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:

>>

CPA-[add number] [Project Name] under Philippines Mini-Hydro PoA
Version [add number]
Date [dd/mm/yyyy]

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

>>

The SSC-CPA involves the construction of [add name of the MHP] with an installed capacity of [number] kW. Estimated annual net power generation is [number] MWh.

Estimated annual net power generation is [number] MWh.

The project is located in the Municipality of [add name], Province of [add name]. The MHP plant is situated on the [add name] River in Barangay [add name].The electricity of the MHP plant will be exported to [add name of grid]. The generated electricity will be purchased by [add name].

[Choose applicable option (a or b):

a) The Project
- does not involve the construction of a storage reservoir; or
- Involves the construction of a storage reservoir with a limited daily poundage of [number] m^3, and is thus a run-of-river hydro plant.

b) The Project will have a reservoir.
- The reservoir is an existing reservoir. The volume of the reservoir is not changed, or
- The reservoir is an existing reservoir. The volume of reservoir is increased. The power density of the reservoir will be [number] W/m2, or
- The reservoir is a newly built reservoir. The power density of the reservoir will be [number] W/m2.]

Sustainable development benefits of the CPA:

1. Improvement of watershed due to watershed management plan, including tree planting and logging control;
2. Creation of employment opportunities during construction, with preferred employment of local residents;
3. Construction of access road, which improves the transport connection of local residents and improve access of farming products to the markets;
4. Allocation of 1% of gross revenues to host community.

The electricity generated by the CPA will displace electricity that in the absence of the PoA would have otherwise been generated by the generation mix from the grid, which would result in a larger amount of greenhouse gas (GHG) emissions. The expected annual emission reduction associated with this CPA is [number] tCO_2e.

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

>>

The proponent is [add name of the responsible individual/entity].

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

The hydropower plant covered under this CPA is a a grid-connected [Greenfield/existing run of river hydropower plant with or without reservoir / a hydropower plant with a dam and a new reservoir / a hydropower plant on an existing reservoir /involve a capacity addition/ involve a retrofit of (an) existing plant(s) / Involve a replacement of (an) existing plant(s)].

[In case the hydropower plant consists of a reservoir please insert this text: "The hydropower plant consists of a reservoir which satisfies the conditions mentioned in AMS-I.D., version 17 under paragraph 4 as explained in section A.2. above."]

The design features are as follows:

The project has an installed capacity of [add number kW/MW], consisting of [add number/type/capacity of turbines] turbines and generators. The plant employs [describe the hydro structures, intakes, spillways etc.]. The plant has a powerhouse with [describe the powerhouse]. The technical specification of the project can be found in the following table:

Parameter	Unit	Value
Power capacity	kW	[add number]
Number and type of turbines	No.	[add number]
Plant Load Factor (PLF)	%	[add number]
Annual electricity generation	GWh/yr	[add number]
Gross head	m	[add number]
Head loss	m	[add number]
Net head	m	[add number]
Intake height/length	m/m	[add number]
Headrace line length/diameter	m/m	[add number]
Penstock line length/diameter	m/m	[add number]
Transformer capacity	MVA	[add number]
Voltage conversion	KV	[add number]

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

>>

A.4.1.1. Host Party:

>>

The Host Party is the Philippines.

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

>>

The projects is in the Municipality of [add name], Province of [add name], Island of [add name].

The geographic coordinates for the hydro structure and the powerhouse are:

Hydrostructure: N [xx.xxxx] and E [xx.xxxx] and powerhouse: N [xx.xxxx] and E [xx.xxxx]

Map 1: [add: map of Philippines with island marked]

Map 2: [add: map of island with municipality marked]

Map 3: [add: map of area with project location marked]

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

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

>>

[dd/mm/yyyy, defined as the first "real action" in relation to project implementation]

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

>>

[number] years

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

[Choose between fixed or renewable]

A.4.3.1. Starting date of the crediting period:

>>

The crediting period starts on [dd/mm/yyyy] or the inclusion of the CPA, whichever occurs later.

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

>>

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.

[Choose between 7 years for renewable or 10 years for fixed]

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

>>

[add amount of emission reductions, section B5.2] over the [3*7 years or fixed 10 years] crediting period.

A.4.5. Public funding of the CPA:

>>

Choose one:

- [The CPA has not received, and will not seek public funding]
- [The CPA has received public funding. Explain/Elaborate]

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

>>

The proposed CPA is not a de-bundled component of a large project activity as the activity implementer, [add name], has not registered nor applied to register another small-scale CPA of any PoA, and has not registered a CDM project activity.

Moreover, LBP has checked whether the project units within the CPA are a de-bundled component of a larger project by using *"Guidance for Determining the Occurrence of Debundling Under a Programme of Activities (PoA)".*[3]

This check is necessary as small-scale project activity that is part of a large project activity is not eligible to use the simplified modalities and procedures for small-scale CDM project activities. For the purposes of registration of a 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.

If each of the independent mini/micro hydro power plants included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied (1% of 15 MW equal to 150 kW) then that CPA of PoA is exempted from performing de-bundling check (i.e. considering as not being a de-bundled component of a large scale activity).

The CPA cannot be a de-bundled component of another project activity as: [Describe which of the options above apply to the CPA that makes it a non de-bundled]

[3] EB54, Annex 13

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

>>

This is confirmed in an official letter from the project implementer.

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:

>>

Title: Philippines Mini-Hydro PoA;
Reference: [add UNFCCC registration reference]

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

>>

Following the "Eligibility criteria for inclusion of a SSC-CPA in the PoA" in section A.4.2.2. of the PoA, the CPA is eligible because it meets all criteria listed.

Criteria met? (yes/no)	Criteria	Documentation to substantiate compliance
	Each CPA[4] is located in the Philippines. Areas that are ineligible for hydropower development per government decree are excluded.	The location of the plant(s) is documented in [Select and if needed elaborate on one or more of the following documents: – Project design features and location of the plant within the Feasibility Study Report(s); – Technical sheet of the unit(s); – Environmental Impact Assessment report(s); – Other credible documents;] dated [dd/mm/yyyy]
	Each SSC-CPA can be uniquely identified and defined in an unambiguous manner by providing the geographical coordinates, and the serial number of the turbines and generators at each location.	Project coordinates and the serial number of the turbines and generators are evidenced in [Select and if

[4] Here and elsewhere, references to "CPA" should be taken to mean "SSC-CPA". The short form is used for sake of brevity.

		needed elaborate on one or more of the following documents: – Project design features and location of the plant within the Feasibility Study Report(s); – Technical sheet of the unit(s); – Environmental Impact Assessment report(s); – Purchase document of the turbines and generators; – Other credible documents;] dated [dd/mm/yyyy]
	Each plant listed in the CPA uses hydropower technology with or without a reservoir, and its technical definition meets the requirements and restrictions applicable to SSC methodology AMS-I.D. version 17[5].	Project design of the plant included in the CPA dated [dd/mm/yyyy]
	The CPA in total has [number] MW capacity which does not exceed the small scale limits for Type I projects (15 MW).	The project capacity of [number] [kW/MW] which is below the 15 MW small scale limit for Type I projects is evidenced in [Select and if needed elaborate on one or more of the following documents: – Project design features and location of the plant within the Feasibility Study Report(s); – Technical sheet of the unit(s); – Environmental Impact Assessment report(s); – Purchase document of the turbines and generators; – Other credible

[5] Indicative Simplified Baseline and Monitoring Methodologies for Selected Small-Scale CDM Project Activity Categories, Type I.D: Renewable Energy Projects, Grid-Connected Renewable Electricity Generation.

		documents;] dated [dd/mm/yyyy]
	The start date of the CPA (earliest starting date of the first unit) does not occur before the validation commencement.	Starting date evidence of the units within the CPA
	Each CPA demonstrates additionality as detailed and elaborated in the CPA-DD document in line with section E.5.1. and E.5.2. of the PoA-DD document.	Section B.3 of the CPA-DD demonstrates the additionality based on the following evidence: [select one or more – Feasibility Study Report(s); – IRR calculation spreadsheet(s) without CDM revenue; – Technical sheet of the unit(s); – Environmental Impact Assessment report(s); – Other credible documents;] dated [dd/mm/yyyy]
	The CPA is not registered as a separate CDM project activity, or as a participating CPA under another PoA.	Official confirmation letter of the MHP owner dated [dd/mm/yyyy].[6]
	The CPA meets Philippine requirements for social and environmental approval.	Copy of the application for Environmental Compliance Certificate (ECC) or Certificate of Non-Covergae (CNC) dated [dd/mm/yyyy]
	The owners of all hydropower plants listed in the CPA have signed an agreement in which it allows LBP to market the emission reductions from the installation and operation of the plant.	Signed MOA between LBP and the owner of each MHP plant dated [dd/mm/yyyy]
	The conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys;	There is no sampling/surveys involved in the monitoring plan nor baseline establishment of each CPA

[6] For more details see section A.4.4.1. Operational and management plan of the PoA-DD

	Each CPA in aggregate meets the small-scale or microscale threshold criteria and remains within those thresholds throughout the crediting period of the CPA; Since AMS-I.D is applied: [Choose I or II, choose I in case the CPA does not apply microscale additionality or II, in case the CPA applies microscale additionality, I. The CPA does not apply microscale additionality, thus the CPA's power capacity in aggregate shall remains below 15MW throughout the crediting period. II. The CPA applies microscale additionality, thus the CPA's power capacity in aggregate shall remains below 5MW throughout the crediting period.]	The CPA aggregated capacity is [number] kW that is well below [select: the small scale OR microscale additionality] capacity threshold of [select: 15MW OR 5MW] throughout the crediting period. The aggregated capacity of the CPA is verifiable through the following documents: [select one or more – Feasibility Study Report(s); – Technical sheet of the unit(s); – Environmental Impact Assessment report(s); – Other credible documents;] dated [dd/mm/yyyy]
	The project must have undertaken a stakeholder consultation as outlined in Section D.	Stakeholders' consultation was conducted at CPA-level on [dd/mm/yyyy]. See details in Section D.
	Real[7] action on CPA level begins after the start of validation of the PoA.	Documentation on project implementation
	The plants within the CPA are not part of a debundling (debundling check).	Debundling check has been carried out on CPA level under section A.4.6. in accordance with the latest "Guidelines on assessment of debundling for SSC project activities".
	Conditions to provide an affirmation that funding from Annex I parties, if any, does not result in a diversion of official development assistance.	Official confirmation from [name of the MHP owner] dated [dd/mm/yyyy].

[7] The notion of "real" project implementation excludes project planning. Real project implementation begins when, for example, a contract has been awarded to begin construction.

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

>>

Additionality is demonstrated on CPA-level following the additionality steps described under section E.5.1 in the PoA-DD.

Choose A or B:

A: Micro-scale (≤5 MW):

The CPA has [number] MW capacity which is below micro-scale additionality threshold and can fulfil the conditions d-i and d-ii as described under section E.5.1 in the PoA-DD document, thus can be deemed as additional.

B: Mini-scale (>5 MW):

The CPA has [number] MW capacity which is above micro-scale additionality threshold thus shall pursue at least one of the following mini-scale additionality criteria.

Choose B1, B2, B3 and/or B4. At least one option should be chosen.

B1. Investment barrier

For demonstration of investment barrier, an investment analysis is conducted on CPA level to show that the proposed project activity is not financially feasible without the revenue from the sale of Certified Emission Reductions (CERs).

Determine appropriate analysis method

As the only realistic scenario is the non-implementation of the project activity, the benchmark analysis is chosen (Option III).

Option III. Apply benchmark analysis

To determine whether the project is financially attractive, an internal rate of return (IRR) analysis is applied. This financial indicator is used by local banks to assess the financial attractiveness of similar investment propositions and is the most straightforward and understandable method applied in capital budgeting. Choose a) or b)

a)The equity IRR is applied as this gives an indication of the attractiveness of the project to potential equity investors.

b) The project IRR is applied as this reflects the overall attractiveness of the project activity and determines the viability of the project to service debt.

The IRR needs to be compared with a benchmark to substantiate the financial unattractiveness of the project activity. The equity IRR of the project activity is compared to the selected benchmark [equity/project] IRR of [number]%.

The benchmark IRR is determined as follows: [if an equity IRR is selected, please choose a, b, c, f or g; if a project IRR is selected, please choose a, d, e, f or g.]

a) The benchmark is a project IRR of 13.9% /equity IRR of 17%. This is the value applied by the National Renewable Energy Board (NREB) for the determination of an appropriate Feed-in-Tariff for mini-hydropower projects in the Philippines. Hence it is judged as an appropriate benchmark to determine the financial feasibility of a project.

b) The benchmark is an equity IRR of [number]%. This value is determined on the basis of official required returns on equity (or cost of equity) of an investment. This is stated [add source where official return on equity is published].

c) The benchmark is an equity IRR of [number]%. This value is determined on the basis of required returns on equity (or cost of equity) of an investment, calculated using the Capital Asset Pricing Model (CAPM). The CAPM determines the required return on equity by accounting for (a) the time value of money and (b) risk.

The time value of money is accounted for through the risk-free rate (R_f). This compensates equity investors for placing money in any investment over a defined period of time in a risk-free asset (typically a long-term government bond). The second part of the formula accounts for the risk and derives the amount of compensation the equity investor expects to earn for taking on the additional risk associated with the project activity. This additional risk is determined through the beta ($ß_a$), which compares the returns of the asset to the market over a period of time and to the market premium ($R_m - R_f$).

The CAPM is calculated as follows:

$$R_a = R_f + ß_a (R_m - R_f)$$

Where:

R_a = Risk free rate, which is the return of a riskless investment with an investment horizon comparable to the analysed investment. This is typically an applicable long term government bond yield.

$ß_a$ = Beta of the asset, which defines the relative exposure of the investment to market risk and describes the relationship between the movements of an individual stock versus the market itself. In cases where the enterprise is not publicly listed, the historical volatility of related publicly listed businesses or sectors can be analysed to determine the beta.

R_m = Expected market return. This is calculated as the difference between the return of the market portfolio and the risk-free rate. To account for the country-specific country risk, the country risk-premium of the Philippines is to be included in the expected market return. This can be done through analyzing the premium that reflects the extra risk of the Philippine market over a mature market.

d) The benchmark is a project IRR of [number]%. This value is calculated as Weighted Average Cost of Capital (WACC). The weighted average cost of capital (WACC) is used to define the minimum standard

internal rate of return that an enterprise needs to earn to satisfy affiliated capital providers. The WACC is based on the relative weights of each component of the capital structure of the enterprise assuming the required returns of each of the financiers. All capital sources (including common stock, preferred stock, bonds and any other long-term debt) are to be included in the WACC calculation.

The WACC is calculated as follows:

$$WACC = \frac{E}{V} * R_e + \frac{D}{V} * R_d * (1 - T_c)$$

Where:

E/V	=	Percentage of financing that is equity, which is calculated by dividing the market value of the equity by the enterprises' total financing.
R_e	=	cost of equity, which can be determined through investor's stated expected Returns or calculated through the CAPM model (described below).
D/V	=	Percentage of financing that is debt, which is calculated by dividing the market value of the debt by the enterprises' total financing.
R_d	=	Cost of debt, which can be determined as the current market rate the enterprise is paying on its debt.
T_c	=	Corporate tax rate is the effective tax rate that is applicable to the enterprise.

e) The benchmark is a project IRR of [number]%, as determined on the basis of local commercial lending rates.

f) The benchmark is a project IRR of [number]%/an equity IRR of [number]%, as defined in the latest version of the GUIDELINES ON THE ASSESSMENT OF INVESTMENT ANALYSIS of the CDM Executive Board.

g) The benchmark is a project IRR of [number]%/an equity IRR of [number]%. This value [add explanation].

Calculation and comparison of financial indicators

Choose a) equity IRR or b) project IRR.

a) equity IRR
For the calculation of the equity/project IRR of the project activity, the input parameters presented in Table 1 were applied in making the projected income statement and IRR computation.

Table 1: Key input parameters applied for the calculation of the IRR

Parameter	Unit	Value	Source
Total investment	*PHP*	[number]	[source]
Loan	*PHP*	[number]	[source]

Annual electricity generation	*kWh*	[number]	[source]
Tariff rate	*PHP/kWh*	[number]	[source]
Annual increase in tariff	*%*	[number]	[source]
Annual O&M costs	*PHP*	[number]	[source]
Loan interest rate	*%*	[number]	[source]
Loan term	*Years*	[number]	[source]
Debt-to-equity ratio	*Ratio*	[number]	[source]
Privilege tax rate	*%*	[number]	[source]
Local tax rate	*%*	[number]	[source]
Service lifetime	*Years*	[number]	[source]
Inflation rate	*%*	[number]	[source]

Parameter	**Unit**	**Value**	**Source**
Total investment	*PHP*	[number]	[source]
Loan	*PHP*	[number]	[source]
Annual electricity generation	*kWh*	[number]	[source]
Tariff rate	*PHP/kWh*	[number]	[source]
Annual increase in tariff	*%*	[number]	[source]
Annual O&M costs	*PHP*	[number]	[source]
Loan interest rate	*%*	[number]	[source]
Loan term	*Years*	[number]	[source]
Debt-to-equity ratio	*Ratio*	[number]	[source]
Privilege tax rate	*%*	[number]	[source]
Local tax rate	*%*	[number]	[source]
Service lifetime	*Years*	[number]	[source]
Inflation rate	*%*	[number]	[source]

All the values applied in the investment analysis reflect the market conditions at the time of the investment decision.

Choose a) for equity IRR or b) for project IRR

a) Equity IRR

As the equity IRR is considered, only the portion of the investment costs which is financed by equity has been regarded as a net cash outflow. In computing the equity IRR, the net cash flow is determined as the gross revenue minus annual O&M costs, applicable taxes and debt service payments, as suggested by the Guidance on the Assessment of Investment Analysis. As the IRR has been computed for a period of [number] years and the entire assets are fully depreciated, salvage value is not accounted for.

b) Project IRR

The project IRR calculates a return based on all project cash out and inflows, irrespective of the source of financing. An investment with a project IRR greater than the Weighted Average Cost of Capital (or WACC) or any other applicable benchmark should be considered as financially viable. As the static

investment covered by the loan is accounted for in the initial year as a cash outflow, the debt service payments are not accounted for as that would infer double–counting .

The application of the CDM can improve the economic viability of the project and render them financially attractive. Table 2 below illustrates that the [equity/project] IRR of the project activity is lower than the selected benchmark. The project is thus not financially attractive without the additional carbon revenues generated under the CDM.

Table 2: Comparison of the IRR with the benchmark rate of return

	IRR without CDM	IRR with CDM	Benchmark
Project activity	[number]%	[number]%	[number]%

Sensitivity analysis

The robustness of the investment analysis has been tested by subjecting key parameters to reasonable variations. Guidance on the Assessment of Investment Analysis defines key parameters as those which constitute more than 20% of the total project costs or total project revenue and reasonable variation is defined as a range of +10% and - 10%.

Given their material impact on the financials of the project activity, the tariff rate and the total investment cost are to be included in the sensitivity analysis. Any other relevant key parameters are also to be included in the assessment.

The parameters that have been identified as critical are: total investment, tariff rate, [name other parameters e.g. electricity generation, O&M costs, Plant Load Factor etc.]. Table 3 shows the result of the sensitivity analysis. In accordance with the Guidance on the Assessment of Investment Analysis, in circumstances where the calculated IRR exceeds the benchmark in one or more scenarios considered under the sensitivity analysis, an assessment of the probability of the occurrence of these scenarios in comparison to the likelihood of the assumptions in the presented investment analysis is to be provided.

Table 3: Outcome of the sensitivity analysis

Parameter	Change	IRR	Probability
Tariff rate	+10%	[number]%	[explanation if higher than the benchmark]
	-10%	[number]%	[explanation if higher than the benchmark]
Investment cost	+10%	[number]%	[explanation if higher than the benchmark]
	-10%	[number]%	[explanation if higher than the benchmark]
[parameter if applicable]	+10%	[number]%	[explanation if higher than the benchmark]
	-10%	[number]%	[explanation if higher than the benchmark]
[parameter if applicable]	+10%	[number]%	[explanation if higher than the benchmark]
	-10%	[number]%	[explanation if higher than the benchmark]

In conclusion, the proposed CDM project activity is unlikely to be financially attractive.

B2. Access to finance barrier

The main barrier to the investment in hydropower plants is the access to loans. According to current regulations, [number]% of equity has to be domestic capital, thus limiting the possibility of foreign

investment. Capital thus has to be sourced domestically. With an average investment as high as USD [number] per MW installed, hydropower plants usually apply for large amounts of external finance.

Hydropower projects require loan conditions that differ from other investment projects:

- Hydropower plants require longer grace periods and payback periods as that the plants only start generating revenues of up to [number] years after the first expenses are due. This is caused by long planning periods ([number] years) and long construction periods ([number] years).
- The design of a hydropower plant is based on a thorough assessment of geologic and hydrologic conditions, including yearlong measurement campaigns. Due to this lengthy and costly process, hydropower plants often require loans during the pre-development stage already.

The project activity applies for a loan from [add]. The bank's lending department considers CDM revenues a crucial factor to grant the loan. This is stated [add how this argument is substantiated].

B3. Technological barrier

If applicable add a list of technological barriers that prevent the implementation of the project if excluded from the PoA. In other words, it should be demonstrated that the CPA can tackle these barriers by becoming part of the PoA. Technological barriers can be of direct or indirect origin. Examples can be lack of MHP experts, lack of O&M knowledge, hydrological and climatic risks on sufficient operation of the MHP plants etc. All explanations and data should come with credible and valid reference or evidence.

B4. Other barriers

Use other barriers as applicable and elaborate. The barriers can be institutional barriers or limited information, managerial resources, organizational capacity, financial resources, prevailing practices or capacity to absorb new technologies.

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 CPA includes the following sources and gasses (this list is consistent with the list in section E.3. of the PoA).

Scenario	*Source*	*Gas*	*Incl.?*	*Explanation*
Baseline	*Grid*	*CO2*	*Yes*	*Main emission source*
		CH4	*No*	*Excluded for simplification. This is conservative.*
		N2O	*No*	*Excluded for simplification. This is conservative.*
Project	*Hydro*	*CO2*	*No*	*Hydropower does not generate CO2 emissions*
		CH4	*Yes*	*Possible methane emissions from the reservoir calculated according to ACM0002*
		N2O	*No*	*Hydropower does not generate N2O emissions*

The geographical boundaries of the CPA are the same as those of the PoA.

The project boundary follows the definition of the methodology AMS-I.D and the project power plant and all power plants connected physically to the same electricity system.

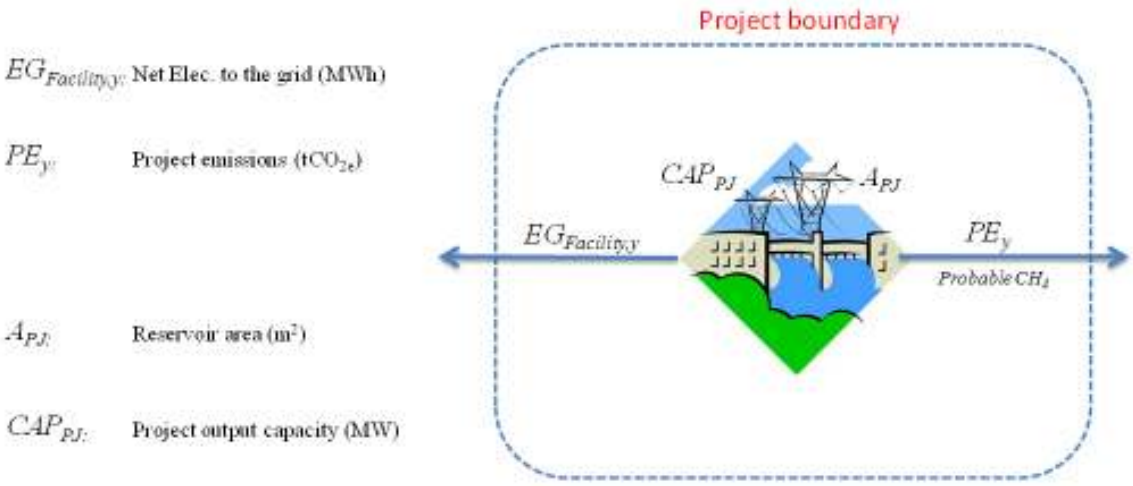

Figure 1. A scheme of the Project boundary

B.5. Emission reductions:

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

>>

Data / Parameter:	$EG_{BL,y}$
Data unit:	MWh
Description:	Net electricity generated and delivered to grid in year ***y***
Source of data used:	Estimated power output as of FSR
Value applied:	[add net power generation] MWh
Justification of the choice of data or description of measurement methods and procedures actually applied :	For the ex-ante calculation of emission reductions, the estimated annual power output as determined in the Feasibility Study Report has been applied. Electricity generation is estimated on the basis of the following parameters: Power capacity: [add]MW Utilization factor: [add]% Electricity capacity: [add] MWh per year
Any comment:	

Data / Parameter:	$EF_{grid,CM,y}$
Data unit:	tCO_2/MWh
Description:	Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"
Source of data used:	Calculated ex-ante based on the data supplied by the Department of Energy of the Philippines as per the "Tool to calculate the emission factor for an

	electricity system".
Value applied:	[add combined margin emission factor of the grid the project is connected to]
Justification of the choice of data or description of measurement methods and procedures actually applied :	The baseline emission factor is needed to estimate the amount of Project's emission reductions. CM emission factor was calculated using OM and BM emission factors as per the "Tool to calculate the emission factor for an electricity system".
Any comment:	Details of calculations are available in spreadsheets.

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2/MWh
Description:	Build margin (BM) emission factor.
Source of data used:	Calculated ex-ante based on the data supplied by Department of Energy of the Philippines as per the "Tool to calculate the emission factor for an electricity system".
Value applied:	[add build margin emission factor of the grid the project is connected to]
Justification of the choice of data or description of measurement methods and procedures actually applied :	The BM emission factor together with OM emission factor is needed to calculate the combined margin emission factor which is used to estimate the amount of Project's emission reductions.
Any comment:	Details of calculations are available in spreadsheets.

Data / Parameter:	$EF_{grid,OM,y}$
Data unit:	tCO_2/MWh
Description:	Operating margin CO_2 emission factor
Source of data used:	Calculated ex-ante based on the data supplied by Department of Energy of the Philippines as per the "Tool to calculate the emission factor for an electricity system".
Value applied:	[add operating margin emission factor of the grid the project is connected to]
Justification of the choice of data or description of measurement methods and procedures actually applied :	The OM emission factor is needed together with BM emission factor to calculate the combined margin emission factor which is used to estimate the amount of Project's emission reductions.
Any comment:	Details of calculations are available in spreadsheets.

Data / Parameter:	EF_{Res}
Data unit:	$kgCO_2e/MWh$
Description:	Default emission factor for emissions from reservoirs

Source of data used:	Decision by EB23
Value applied:	90 $kgCO_2e/MWh$
Justification of the choice of data or description of measurement methods and procedures actually applied :	Applicable according to ACM0002 "Consolidated baseline methodology for grid-connected electricity generation from renewable sources".
Any comment:	

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Source of data:	Project site
Value applied	[add surface area of reservoir]
Justification of the choice of data or description of measurement methods and procedures actually applied :	
Any comment:	

Data / Parameter:	CAP_{PJ}
Data unit:	W
Description:	Installed capacity of the MHP plant after the implementation of the project activity
Source of data:	Technical specification of the equipment as defined in Feasibility Study Report
Value applied	[add installed capacity]
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:

>>

Baseline emissions

Baseline emissions are considered to be electricity generated times an emissions factor appropriate to the grid to which the hydroelectric power project is connected.

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

where:

BE_y Baseline emissions in year y; in tCO_2e

$EG_{BL,y}$ Net electricity generated and fed into the grid in year y; in MWh

EF_{CO2} CO_2 emission factor in year y; in tCO_2e/MWh.

The grid emission factor is defined ex-ante. The value applicable to the CPA is [add grid emission factor of respective grid], which is the grid emission factor of the [add name of the grid].

Baseline emissions are thus calculated as follows:

BE_y = [add annual net electricity generation] * [add grid emission factor] = [calculate results]

Project emissions

For hydropower projects, emissions from water reservoirs have to be taken into account. The calculation follows the guidance in AMC0002. Emissions from the reservoir are considered to be zero if power density is higher than 10W/m2. The MHP plant has a power density of [add power density]W/m^2 as shown in the following calculation:

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

Where:

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

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

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

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

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

PD = *[add calculation]* = *[add result]*

CH4 emissions are considered to be zero when power density is higher than $10W/m^2$. If power density is below $10W/m^2$, emissions from the reservoir have to be calculated using the following formula:

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

Where:

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

EF_{Res} = Default emission factor for emissions from reservoirs of hydro power plants in year *y* ($kgCO_{2e}/MWh$) = 90 $kgCO_{2e}/MWh$

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

PE_y = [add project emissions, if applicable].

Leakage

Leakage is only to be considered if the energy generating equipment is transferred from another activity. This is not the case for the CPA. Therefore, leakage is considered to be zero.

$LE_y = 0$.

Emission reductions

Per AMS.I.D, emissions reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

where:

ER_y emissions reductions in year *y*; in tCO_2e

BE_y baseline emissions in year *y*; in tCO_2e

PE_y project emissions in year *y*; in tCO_2e

LE_y leakage emissions in year *y*; in tCO_2e.

As project emissions are leakage are considered to be zero, emission reductions equal baseline emissions.

$$ER_y = BE_y.$$

Emissions for the project are thus calculated as follows:

ER_y = *[add emission reductions]*

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

>>

Table D: Summary of ex ante estimation of emission reductions

Years	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)
Year A (2012)	[add]	[add]	0	[add]
Year B (2013)	[add]	[add]	0	[add]
Year C (2014)	[add]	[add]	0	[add]
Year D(2015)	[add]	[add]	0	[add]
Year E (2016)	[add]	[add]	0	[add]
Year F (2017)	[add]	[add]	0	[add]
Year G (2018)	[add]	[add]	0	[add]
Year H (2019)	[add]	[add]	0	[add]
Year I (2020)	[add]	[add]	0	[add]
Year J (2021)	[add]	[add]	0	[add]
Year K (2022)	[add]	[add]	0	[add]
Year L (2023)	[add]	[add]	0	[add]
Total (tonnes of CO_2 e)	[add]	[add]	**0**	[add]

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

B.6.1. Description of the monitoring plan:

>>

The monitoring plan follows the "General Guidelines to SSC CDM Methodologies" version 17 and the approved monitoring methodologies for AMS I.D. version 17. Monitoring tasks must be implemented according to the monitoring plan in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the proposed Project is monitored and reported.

[ADD NAME], in collaboration with LBP, will develop an operations plan that defines a standard against which the project performance will be measured in terms of its emission reductions (ER) and conformance with all standards and criteria under the PoA. It assists [ADD NAME] in establishing a credible, transparent, and adequate data measurement, collection, recording and management system to coordinate all the monitoring requirements for generating certified emission reductions from their project and for ensuring compliance of the project proponent with the obligations with LBP under the PoA.

1. Monitoring Plan Objective and Organisation

The operator of the MHP is in charge of implementing monitoring on project level. Data is recorded manually. Monitoring data is submitted to Land Bank Philippines (LBP) on a monthly basis using a standardised submission form.

Responsibility and organisation: The operator of the power plant, [ADD NAME], will be in charge of metering the monitoring parameters in section E.7.1. The designation of a dedicated, trained monitoring officer at each hydropower plant will ensure that metering is implemented according to the monitoring plan.

[ADD NAME] shall carry out the monitoring in accordance with LBP's monitoring manual which will encompass among other areas provisions, monitoring, data management, and reporting which will specifically establish:

- a set of procedures that cover all key processes in the business;
- monitoring processes to ensure they are effective;
- keeping adequate records;
- checking output for defects, with appropriate and corrective action where necessary;
- regularly reviewing individual processes and the quality system itself for effectiveness; and
- facilitating continual improvement

[ADD NAME] will comply fully with the all CDM requirements in the methodology and the PDD for operation and for monitoring and reporting electrical production and consumption. The following are the scope items relative to monitoring and reporting during the operation phase:

- The operator shall provide the power plant owner and LBP with monthly and annual reports on the operation and performance of the Power Station in a format given in the monitoring manual by LBP. These reports shall include all the monitoring parameters measurements with the required time interval records;
- The Operator shall comply with the instructions of the monitoring plan in relation to the reading, inspection, adjustment, reporting, replacement and calibration of meters;

The MHP plant operator shall assign at least one monitoring technician responsible for data collection and recording and one monitoring officer to check the consistency and approval of the data daily. It is not possible to have one person covering both of the responsibilities. The tasks and responsibility of the monitoring technician and officer are described as the following:

Monitoring technician:

- Daily check on metering equipment and ensuring their continuous performance and reporting any unusual issue in daily reports;
- Measuring and recording the data according to the monitoring manual;
- Preparing daily data collection reports for internal approval by the monitoring officer; The reports shall include any unusual performance of the meters and the monitoring procedure;
- Following necessary calibration due time for metering equipment if necessary as per monitoring officer guidance;

Monitoring officer:

- Responsible for the monitoring operation and procedures performed by the monitoring technician;
- Reviewing the daily monitoring reports prepared by the technician;
- Checking the consistency of the daily metered and recorded data as indicated in PoA and CPA-DD in compliance with the applied methodology and approving the daily monitoring reports;;
- Scheduling necessary calibration plans for the meters;

- Preparing monthly monitoring reports to the MHP plant operator be sent to the managing entity (LBP);

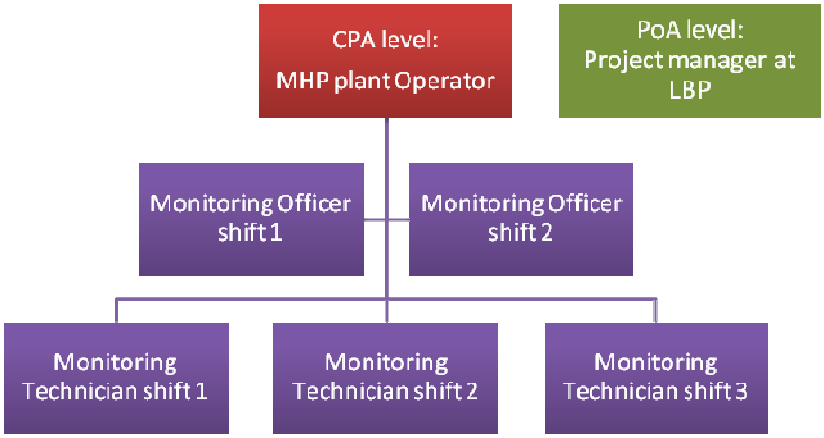

Figure 2. Monitoring organisational chart

2. Monitoring Data

Parameters to be monitored are listed in section E.7.1 of the PoA-DD document:

1) Generated electricity fed into the grid (net electricity generation);

2) Factors determining power density: size of the reservoir when full and installed capacity;

3) Emissions from reservoir: total electricity produced.

Electricity generation
For the monitoring of the electricity fed into the grid, an electricity meter that is installed will be used. Net electricity generation will be metered continuously and recorded hourly. In addition, a meter to determine gross power production would need to be installed too. The metering equipment is certified according to national standards or IEC standards.

Metering results on plant-level for electricity fed into the grid will be cross-checked with receipts on electricity feed-in from the grid operator.

Power density
The size of the reservoir and the installed capacity are monitored annually. The size of the reservoir is established using maps or topographical surveys. The installed capacity is determined by visiting the facility during the monitoring period and checking the generators and their name plates. Monitoring results are recorded and reported to LBP on an annual basis.

Reservoir emissions
Emissions from the reservoir only need to be monitored if the power density is above 4 W/m^2 and below $10W/m^2$. If power density is lower than $10W/m^2$, the operator of the MHP will monitor gross power generation. To this end, another meter metering internal loads or gross electricity generation will be

installed. Gross power generation will be monitored continuously and recorded hourly. The operator of the MHP will submit monitoring results to LBP monthly using a standardised submission form.

Overall lay out of the metering devices is displayed in Figure [figure number].

[add figure]
Figure [number]. The Layout of the meters involved in the monitoring plan.

3. **Quality Assurance and Quality Control**

Quality Assurance and Quality Control (QA/QC): [ADD NAME] will have a quality assurance and quality control plan in order to ensure that monitoring is done accurately and with properly calibrated instruments. The basic requirements are outlined in Section E.7.1. of the PoA-DD.

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. Recalibration shall take place according to the manufacturer's specifications or intervals determined by the operator of the operator of the hydropower plant.

Calibration assessment of the meters will follow the Philippines Grid Code Energy Regulator Commission 2001.[8] According to this document the meter operator and user through the ERC or an independent party authorised by the ERC shall test and seal the meters at least once a year and recalibrate or replace such meters if found to be outside the acceptable accuracy stipulated in the same document.

The accuracy of the meters: according to the same document[8] meters shall be of three-element type rated for the site in compliance with IEC or equivalent national standards for static watt-hour meter and other types of meters and be of the accuracy class of 0.3 or equivalent. The meters shall measure and locally display at least the kW, kWh, kVAR, kVARh, and cumulative demand with the features of time-of-use, maintenance records and pulse output.

Data processing and data keeping: Measured data gathered on project unit-level will be recorded and stored electronically by the "monitoring officer" according to a monitoring manual developed by LBP. This data includes both measurement records as well as external proofs, such as receipts from the grid operator. The data are stored locally and are delivered to LBP for further processing.

All documents including maps, diagrams, engineering and environmental assessments will be kept in a central place, together with this monitoring plan. All information will be stored by the monitoring group and all material will have a copy for backup.

Record keeping will be maintained for a period of not less than 2 years after the end of the crediting period or the last issuance of CERs, whichever occurs later. These monitoring and record keeping

[8] The Philippines Department of Energy, Energy Regulatory Commission 2001, the Philippines Grid Code, http://www.doe.gov.ph/Downloads/Final_Grid_Code.pdf

requirements will be incorporated into the overall Project information and compliance management system. The net electricity metered on site can be verified with the monthly invoices sent to the grid company or the buyer of the electricity. Copies of these invoices will be provided to LBP monthly.

Reporting: Monitoring data will be reported monthly to LBP along with any major issues related to the monitoring system that may need attention. The estimation of emission reductions and reporting of the data for verification purposes will be done annually by LBP based on the aggregated data as outlined in Section A.4.4.2.

The specific steps for data collection and reporting are listed below:

- The data of electricity supply to the grid will be recorded continuously electronically.
- [ADD NAME] will read, record and keep the measured data from the meters and reports the data to LBP and project owner on monthly basis.
- The grid company will provide sales documents for cross-checking.
- [ADD NAME] will provide meters' readings and photocopies of feed-in invoices to DOE in the time of emission reductions verification.

The approved monitoring methodology AMS I.D. is used for developing the monitoring plan. Monitoring tasks must be implemented according to the monitoring plan in order to ensure that the real, measurable and long-term greenhouse gas (GHG) emission reduction for the proposed Project is monitored and reported.

Emergency plan: The PoA has foreseen an emergency plan for when the monitoring meters are not functioning due to any unexpected circumstances. When any of the main monitoring meters are not able to record the necessary data including the amount of the net exported electricity, the data during those moments will be taken from a second meter that is controlled by the utility company to which the electricity is exported. This meter is only accessible by the utility company thus arrangements will be carried out during unexpected emergency situations.

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.

Environmental analysis is undertaken at CPA level.

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

>>

Negative impacts and mitigation activities identified include:

Construction phase

Impact	Mitigation activity
[add information as of feasibility study]	[add information as of feasibility study]

Operation

Impact	Mitigation activity
[add information as of feasibility study]	[add information as of feasibility study]

Source: FSR

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:

>>

Yes. An Environmental Compliance Certificate (ECC) is required before construction may begin, and has been issued [confirm whether ECC has been issued].

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.

Stakeholder comments are invited and addressed at the CPA level. Affected parties (i.e. stakeholders) will in general be local to a CPA, and may include:

- those who stand to benefit from the development effect of the CPA;
- those in the inundation area that might need to be relocated and for whom compensation would be required;

- those who use the river for fishing or recreational purposes;
- municipal or other water utilities that rely on river flow and which might be affected; and
- those who are downstream of the structures that would face a risk of damage should the structures fail for any reason such as earthquake, mudslide, flood, etc.

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

>>

The project owner requested the local government unit (LGU) of [add name] where the project is located to assist them in the invitation of affected stakeholders for [add name] MHP plant. The invitation was [add how invitation was published/where posted] on [add date]. In addition [add if other information channels were used to inform stakeholders, such as radio announcements, banners, announcement in local newspaper etc.].

The meeting was held on [dd/mm/yyy] in [place], [address] from [start time] to [end time].

Key stakeholders are listed below and include the people living in the vicinity and those that have administrative, social or political interest in the project or its vicinity.

In attendance were:

- Local residents of the affected areas
- Local Government Unit (LGU) [add who]
- [add who]

D.3. Summary of the comments received:

>>

The stakeholder's meetings were undertaken by name of project owner in coordination with the [add]. There were presentations on:

- [add]

There was an open forum that the [add who] moderated to address the concerns and questions of the stakeholders. The following provides a summary of comments and concerns received by the stakeholders, as well as responses/recommended measures to address the issues.

The Minutes of the meetings and the attendance lists are attached in Annex 5.

Comments/Concerns Raised	Responses/ Recommended Measures to Address the Comments/Concerns
[add]	[add]

If questionnaires were used, following table can be used. PLEASE NOTE THAT THE TABLES ARE OPTIONAL.

For the first set of survey questions, the responses obtained were as summarized in Table E.

Table E: Survey of barangay residents – compilation of multiple-choice responses [add results of survey]

No.	*Question*	*Response*			
		Yes	*No*	*Maybe*	*None*
1.	Are you aware of its purpose that may serve you and your community?				
2.	Are you aware of its purpose that may serve you and your community?				
3.	Do you have any idea about its benefits which may affect you, your properties and your community?				
4.	Do you have any idea about its effects which may bring harm to you, your properties, and your community				
5.	In case the project will be constructed, are you willing to be relocated?				
6.	Are you willing to be paid for your properties and be relocated?				
7.	For future job opportunities in the proposed project, are you willing to be employed?				
8.	Personally, would you like this kind of project constructed in your area?				
9.	Will the project improve your personal life?				
10.	Will the project improve the life of your town?				

Source: *ibid,* Sect. 2.6.7.

Table F: Survey of barangay residents – compilation of positive personal insights [add results of survey]

No.	*Positive insight*	*Count*
1.	Electricity	
2.	Happy	
3.	hopes to be implemented	
4.	Roadways	
5.	near / ease access to town	
6.	Work	
7.	better lifestyle	
8.	development to town	
9.	success improve our lives	
10.	transport goods	50
11.	low electric bills	49

Source: *ibid,* Sect. 2.6.8-1

The negative personal insights could be summarized as shown in the following table.

Table G: Survey of barangay residents – compilation of negative personal insights [add results of survey]

No.	*Positive insight*	*Count*
1.	No comment	
2.	nature destruction	
3.	property destruction	
4.	cause harm to people	
5.	worried if not pursued	
6.	might not materialize like before	
7.	may not pay for properties	

Source: *ibid,* Sect. 2.6.8-2

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

>> [add]

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE SMALL-SCALE CPA [add information on organisation in charge of the CPA]

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

Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

[add]

Annex 3

BASELINE INFORMATION

For the determination of the grid emission factor please see attached spreadsheet.

Annex 4

MONITORING INFORMATION

- - - - -