasification power plant(s) or unit(s)

Data / Parameter:	$EG_{add, y}$
Data unit:	MWh/y
Description:	The total net electrical energy supplied to a grid in year *y* by all units, existing and new project units
Source of data to be used:	Measured by energy meter(s)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Continuous monitoring by instruments having class accuracy acceptable by national standards meter integrated hourly and recorded monthly and yearly for each energy unit. Data archiving would be done both electronically and on paper records. 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. The Data will be stored for atleast 2 years after last crediting period
QA/QC procedures to be applied:	If applicable, measurement results will be cross checked with records for sold/purchased electricity (e.g., invoices/receipts). Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years.
Any comment:	Applicable to wind/solar/hydro/geothermal/tidal/wave/renewable biomass/ biomass gasification power plant(s) or unit(s). This parameter is applicable

	in case of capacity addition

Data / Parameter:	$EG_{actual, y}$
Data unit:	MWh/y
Description:	The actual, measured net electrical energy produced and supplied to the grid by the existing units in year *y* (MWh)
Source of data to be used:	Measured by energy meter(s)
Value of data applied for the purpose of calculating expected emission reductions in section B.5	To be specified in each SSC-CPA
Description of measurement methods and procedures to be applied:	Continuous monitoring by instruments having class accuracy acceptable by national standards meter integrated hourly and recorded monthly and yearly for each energy unit. Data archiving would be done both electronically and on paper records. 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. The Data will be stored for atleast 2 years after last crediting period.
QA/QC procedures to be applied:	If applicable, measurement results will be cross checked with records for sold/purchased electricity (e.g., invoices/receipts). Measuring equipment should be certified to national or IEC standards and calibrated according to the national standards and reference points or IEC standards and recalibrated at appropriate intervals according to manufacturer specifications, but at least once in three years.
Any comment:	Applicable to wind/solar/hydro/geothermal/tidal/wave/renewable biomass/ biomass gasification power plant(s) or unit(s). This parameter is applicable in case of capacity addition

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

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

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

[Description of environmental impacts]

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

As discussed in section C.3 of PoA-DD, Environmental impact assessments will be conducted for each CPA according to the applicable to current laws and regulations in PNG.

[Description of applicability of EIA regulations]

SECTION D. Stakeholders' comments

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

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

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

[Invitation Procedure]

D.3. Summary of the comments received:

[Comments and Suggestions, if any]

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

[XXXXX]

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA

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

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

[Information on public funding]

Annex 3

BASELINE INFORMATION

[Baseline Information]

Annex 4

MONITORING INFORMATION

[Monitoring Information]

Annex 5

SAMPLING PLAN [If required]

The section below provides information on the methodology to be followed for determining the sampling size for CPA's with certain technology/measures under this PoA. Detailed sampling plan will be provided in the CPA's where sampling survey will be required.

A) Sampling Design

(i) Sampling Objectives and Reliability

The objective is to obtain a reliable estimate of the following key variables over the course of the crediting period and meeting the 90/10 confidence/precision levels. . It is envisaged that sampling will be carried out for the following technology measures. In general the users would be renewable energy generated by individual / community users having small capacity

- Solar photovoltaic systems
- Biomass gasifier
- Roof top / standalone wind turbine
- Micro / pico hydro power plants

In case a CPA involves more than one technology listed above the sampling survey will be conducted for each technology included in the CPA.

It is envisaged that the key variable will be

- Number of devices in service and operating (ex-post)
- Number of devices (sample size) for which electricity generation is metered as a representative of the group

In case additional variables are identified during CPA validation stage, after taking into consideration CPA characteristics, the sampling plan will be adopted accordingly.

(ii) Target Population

The target population is the households/SMEs/communities/users that will participate in the CPA under this PoA. The device to be sampled will be drawn from the list of individual device/equipment users as contained in the CPA records (database) which is maintained by the CPA implementer.

(iii) Sampling Method

The required number of device to be selected for sampling of the required parameter will be determined by the CME according to the level of reliability required. The population within the sampling frame is expected to be homogenous, taking into consideration the key variable to be determined. Hence as per

'Guidelines for sampling and surveys for CDM project activities and programme of activities' version 02, EB 69 simple random sampling method will be adopted. If necessary or deemed to be appropriate by the CME, other sampling methods could also be applied with proper justification in line with 'Guidelines for sampling and surveys for CDM project activities and programme of activities' version 02, EB 69.

(iv) Sampling Size

To ensure a random selection, random number generators shall be applied. Each device in the target population will be uniquely identifiable by its Serial ID number. Each device can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of device in the Database.

It is envisaged that the key parameter of interest will be – Number of devices in service and operating (ex-post) expressed in percentage or
The sample size for which metering of electricity system shall be done

The equation to give us the required sample size is:

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1)\times 0.1^2 \times p^2 + 1.645^2 p(1-p)}$$

n	Sample size
N	Total number of households /users
p	Expected proportion (0.50)
1.645	Represents the 90% confidence required
0.1	Represents the 10% relative precision

However in survey's where the of the CPA relates to a mean value of interest the following equation shall be followed

$$n \geq \frac{1.645^2 NV}{(N-1)\times 0.1^2 + 1.645^2 V}$$

Where

$$V = \left(\frac{SD}{mean}\right)^2$$

n	Sample size
N	Total number of households /users
Mean	Expected mean
SD	Expected standard deviation
1.645	Represents the 90% confidence required
0.1	Represents the 10% relative precision

The sample survey shall be carried out as per the methodology requirement and the CPA characteristics. The information related to frequency of sample survey shall be provided in SSC-CPA-DD. Similar approach (equation) as described above shall be followed in the case of a baseline survey, required for a particular CPA.

The precision and expected variance will be established in accordance with the recommended values by UNFCCC, namely 90% precision and 10% margin of error.

(v) Sampling Frame

Sample frame will be developed from the data recorded by SSC-CPA implementer. The frame will consist of the recipient information in the project region.

a) Information recorded in database

The following minimum information on households/users that receive the device will be recorded

- A list of each household/user that received the device (house address, name of occupant);
- Date of installation of the device
- Serial Number and nominal power ratings of the device installed
- Date of collection of the device

b) Information on households included in *ex-post* monitoring survey

- A list of each household in the survey (house address, name of occupant).
- Information on when the household has been added to the survey and information on when it has been removed (if applicable).
- Information on any changes made to the device (exchange, repair, removed and installed elsewhere, etc).

B) Data to be collected

(i) Field measurement

Number of devices placed in service and operating (ex-post)

- Within 12 months of the start of distribution, on-site visual surveys of sample households shall be done to identify devices are installed and operating.
- Only devices bearing certain specific characters (to be decided at CPA level) can be counted as installed. While devices replaced as part of a regular maintenance or warranty program can be counted as operating, devices cannot be replaced as part of the survey process and counted as operating.
- In CPA's where measurements are conducted only during limited time periods and are to be scaled up to the whole year demonstrate in the CPA-DD that the parameter of interest is not subject to seasonal fluctuations or the time period selected is conservative or the necessary corrections are applied.
- The record keeping database will be used to record the results of all monitoring, thereby avoiding double counting, with all data stored to be kept for at least two years after the crediting period or the last issuance of CERs for the project activity.

(ii) Quality Assurance/Quality Control

Training will be given to staff responsible for the data collection system on the management system to be put in place as part of the overall PoA. This will include:

- Data to be recorded in the database
- How to identify and record the serial number on a device/equipment;
- How to fill out and where to submit copies of the installation records and any associated documentation;
- Procedure for dealing with a change in serial number or address of a device/equipment;
- Monitoring procedures, in accordance section E.6.3 and E.7.2 of the PoA-DD

On completion of training, trained staff will receive a letter confirming their attendance. The name, company and contact details of all attendees will be recorded as part of the CPA database. This will be used to confirm that the training has been completed and that staffs are qualified to carry out the data collection as required under the PoA.

In order to minimise errors, a quality control and assurance strategy plan will be established. This strategy includes a planning phase in which a clear definition of the target population, the issues and variables to be investigated, the sampling frame and sample size are determined. Also the design of a questionnaire that reflects the objectives of the survey and facilitates field operations and information processing is prepared.

In order to minimise errors, all personnel conducting field measurements, both for the collection of baseline data and annual monitoring of CPAs, on behalf of the programme, will receive training on the procedures to be used for data collection, including the format in which data should be collected, project background, basic functioning of the technology and any other relevant project background.

The potential for non-responses, refusals and related issues will be considered by the CME during sample selection. If the sampling results are insufficient to achieve the target reliability levels, the CME will address this by selecting a larger than necessary sample size before commencing monitoring. Non-

response could be considered (e.g. 10%), when designing the sampling survey and determining the sample size. This will be further decided at CPA level.

To achieve good quality data, a standard form shall be designed ex-ant and assessed by the CME. All field personnel will be trained to decrease error. If it is necessary to engage third parties for carrying out field measurements, the CME will ensure that any such third parties are credible, experienced adequately trained for the tasks they are contracted for.In case of an outlier that is a result of a mistake (wrongly recorded, or wrongly entered onto the computer) it can be corrected and in case it is a real value it must be left as it is and included in the analysis. In case the data are highly skewed, then it should be transformed prior to the analysis using appropriate methods.

(iii) Analysis

Data will be used for the preparation of monitoring reports for each CPA. The results of all monitoring will be entered into the database. The raw data shall be scrutinised carefully prior to estimating the mean and checking its reliability. This shall be done using graphical summaries such as histograms, boxplots, normal probability plots, etc. These plots would show up outliers in the data or any skewness in the distribution of the data.

In case of highly skewed data which cannot be transformed prior to the analysis using appropriate methods additional sample shall be taken.

C) Implementation Plan

All sampling efforts will be conducted by staff/third party who have undergone training as part of the programme, as described above. The samplers will have understanding of the native language(s) in which the CPA has been implemented, or will be accompanied by interpreters, thereby allowing complete understanding of any responses given by users, and any questions therein.

The frequency of monitoring shall be specified in the CPA.