



**Monitoring report form for CDM programme of activities
(Version 03.0)**

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

MONITORING REPORT

Title of the PoA	Programme of Activities for Small Scale Hydropower CDM in Sri Lanka	
UNFCCC reference number of the PoA	9705	
Version numbers of the PoA-DD applicable to this monitoring report	03	
Version number of this monitoring report	01.0	
Completion date of this monitoring report	27/03/2020	
Monitoring period number	2	
Duration of this monitoring period	01/05/2016 - 31/12/2019	
Monitoring report number for this monitoring period	1	
Coordinating/managing entity	Sri Lanka Climate Fund (Private) Limited	
Host Parties	Host Party of the PoA	Is this the host Party of a CPA covered in this monitoring report? (yes/no)
	Sri Lanka	Yes
Applied methodologies and standardized baselines	Methodology: AMS-I.D. Grid connected renewable electricity generation (Version 17.0.0) Standardized Baselines: NA	
Sectoral scopes	Sectoral Scope 1: Energy Industries (renewable - / non-renewable sources)	
Amount of GHG emission reductions or net anthropogenic GHG removals achieved by all CPAs covered in this monitoring report in this monitoring period	Amount achieved before 1 January 2013	Amount achieved from 1 January 2013
	NA	23,379 tCO ₂ e
Amount of GHG emission reductions or net anthropogenic GHG removals estimated ex ante for this monitoring period in the CPA-DDs for the CPAs covered in this monitoring report	33,212 tCO ₂ e	

PART I Monitoring of programme of activities (PoA)

SECTION A. Description of PoA

A.1. General description of PoA

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Policy/measure of stated goal of the PoA

Sri Lanka is heavily dependent on imported fossil fuel to meet its annual energy demand. Sri Lanka's annual oil import bill is 60% of its total export income and more than 25% of its annual total import bill. When the economy is expected to grow by 8%, the annual energy demand will grow by at least 6%. Country's high dependence on fossil fuel will gradually increase its GHG emission.

The government has given priority to develop its renewable energy potentials and taken Non-Conventional Renewable Energy (NCRE) as the fourth resource of the nation's diversification and security of energy strategy. In the renewable energy sector, small hydropower generation has great potential. Sri Lanka has large number of small scale hydropower projects distributed across the country. However, most of the small hydropower projects are not attractive to investors due to low return on investment. The government encourages investors to use CDM mechanism to make these small hydro projects viable.

Sri Lankan government has established Sri Lanka Climate Fund(Private) Limited The fund is a dedicated institution to encourage and facilitate investors to use CDM mechanism to mitigate country's GHG emissions. This PoA involves implementation of small hydropower project (CPA) to avoid the emissions of Carbon Dioxide to the atmosphere from the fossil fuel based power generation that would have otherwise been implemented to supply electricity to the people.

General operating and implementing framework of PoA

This Programme of Activities for small scale hydropower CDM in Sri Lanka (hereinafter "PoA") is to promote small hydropower generation in Sri Lanka through Clean Development Mechanism and to reduce GHG emission.

Currently there is a large potential for small hydropower generation in the country. However, most of these projects that are yet to be developed have faced serious financial and other barriers. Some of the developers have used Clean Development Mechanism (CDM) to improve the financial viability and remove these barriers. However, most small scale hydropower developers find it difficult to use CDM mechanism due to prohibitive cost mainly due to the small size of the project. Therefore the objective of this PoA is to develop programmatic CDM for those small hydropower generation projects which are not viable as a CDM project due to the small size and those have significant emission reduction potential.

This PoA is geographically located in Sri Lanka. The generated electricity is supplied to the national grid owned by CEB, the national utility.

The project participants of this PoA are Sri Lanka Climate Fund (Private) Limited (SLCF) which is a Company incorporated under the Company Act. 07 of 2007 of Sri Lanka, Korean Environment Corporation (KECO)², a Public Agency established under the Korea Environment Act. No.9433 of South Korea and Koho Trading & Consultancy (Private) Limited (KoHo), a Company incorporated under the Company Act., 07 of 2007 of Sri Lanka. The SLCF has signed a MoU with KECO and KoHo on 13th September 2012 to develop this PoA. Three parties, SLCF and KECO and KoHo jointly implement this PoA under clearly demarcated responsibilities.

The SLCF functions as CME of this PoA. KECO is responsible for the CDM registration, monitoring and CER issuance and other CDM-related issues. The KoHo supports SLCF for CME activities and the CPA activities.

This PoA consists of project activities that install a new small hydropower plant where there was no renewable energy power plant operation prior to the implementation of the project activities (Greenfield plant). Private companies or any government or semi government agencies that meet the criteria outlined in this PoA can participate in this PoA as a CPA implementer. The installed capacity of each CPA is less than or equal to 15MW. Therefore, all the entities regardless of whether private or public may be involved in this proposed PoA.

A.1.1. Corresponding generic component project activities (CPAs)

Title and reference number of the corresponding generic CPA	Version of the PoA-DD	Sectoral scopes	Applied methodologies and standardized baselines
Single generic CPA as per Part II of PoA " Programme of Activities for Small Scale Hydropower CDM in Sri Lanka" version 03 dated 06/08/2013	3.0	1 – Energy industries (renewable/n on-renewable sources)	Methodology AMS-I.D. Grid connected renewable electricity generation (Version 17.0)

A.1.2. CPAs included in the PoA

Title and UNFCCC reference number of the CPA	Version of the PoA-DD	Title and reference number of the corresponding generic CPA	Crediting period type and duration	Covered in this monitoring report? (yes/no)
9705-0001: CPA Name: Ganthuna Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA " Programme of Activities for Small Scale Hydropower CDM in Sri Lanka" version 05 dated 30/10/2019	Renewable 01/01/2016- 31/12/2022	No
9705-0002: 3.8MW Bulathwaththa Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA " Programme of Activities for Small Scale Hydropower CDM in Sri Lanka" version 05 dated 30/10/2019	Renewable 01/09/2015 – 31/08/2022	Yes
9705-0003: 2.0MW Maskeliya Oya Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA " Programme of Activities for Small Scale Hydropower CDM in Sri Lanka" version 05 dated 30/10/2019	Renewable 17/05/2016- 16/05/2023	No
9705-0004: 3.0MW Koswathu Ganga Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA " Programme of Activities for Small Scale Hydropower CDM in Sri Lanka" version 05 dated 30/10/2019	Renewable 01/09/2016- 31/08/2023	No
9705-0005: 3.25MW Dambulu Oya Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA " Programme of Activities for Small Scale Hydropower CDM in Sri Lanka" version 05 dated 30/10/2019	Renewable 01/01/2017- 31/12/2023	No
9705-0006:	3.0	Single generic CPA as per Part II of PoA	Renewable 01/11/2017 –	No

1.4MW Gomale Oya Small Hydropower Project		“ Programme of Activities for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	31/10/2024	
9705-0007: 1.5MW Moragaha Oya Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activities for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/11/2017 – 31/10/2024	No
9705-0008: 1.90MW Upper Hulu Ganga Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activities for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/04/2019 – 31/03/2026	No
9705-0009: 3.0MW Galabodawatta Mini Hydro Power Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activities for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/12/2019 – 30/11/2026	No
9705-0010: 1.77MW Hapugahakumbura Walawa Mini Hydro Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activities for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/01/2019 – 31/12/2025	No
9705-0011: 1.2MW Ranwala Oya Mini Hydro Power Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activities for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/11/2019 – 31/10/2026	No
9705-0012: 1.12MW Denipalle Oya Mini Hydro Power Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activities for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/11/2019 – 31/10/2026	No

A.2. Coordinating/managing entity

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CME: Sri Lanka Climate Fund (Private) Limited

Name: Mr. Mahesh Charmara Ariyathilaka

e-mail: chamara.cpe@gmail.com Telephone: +94 114 231 874

SECTION B. Implementation of PoA

B.1. Description of implemented PoA

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The operation and management of this PoA are implemented based on CDM Operation Manual for 'Programme of Activities for Small scale Hydropower CDM in Sri Lanka'(hereinafter 'manual'). This manual has a purpose for CME to develop various procedures in order to operate this PoA in stable and involves a range of operational activities in order to implement and manage the CPA by CME. According to the 'Standard for demonstration of additionality, development of eligibility criteria and application of methodologies for programmes of activities, version 02.1 (EB 70, Annex 5)', this manual should involve the following:

- a. Roles, Responsibilities of personnel involved in the process of inclusion of CPAs, including a
- b. review of their Competencies;
- c. Records of arrangements for training and capacity development for personnel;
- d. A procedure for technical review of inclusion of CPAs;
- e. A procedure to avoid double counting;
- f. Records and documentation control process for each CPA under the PoA;
- g. Measures for continuous improvements of the PoA management system;
- h. Any other relevant elements.

Through Manual, Sri Lanka Climate Fund (Private) Limited implements the management system of each

CPAs including environmental and social impact mitigation, baseline and project emission monitoring process, all the data collection, storage and retrieval system. Since this manual is subject to continuous improvement by CME or CPA implementer's request or due to validation and verification process, its content and possibly even structure can be expected to vary over time.

Nevertheless, any changes that a DOE might observe at inclusion of CPAs after validation of the PoA will be documented through the procedure for continuous improvement.

Entity	Roles
CME (SLCF)	<ol style="list-style-type: none"> 1. Function as joint focal point on Modalities of Communication Form of the PoA. 2. Support the KECO and KoHo for PoA Registration and verification, communication, etc. with DOE, UNFCCC Secretariat and CDM EB 3. Providing CPA implementers with guidance for proper CDM monitoring activity and other CDM related process 4. General management of monitored parameters of all CPAs 5. Inclusion of new CPAs 6. De-bundling check 7. Double counting check 8. Ensure monitoring plan and establish the monitoring system 9. Verification and storage of monitoring data 10. CERs allocation with CPA implementer according to agreements
KECO	<ol style="list-style-type: none"> 1. Support activities related to CDM application 2. Support establishing PoA operation procedure and system 3. Undertake CDM registration, monitoring, CER issuance and other CDM related issues. 4. Function as joint focal point on Modalities of Communication Form of the PoA 5. Prepare monitoring report

KoHo	<ol style="list-style-type: none"> 1. Support SLCF for CME activities and the CPA activities 2. Support KECO for CDM registration, monitoring, CER issuance and other CDM related issues 3. Function as joint focal point on Modalities of Communication From of the PoA
CPA Implementer (Melanka Power Moraketiya (Private) Limited)	<ol style="list-style-type: none"> 1. Construction and operation of the hydropower plant 2. Direct CDM monitoring activity including data recording etc. 3. Installation and management of monitoring equipment including QA/QC activities 4. Report monitoring activity records to Sri Lanka Climate Fund (Pvt.) Limited 5. Demonstrate the additionality of the CPA 6. Record keeping system

In addition, Sri Lanka Climate Fund (Private) Limited implements the following operational elements to ensure proper management and control of the proposed PoA.

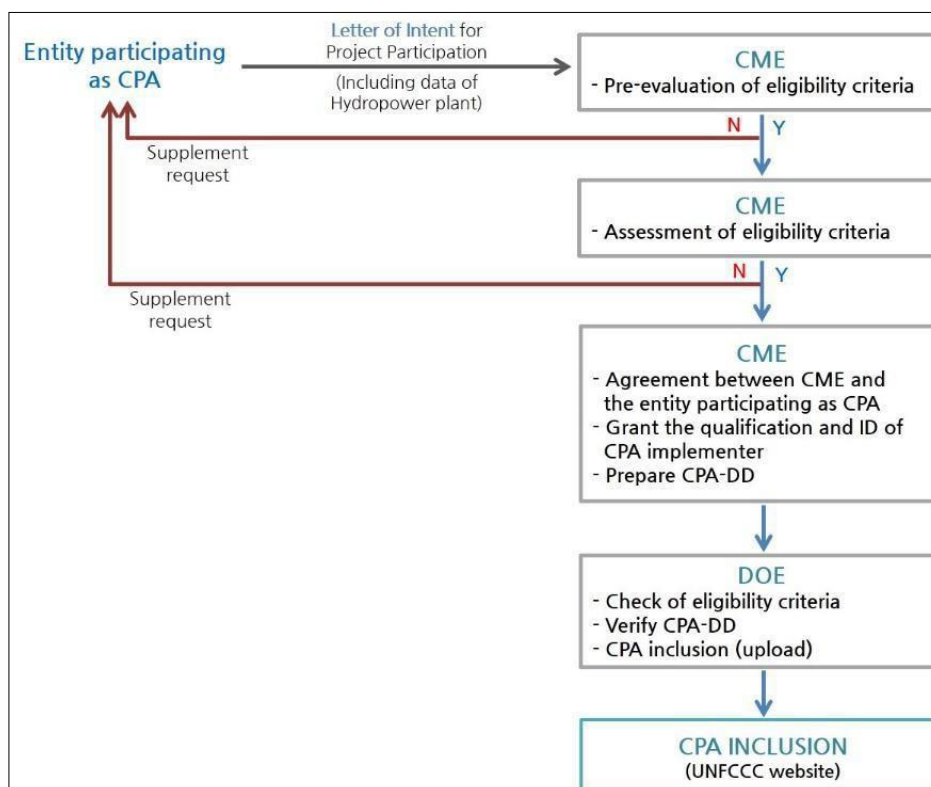
Records of arrangements for training and capacity development for personnel;

Training programs refer to activities and programs carried out by the CME or outside institute with the goal of maintaining and improving the job performance, qualifications and skills of the employees and managers of CPA implementer. Training contents for effective operation of the PoA are as following.

Department	Contents
Technical/Operation Department	<ul style="list-style-type: none"> - EB Guidelines and Methodology (AMS-I.D) - CDM Process - Monitoring parameter - Monitoring method and frequency - Calibration - Recording of monitoring data
Management Department	<ul style="list-style-type: none"> - Reporting of monitoring data - Data collection - Data management - Data storage

A procedure for technical review of inclusion of CPAs;

The flow of CPA inclusion is as follow; (The detailed procedures for the technical review of inclusion of CPAs has been included in the manual which has been provided to the DOE.)



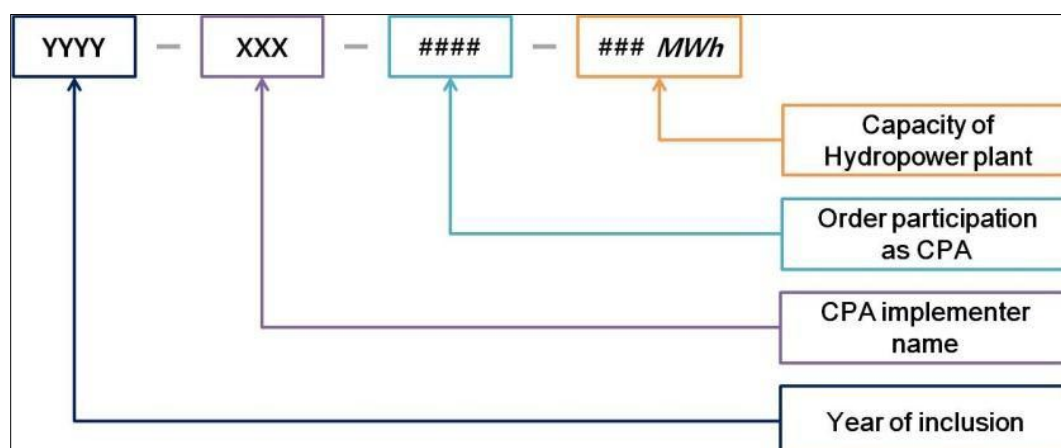
A procedure to avoid double counting;

The database described above will be used to perform a double counting check. Every new CPA will be compared to the list of project activities that are under validation or registered at the UNFCCC. Before the inclusion of any CPA the CPA implementer will be made aware of the double counting principle and will be required to certify in writing that proposed CPA is not currently registered under the CDM of UNFCCC or any voluntary scheme nor is currently in the CDM pipeline going through the process of validation or registration.

Therefore, eligibility criteria No. 5 of this PoA provides a strict restriction that will avoid double counting of a new CPA.

Records and documentation control process for each CPA under the PoA;

In order to unambiguously identify each CPA in this PoA, Sri Lanka Climate Fund (Private) Limited will grant CPA implementers with ID number according to the following ID numbering system;



[Figure B.2: I.D. forms of CPA Implementer]

This ID numbering system will be used to record baseline and monitoring data on a continuous basis using a template of CDM Operation Manual with a MS excel database. Each CPA will follow the monitoring requirements stipulated in AMS-I.D, ver.17 and CME will record and document CPA detail information as follows:

- Name, address, details of CPA implementer
- Capacity of hydropower plant
- Geographical coordinates of CPA (GPS information)
- The record of technical specification of each hydropower plant participating in the PoA
- Check if the hydropower plant equipment were transferred from or to another project activity

And CME develops and maintains an electronic database, which contains essential data and information about each CPA, including;

i) Technical Document

- Project Design Document (PoA-DD & CPA-DD)
- Validation Report of PoA & CPA
- Documents related to government approval
- Qualification or education certificate of person in charge
- CDM Operational Manual and Procedures
- Monitoring report
- Documents related to eligibility criteria check
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ii) Standard Document/Information

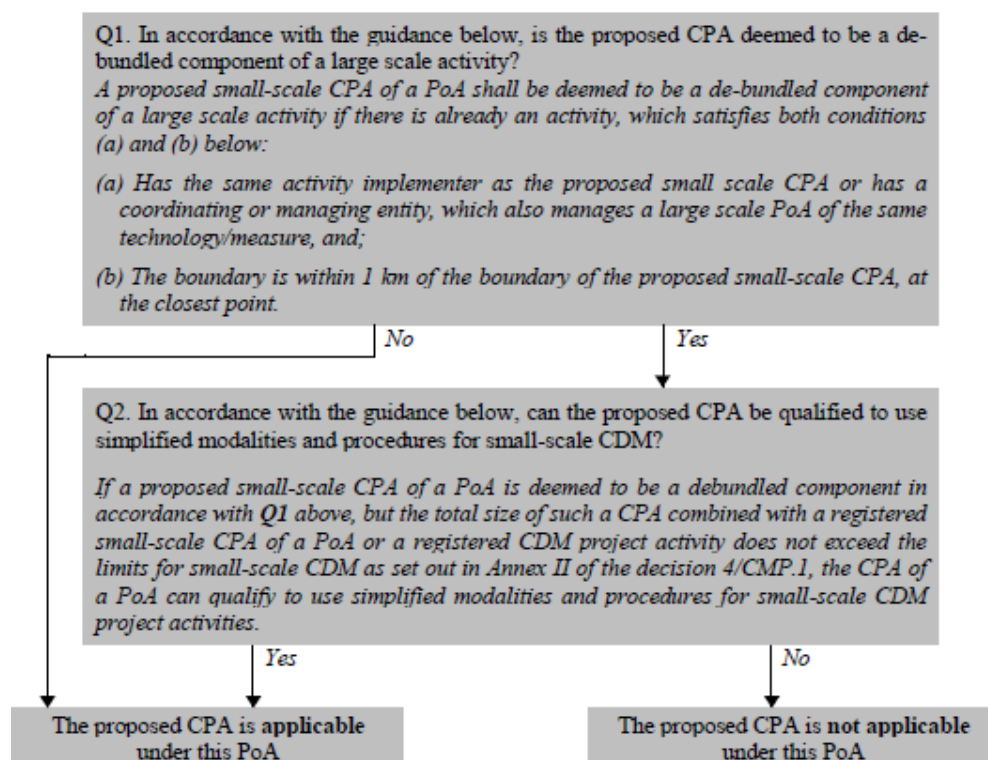
- CDM-SSC-PoA-DD
- CDM-SSC-CPA-DD
- AMS I.D, Grid connected renewable electricity generation
- Methodological Tool
- Guidelines and Standards

iii) General Document

General documents are classified into the internal documents such as the minutes or notes of CPA Implementer/CME, and the External documents such as the official notes from government offices, 3rd parties

Any other relevant elements.

- Procedure to check de-bundled component;



[Figure B.3: De-bundling check list]

The de-bundling check will be performed based on “Guidelines on assessment of de-bundling for SSC project activities, Version 03 (EB 54, Annex 13). The database described above will be used to perform the de-bundling check. Every new CPA will be compared to the list of project activities that are under validation or registered at the UNFCCC by Sri Lanka Climate Fund (Private) Limited Before the inclusion of any CPA the CPA implementer will be made aware of the de-bundling rules below.

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

To ensure that the operators of the CPA are aware of and have agreed that their activity is being subscribed to the PoA, the CPA implementer shall enter into a contractual arrangement with CME including respective provisions that:

- The CPA implementer is aware that the CPA will be subscribed to the present PoA.
- The CPA (has not) is not (and will not) undertaking another hydropower project within 1 km of the proposed CPA.
- The CPA implementer may cede its rights to claim and own emission reductions under the CDM or any voluntary scheme to CME
- The CPA implementer certifies that the CPA is not registered under the CDM of the UNFCCC or any voluntary scheme

Therefore, the acceptance and awareness of each CPA implementer is evidenced through the agreement between CME and CPA implementer before CPA inclusion in the PoA. In case that CPA implementer is same with CME, the agreement is not necessary.

B.2. Post-registration changes to PoA**B.2.1. Corrections**

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Following corrections were done to the registered PoA-DD 9705 (Version 5.0):

The name of Coordinating/managing entity is changed to Sri Lanka Climate Fund (Private) Limited from Sri Lanka Carbon Fund (Private) Limited as the name of CME was changed in 2016. Address of the CME was changed in 2017. Address of Project Participant, Koho Trading and Consultancy (Private) Limited, was changed in 2014.

B.2.2. Inclusion of monitoring plan

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Not Applicable

B.2.3. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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No permanent changes from registered monitoring plan or applied methodology.

B.2.4. Changes to programme design

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Not Applicable

B.2.5. Changes specific to afforestation or reforestation activities

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Not Applicable

PART II Monitoring of CPAs

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SECTION C. Implementation of CPAs**C.1. Description of implemented CPAs**

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The Bulathwaththa Small Hydropower Project is to promote small hydropower generation in Sri Lanka through Clean Development Mechanism. Currently there is a large potential for small hydropower generation in the country. However, most of the potential projects have not been developed due to serious financial and other barriers that the developers face. Even though some developers are willing to remove these barriers through Clean Development Mechanism, due to the small size, the application of CDM has been costly. Therefore, the project aims to supply the electricity to a national grid by generating electricity using mini-hydro technology.

Brief description of the installed technology and equipment

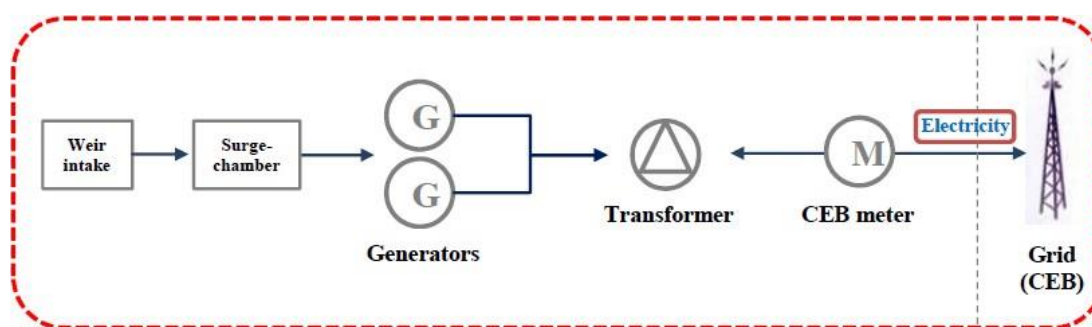
The run-of-river hydropower plant with a capacity of 3.8MW has been installed using water flow of Kalkanna Oya at Bulathwaththa. The estimated annual power generation of the hydropower plant is 12,464MWh. The entire power generation is exported to the national grid of Ceylon Electricity Board, but this CPA does not generate more than 3.8MW of electricity pursuant to the contract with CEB, which is the National Utility, owns the grid. If more than 3.8MW of electricity is generated, the alarm will go off or the system will be shut down.

The proposed project activity is the implementation of the small-scale hydro power plant project that supplies electricity to national grid. The Bulathwaththa small hydro power plant consists of construction of a weir, intake, a headrace channel, a surge chamber, and a tailrace and Switchyard and power house equipped with two sets of turbines. The moving water rotates the turbine, which spins a shaft. The motion of the shaft was used for mechanical processes, such as pumping water, or it was used to power an alternator or generator to generate electricity.

[Table D.1] Project Technical Parameters

Catchment Area	55km ²
Installed Capacity	3.9MW
No. of Generator Units	2 Unit
Capacity of each Generator	2,600kW, 1,300kW
Hydraulic Turbine	Francis
Plant Load Factor	37.4%
Yearly generation (ex-ante)	12,464MWh

The system diagram of Bulathwaththa small hydro power is as below:



[Figure D.1] Project Boundary

Project schedule for the specific CPA is as follows;

[Table D.2] Relevant dates for the specific-case CPA

No	Date/Month/Year	Implementation Schedule
1	14/10/2010	Environmental Approval Letter from Forest Department
2	20/10/2011	Standardised Power Purchase Agreement(SPPA)
3	08/03/2013	Contract agreement for construction of CPA
4	28/03/2015	Commissioning Date of the plant

Total GHG emission reductions achieved in this monitoring period: 6,760 tCO₂e

C.2. Location of CPAs

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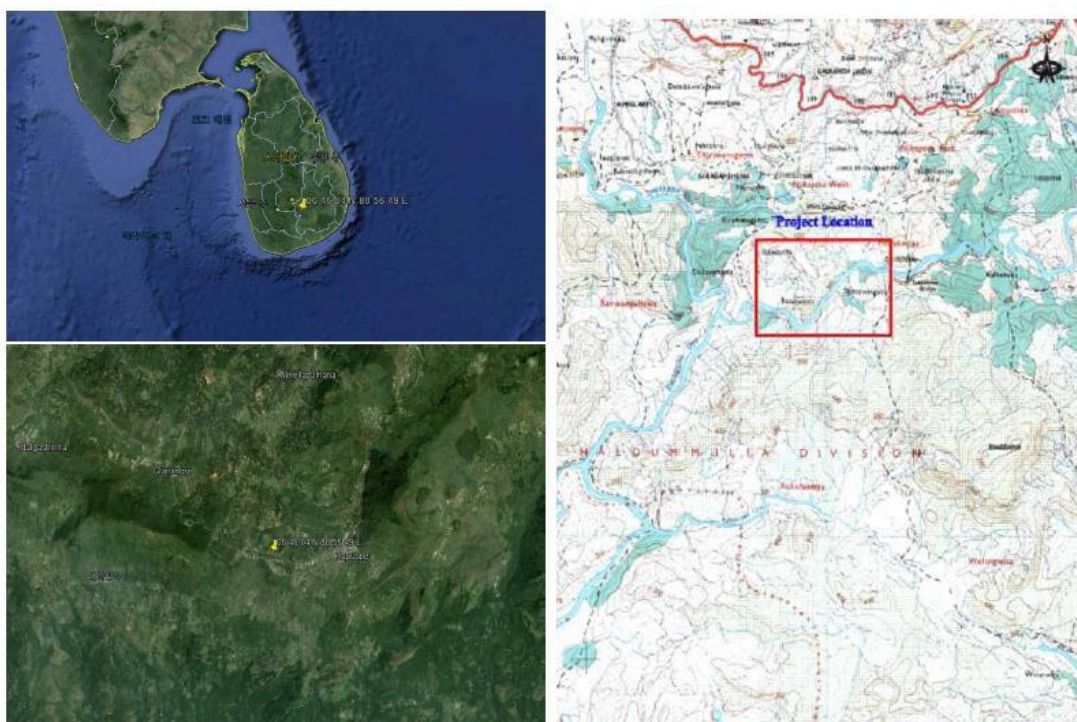
The project site is located on a tributary of Weli Oya and Walawe Ganga, as it drops down 117.7 m, near the village of Bulathwaththa in the Divisional Secretarial area of Haldummulla.

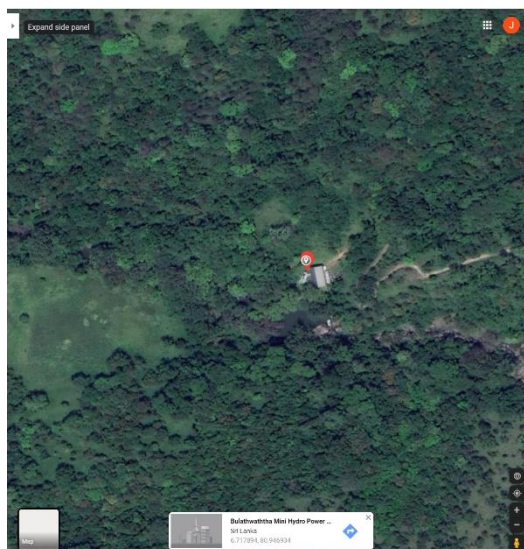
Detailed information is as follows;

- Host party: Sri Lanka
- Region/state/province: Uva
- City/town/community: Nikapota, Bulathwaththa

[Table D.3] Project Boundary

Component	Details
Address of CPA site	Kalkanna Oya – a tributary of Weli Oya and Walawe Gangs
Name of relevant entity which is responsible for management of the power plant used for the proposed CPA	Melanka Power Moraketiya (Private) Limited
Geographic Reference based on GPS	<div>Longitude Latitude</div> <div>Power house : 80°56'49"E 06°43'04"N</div> <div>Weir : 80°57'44"E 06°43'24"N</div>





Power House

C.3. Post-registration changes to CPAs

C.3.1. Temporary deviations from the monitoring plans in the included CPA-DDs, applied methodologies, standardized baselines or other methodological regulatory documents

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Not Applicable

C.3.2. Corrections

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Not Applicable

C.3.3. Changes to the start date of the crediting period

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Not Applicable

C.3.4. Inclusion of monitoring plan

>>

Not Applicable

C.3.5. Permanent changes to the included monitoring plans, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other methodological regulatory documents

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Not Applicable

C.3.6. Changes to project design

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Not Applicable

C.3.7. Changes specific to afforestation or reforestation CPA

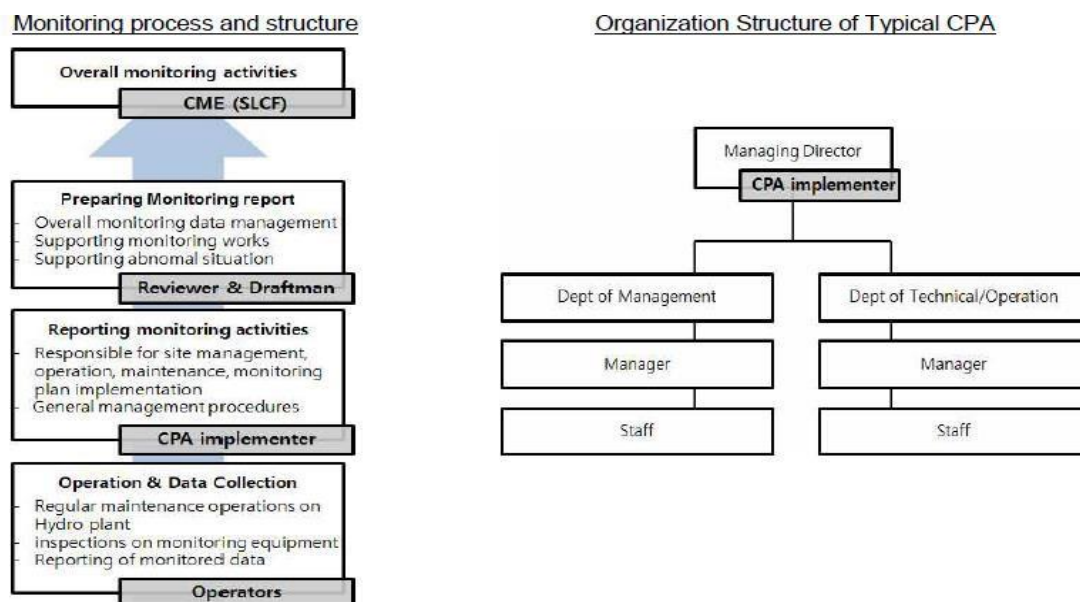
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Not Applicable

SECTION D. Description of monitoring system of CPAs

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The purpose of Monitoring Plan (MP) is provided standard to conduct monitoring and record consistent data necessary for the verification of the Project. Monitoring plan of the project includes followings



(a) [Figure F.1] Monitoring System

Data Collection and Archiving Procedures

Monitoring and its recording activity are implemented by the CPA implementer, Melanka Power Moraketiya (Private) Limited. All the data collected by the monitoring activity of the CPA are manually documented or electronically saved.

- The collected data is saved as computer file at least once a month. All the data collected are available two years after the end of the crediting period of the CPA.
- The monitoring activity includes QA/QC procedures for each parameter. For the stable CDM monitoring activity, the specific procedure are available in CDM Operation Manual.

Training

- Melanka Power Moraketiya (Private) Limited should organize training for its staff that operates and maintains the power plant facility. The training includes maintenance, repair, overhaul, etc. for CDM activity and usually organized in collaboration with the machine suppliers and KECO and KoHo. The person in charge of monitoring has been trained according to the CDM Operation Manual.

Operational and Monitoring Obligations

- Procedures for CPA monitoring activities are specified in a CDM Operation Manual which was prepared before the start of the first crediting period and has been tested during start-up of the components of the PoA. This provides an opportunity to correct any deficiencies and further refine the monitoring and recording procedures. It may also provide an opportunity to train operating personnel for the strict requirements for

accuracy in collecting and recording data for CDM purposes.

Quality Assurance and Quality Control

The quality assurance and quality control system for recording, maintaining and archiving data shall be maintained by each SSC-CPA. In order to maintain and upgrade the capability and skill of the operator, training related to maintenance of data and information related to power generation has been performed. Prior to the operation of the project, trainings are to be conducted for each of SSC-CPA personnel in order to ensure that the persons in charged are competent in performing their duties.

- The Metering Equipment shall be tested at least annually in accordance with Prudent Utility Practices set by CEB. Testing and calibration of meters, and any verification of meter accuracy, shall be performed pursuant to IEC Standards, by CEB or by a mutually agreed upon qualified independent third party. The metering instruments shall be calibrated before use of the meters and be sealed and locked by CEB after calibration/testing and after CEB who is the purchaser of the electricity shall carry out calibration according to their own standard, at any reasonable time. The results of meter calibration or tests shall be available for at all reasonable times. If, at any time, any metering equipment is found to be inaccurate by more than two per cent (2.0%), CEB shall cause such metering equipment to be made accurate or replaced as soon as possible.

Contingency Plan

- In case of measurement equipment trouble or data transferring error, the person in charge of monitoring is responsible for prompt grasping the problem and restoring it in due course. Also the person should comply with CDM Operation Manual.
- Corrective Action: When need for improvement is discovered during hydropower generation process, corrective action shall be taken immediately.
- Preventive Action: In order to find out any potential causes to abnormality in advance, carry out the preventive measures by using performance data and observation, periodically.
- After the Actions: Record the result of corrective and preventive actions taken and check if the results of such actions are effective.

SECTION E. Data and parameters

E.1. Data and parameters fixed ex ante

Data/Parameter	$EF_{grid,CM,y}$
Unit	tCO ₂ /MWh
Description	Combined Margin emission factor
Source of data	Calculated
Value(s) applied	0.7268

Choice of data or measurement methods and procedures	This value is calculated according to "Tool to calculate the emission factor for an electricity system (Version 03.0)". Sustainable Energy Authority in Sri Lanka (SEA), government for environmental issue, calculates the emission factor every year and opens the value to public. [Reference] http://www.energy.gov.lk/sub_pgs/elibrary_spe_pub.html
Purpose of data/parameter	Calculation of baseline emissions
Additional comments	- This data was calculated by SEA at the latest time of PoA-DD submission - $EFCO2,grid = EF_{grid,CM,y} = wOM \cdot EF_{grid,OM,y} + wBM \cdot EF_{grid,BM,y}$ This value is applied during the crediting period without update.

E.2. Data and parameters monitored

(Copy this table for each data or parameter.)

Data/Parameter	$EG_{BL,y}$	
Unit	MWh/yr	
Description	The quantity of net electricity supplied to national grid by project activity in year y	
Measured/calculated/default	Calculated	
Source of data	The net electricity supplied by the hydropower plant to the national grid is calculated as the difference between Export and the import readings from the electricity meter. The electricity exported and electricity imported are measured once every month using electricity meter at grid interconnection point.	
Value(s) of monitored parameter		
Monitoring equipment	Item	Main Meter
	Serial Number	213017492
	Accuracy Class	$\pm 1\%$
	Calibration Frequency	1 year
	Previous Calibration	23/08/2017
	Previous Validity	22/08/2017
	Last Calibration	06/10/2018
	Last Validity	05/10/2019
Measuring/reading/recording frequency	Monthly	
Calculation method (if applicable)	N/A	
QA/QC procedures	Calibration frequency: The Metering Equipment shall be tested at least annually in accordance with Prudent Utility Practices set by CEB. And the calibration should be carried out by an accredited person or institution.	
Purpose of data/parameter	Calculation of baseline emissions	
Additional comments		

E.3. Implementation of sampling plan

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Not Applicable

SECTION F. Calculation of emission reductions or net anthropogenic removals**F.1. Calculation of baseline emissions or baseline net removals**

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

$EF_{CO2,grid,y}$ Where;

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

$EG_{BL,y}$ is estimated as follows: [Electricity output(MWh) – Electricity Input(MWh)] * $EF_{CO2,grid,y}$

Net electricity supplied to the grid by the project is calculated as follows;

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

(Year 2016) for the eight monitoring period
 = 3,460.807 MWh/y X 0.7268tCO₂e/MWh
 = 2,515.31 tCO₂e

(Year 2017)
 = 6,531.587 MWh/y X 0.7268tCO₂e/MWh
 = 4,747.16 tCO₂e

(Year 2018)
 = 11,677.743 MWh/y X 0.7268tCO₂e/MWh
 = 8,487.38 tCO₂e

(Year 2019)
 = 10,496.867 MWh/y X 0.7268tCO₂e/MWh
 = 7,629.12 tCO₂e

The sum of baseline emissions ($BE_{2016}+BE_{2017}+BE_{2018}+BE_{2019}$) = 23378.98 tCO₂e

F.2. Calculation of project emissions or actual net removals

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As described in paragraph 20 of AMS I.D (ver.17), for most renewable energy project activities, $PE_y = 0$.

For this project, Project Emission is zero because there is no fossil fuel consumption in this project. And this CPA's plant type is run-of-river type, not the hydro power project activities that result in new single or multiple reservoirs or result in the increase of single or multiple existing reservoirs.

$$PE_y = 0$$

F.3. Calculation of leakage emissions

>>

As per category AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity. Since this does not apply for the project activity, there is no leakage associated with the project activity and therefore, leakage is zero.

$$LE_y = 0 \text{ tCO}_2/\text{y}$$

$$LE_y = 0$$

Thus $ER_y = BE_y$

i.e. the emission reductions are the baseline emissions in this project.

F.4. Calculation of emission reductions or net anthropogenic removals

CPA UNFCCC reference number	Baseline GHG emissions or baseline net GHG removals (t CO ₂ e)	Project GHG emissions or actual net GHG removals (t CO ₂ e)	Leakage GHG emissions (t CO ₂ e)	GHG emission reductions or net anthropogenic GHG removals (t CO ₂ e)		
				Before 01/01/2013	From 01/01/2013	Total amount
9705-002	23,379	0	0	0	30,139	30,139
Total	23, 379	0	0	0	30,139	30,139

F.5. Comparison of emission reductions or net anthropogenic removals achieved with estimates in the included CPA-DDs

CPA UNFCCC reference number	Amount achieved during this monitoring period (t CO ₂ e)	Amount estimated ex ante for this monitoring period in the CPA-DD (t CO ₂ e)
9705-0002	23,379	33,212
Total	23,379	33,212

F.5.1. Explanation of calculation of “amount estimated ex ante for this monitoring period in the CPA-DD”

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Ex-ante Calculation of Baseline Emission:

As describe in the equation (6) of Section B.6.1, the baseline emission is given by

$$BE_y = EG_{BL,y} * EF_{CO_2,grid,y}$$

Where;

BE_{y} : Baseline Emissions in year y (tCO₂)

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

$EF_{CO_2, grid y}$: CO₂ emission factor of the grid in year y (tCO₂/MWh)

As per described in B.6.3 of Part II in PoA-DD, in ex-ante calculation of emission reductions, $EG_{BL,y}$ is estimated as follows:

$$EG_{BL,y} = (\text{Capacity} * 365\text{days} * 24\text{hours} * 37.44\%)$$

$$= (3.8\text{MW} * 365 * 24 * 37.44\%)$$

$$= 12,464 \text{ MWh/yr}$$

$$BE_y = EG_{BL,y} * EF_{grid CM,y}$$

$$= 12,464 * 0.7268$$

$$= 9,058 \text{ tCO}_2/\text{yr}$$

Ex-ante calculation of Project Emission:

As described in paragraph 20 of AMS I.D (ver.17), for most renewable energy project activities, $PE_y = 0$.

For this project, Project Emission is zero because there is no fossil fuel consumption in this project. And this CPA's plant type is run-of-river type, not the hydro power project activities that result in new single or multiple reservoirs or result in the increase of single or multiple existing reservoirs.
 $PE_y = 0$

Leakage Emissions (LE_y):

As per category AMS I.D, leakage is to be considered only if the energy generating equipment is transferred from another activity or if the existing equipment is transferred to another activity. Since this does not apply for the project activity, there is no leakage associated with the project activity and therefore, leakage is zero.

$$LE_y = 0 \text{ tCO}_2/\text{y}$$

$$LE_y = 0$$

Ex-ante Calculation of Emission Reductions:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y : Emission Reductions in the year y (tCO₂e)

BE_y : Baseline emissions in the year y (tCO₂e)

PE_y : Project emissions in the year y (tCO₂e)

LE_y : Leakage emissions in the year y (tCO₂e)

$$ER_y = BE_y$$

Summary of the ex-ante estimates of emission reductions

Year	Baseline emissions (t CO ₂ e)	Project emissions (t CO ₂ e)	Leakage (t CO ₂ e)	Emission reductions (t CO ₂ e)
Year 2016 (eight monitoring periods)	6,038	0	0	6,038
Year 2017	9,058	0	0	9,058
Year 2018	9,058	0	0	9,058
Year 2019	9,058	0	0	9,058
Total	33,212	0	0	33,212

* All numbers are rounded-down

F.6. Remarks on increase in achieved emission reductions

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Not Applicable

F.7. Remarks on scale of small-scale CPAs

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Any of the project activities have ever exceeded the maximal installed capacity of 15 MW per CPA set forth in the applied Methodology AMS-I.D. ver. 17 – Grid connected renewable electricity generation. This CPA comply with the eligibility criteria and can be included. All installations have been verified periodically during annual verifications and no increase of capacity exceeding the limit has ever been recorded.

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN); • Add a section on remarks on the observance of the scale limit of small-scale CPAs during the crediting periods; • Add "changes specific to afforestation or reforestation activities/CPA" as a possible post-registration changes; • Clarify the reporting of net anthropogenic GHG removals for A/R PoAs between two commitment periods; • Make structural and editorial improvements.
02.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 01.0 of the “CDM project standard for programmes of activities (CDM-EB93-A07-STAN); • Make editorial improvements.
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