



**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	3	
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	31,199
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	49,284	

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), 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 Activites 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 Activites 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 Activites for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/09/2015 – 31/08/2022	No
9705-0003: 2.0MW Maskeliya Oya Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activites 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 Activites 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 Activites for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/01/2017- 31/12/2023	Yes
9705-0006: 1.4MW Gomale Oya Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activites for Small	Renewable 01/11/2017 – 31/10/2024	Yes

		Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019		
9705-0007: 1.5MW Moragaha Oya Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activites for Small Scale Hydropower CDM in Sri Lanka” version 05 dated 30/10/2019	Renewable 01/11/2017 – 31/10/2024	Yes
9705-0008: 1.90MW Upper Hulu Ganga Small Hydropower Project	3.0	Single generic CPA as per Part II of PoA “ Programme of Activites 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 Activites 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 Activites 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 Activites 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 Activites 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 (Private) 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.

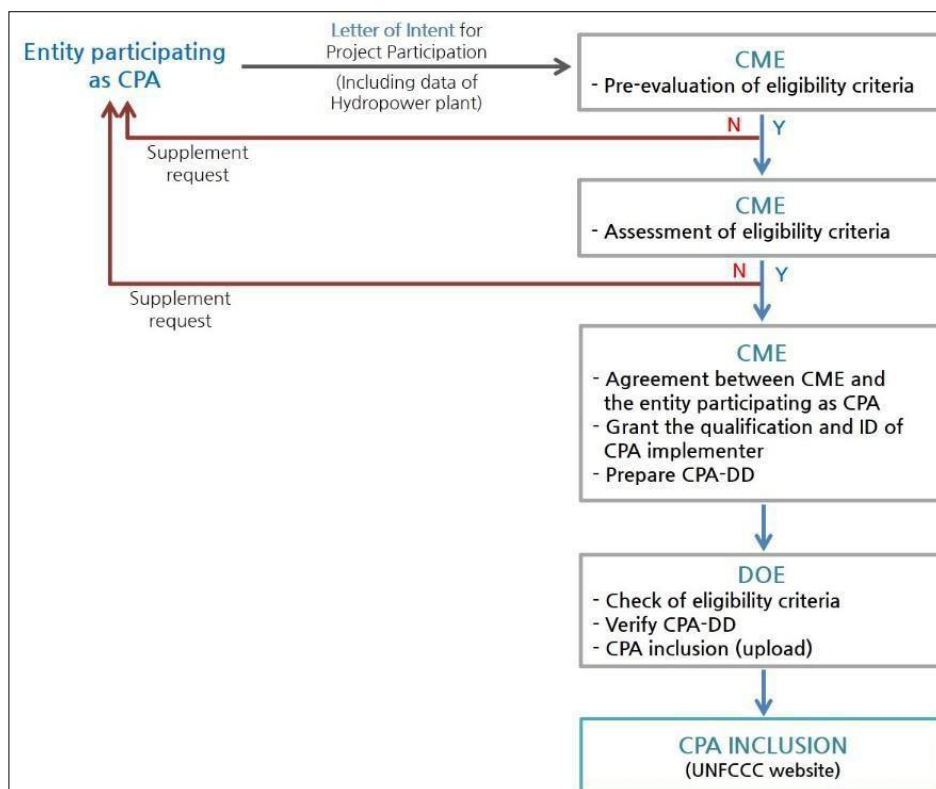
Records of arrangements for training and capacity development for personnel;

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.)



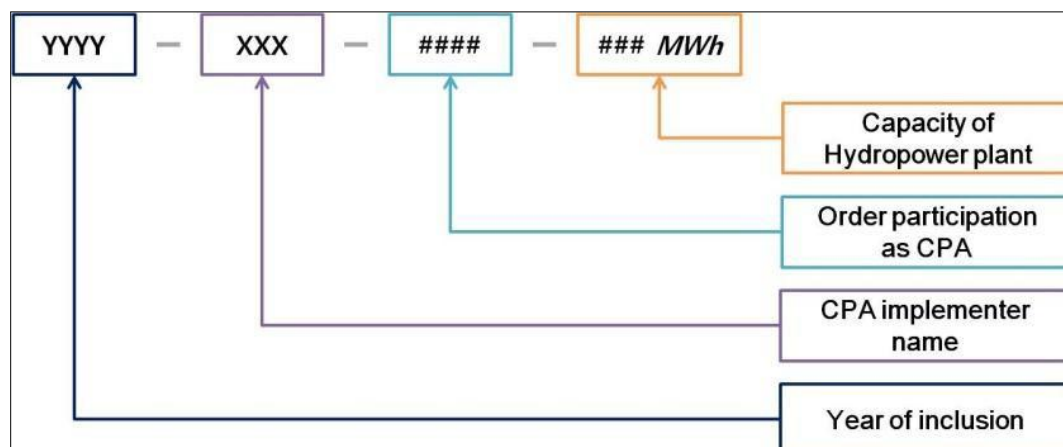
A procedure to avoid double counting;

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

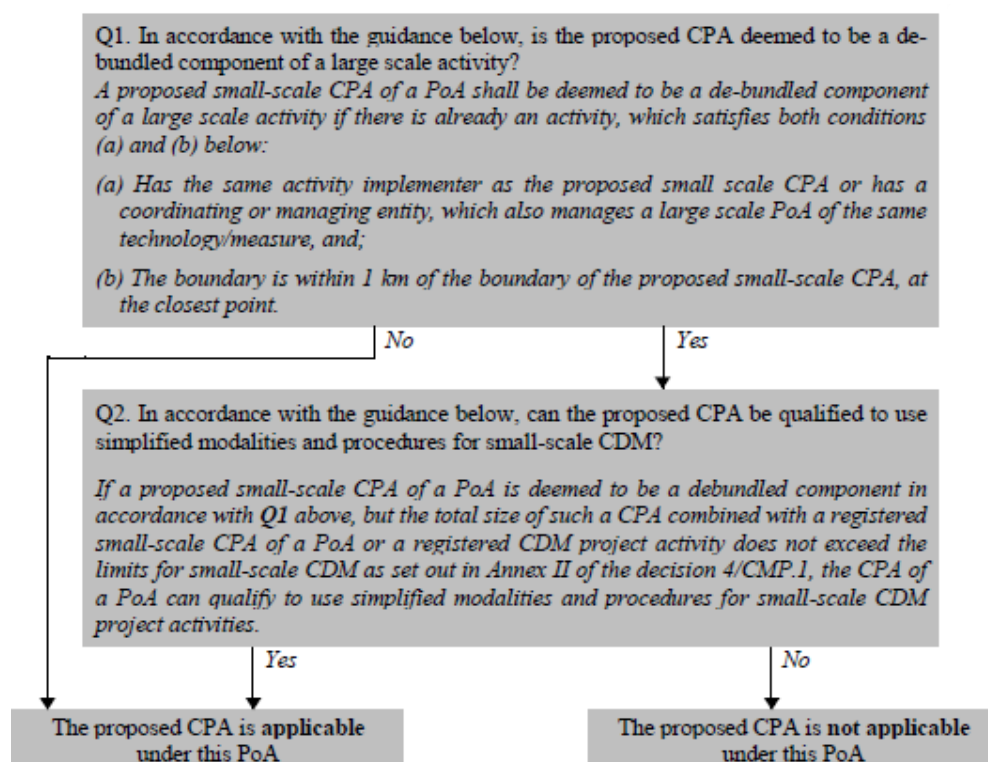
- CDM-SSC-PoA-DD
- CDM-SSC-CPA-DD
- AMS I.D, Grid connected renewable electricity generation
- Methodological Tool
- Guidelines and Standards

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:

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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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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9705-P1-0005: 3.25MW Dambulu Oya Small Hydropower Project:

This CPA is to develop Dambulu Oya Small Hydropower project under the 'Programme of Activities for Small Scale Hydropower CDM in Sri Lanka'. The objective of the PoA 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.

The proposed project is to supply the electricity to a national grid by generating electricity using hydro technology. Proposed project will be developed by HPD Power (Pvt) Limited. Hydropower systems

use the energy in flowing water to produce electricity. This CPA is planning to install a hydropower plant with a capacity of 3.25MW using water flow of Dambulu Oya reservoir. Dambulu Oya, The water source identified for hydro generation, receives water from two sources. From Dambulla Oya reservoir, the water is diverted to Kala Wawa to cultivate approximately 100,000 acres of paddy. Due to large bodies of water source, this CPA project has a higher Plant Load Factor(PLF) than another small hydro project. The estimated annual power generation of the hydropower plant is 15,187MWh. The entire power generation will be exported to the national grid of Ceylon Electricity Board. AMS.I.D included in the sectoral scope of energy industries (renewable energy source) is selected because

- Hydro power as a kind of renewable energy is applied;
- A total capacity of the power system to be planed is not exceed 15MW; and
- Supplying electricity to national grid

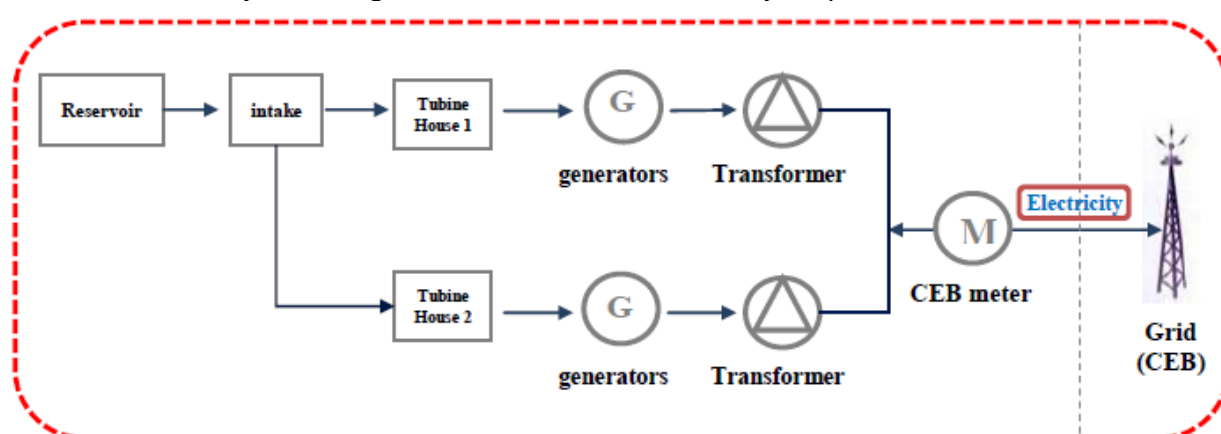
In addition, this methodology is applicable for project activity that installs a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity(Greenfield plant), as stated on the paragraph 3 of AMS-I.D(ver. 17). Because this project activity will build new plants, the existing scenario prior to the implementation of this project activity is not presentable. Meanwhile the baseline scenario is considered that the electricity supplied to the grid by project activity would have otherwise been generated by the operation of grid connected power plants.

The GHG emission reduction is calculated by AMS-I.D, which formula is $BE_y = EG_{BL,y} * EF_{CO2,grid,y}$. According to AMS-I.D, $EF_{CO2,grid,y}$ is calculated by "Tool to calculate the emission factor for an electricity system (ver.03.0, Annex22 of EB70), and the value is 0.7268 tCO₂/MWh. Consequently, calculated GHG emission reduction is table below.

[Table 1] Project Technical Parameters

Catchment Area	100km ²
Installed Capacity	3.585MW
No. of Generator Units	2 Unit
Capacity of each Generator	1,920kW, 1,442kW
Hydraulic Turbine	Kaplan
Plant Load Factor	56.7%
Yearly generation (ex-ante)	16,752MWh

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



[Figure D.1] Project Boundary

- Intake: 21m mouth width and 19m long intake and de silting section with water height of 4.1m
- Penstock line: DN2200, 2000, 1800, 3 lines pipes with pressure class PN 2 with a length of 300m
- Pressure chamber: 7m × 3.5m with a length of 7.5m connecting the popes and the power house
- Power house for turbine 1: 8m × 15m area for one unit of Kaplan machine together with synchronous generator.
- Headrace channel : length of 1550m

- Power house for turbine 1: 8m × 15m area for one unit of Kaplan machine together with synchronous generator.
- Tail water channel: length of 630m

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	05/02/2013	The start date of validation for PoA
2	13/01/2014	Contract agreement for Equipment purchase of CPA
3	15/12/2014	Letter of Intent(LOI) to Sri Lanka Carbon Fund(Private)Limited
4	12/01/2015	Approval obtained from Maheweli Authority of Sri Lanka for Environmental Impact Assessment Report(EIA)
5	02/02/2015	Renewal Contract agreement for Equipment purchase of CPA
6	28/04/2015	Standardised Power Purchase Agreement(SPPA)
7	12/2016	Schedule for Complete the construction

9705-P1-0006: 1.4MW Gomale Oya Small Hydropower Project

The CPA is to develop Gomale Oya Small Hydropower project under the 'Programme of Activities for Small Scale Hydropower CDM in Sri Lanka.' The objective of the PoA 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.

The proposed project is to supply the electricity to national grid by generating electricity using mini- hydro technology. Proposed project will be developed by Gomale Oya Hydro Power (Private) Limited.

Hydropower systems use the energy in flowing water to produce electricity. This CPA is planning to install a run-of-river hydropower plant with a capacity of 1.4MW using the stream of lower segment of Gomale Oya in the Malgala village in the Deraniyagala Secretariat Division in Nuwara Eliya District. The estimated annual power generation of the hydropower plant is 3,461 MWh. The entire power generation will be exported to the national grid owned by Ceylon Electricity Board, National Utility.

AMS.I.D included in the sectoral scope of energy industries (renewable energy source) is selected because

- Hydro power as a kind of renewable energy is applied;
- A total capacity of the power system to be planed is not exceed 15MW; and
- Supplying electricity to national grid

In addition, this methodology is applicable for project activity that installs a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity(Greenfield plant), as stated on the paragraph 3 of AMS-I.D(ver. 17). Because this project activity will build new plants, the existing scenario prior to the implementation of this project activity is not presentable. Meanwhile the baseline scenario is considered that the electricity supplied to the grid by project activity would have otherwise been generated by the operation of grid connected power plants.

The GHG emission reduction is calculated by AMS-I.D, which formula is $BE_y = E_{GBL, y} * EF_{CO2, grid, y}$. According to AMS-I.D, $EF_{CO2, grid, y}$ is calculated by "Tool to calculate the emission factor for an

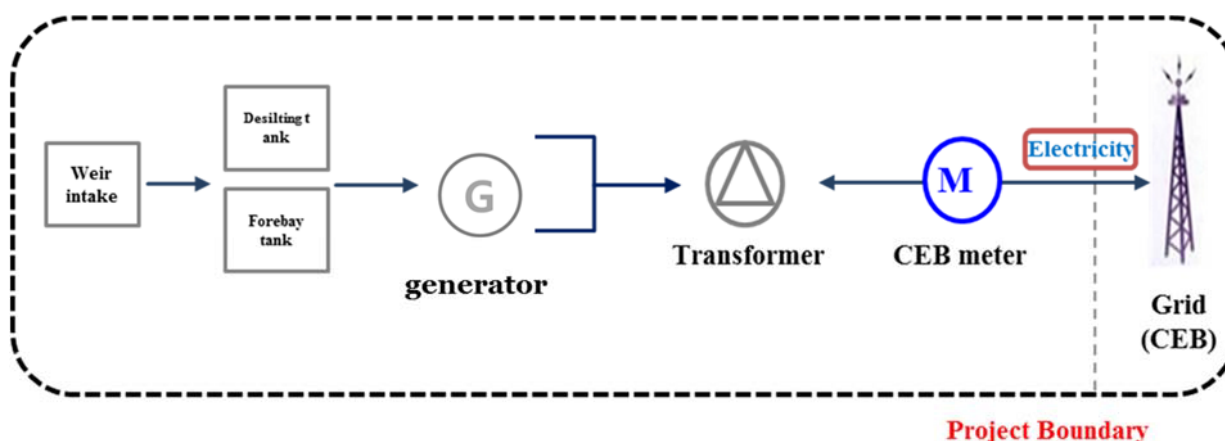
electricity system (ver.03.0, Annex12 of EB70), and the value is 0.7268 tCO₂/MWh. Consequently, calculated GHG emission reduction is table below.

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

No	Date/Month/Year	Implementation Schedule
1	08/07/2013	Environmental Approval Letter from Central Environmental Authority
2	28/04/2015	Standardised Power Purchase Agreement(SPPA)
3	05/02/2013	The start date of validation for PoA
4	16/01/2015	Purchasing Contract of equipment for CPA

CPA specific technical specification	
Installed Capacity	1,387kW
No. of Generator Units	1
Capacity of each Generator	1,600 kVA
Hydraulic Turbine	Pelton
Plant load factor	28.22%
Yearly generation (ex-ante)	3,428MWh

The proposed project activity is the implementation of the small-scale hydro power plant project that supplies electricity to national grid. Gomale Oya power plant will consist of construction of weir/intake, headrace channel, desilting tank/fore-bay, penstock path, switch yard, transmission line, access road and power house equipped with turbine & generator. The moving water rotates the turbine, which spins shaft. The motion of the shaft was used for mechanical processes, such as pumping water, or it was used to power alternator or generator to generate electricity.



[Figure A.1 Project boundary]

9705-P1-0007-CP1: 1.5MW Moragaha Oya Small Hydropower Project

The CPA is to develop Moragaha Oya Small Hydropower project under the 'Programme of Activities for Small Scale Hydropower CDM in Sri Lanka.' The objective of the PoA 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.

The proposed project is to supply the electricity to national grid by generating electricity using mini- hydro technology. Proposed project will be developed by Moragaha Oya (Private) Limited. Hydropower systems use the energy in flowing water to produce electricity. This CPA is planning to install a run-of-river hydropower plant with a capacity of 1.5MW using water flow of Moragaha Oya at Panwila, Kandy. The estimated annual power generation of the hydropower plant is 4,450 MWh. The entire power generation will be exported to the national grid owned by Ceylon Electricity Board, National Utility.

AMS.I.D included in the sectoral scope of energy industries (renewable energy source) is selected because

- Hydro power as a kind of renewable energy is applied;
- A total capacity of the power system to be planed is not exceed 15MW; and
- Supplying electricity to national grid

In addition, this methodology is applicable for project activity that installs a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity(Greenfield plant), as stated on the paragraph 3 of AMS-I.D(ver. 17). Because this project activity will build new plants, the existing scenario prior to the implementation of this project activity is not presentable. Meanwhile the baseline scenario is considered that the electricity supplied to the grid by project activity would have otherwise been generated by the operation of grid connected power plants.

The GHG emission reduction is calculated by AMS-I.D, which formula is $BE_y = E_{GBL,y} * EF_{CO2,grid,y}$. According to AMS-I.D, $EF_{CO2,grid,y}$ is calculated by "Tool to calculate the emission factor for an electricity system (ver.03.0, Annex12 of EB70), and the value is 0.7268 tCO₂/MWh. Consequently, calculated GHG emission reduction is table below.

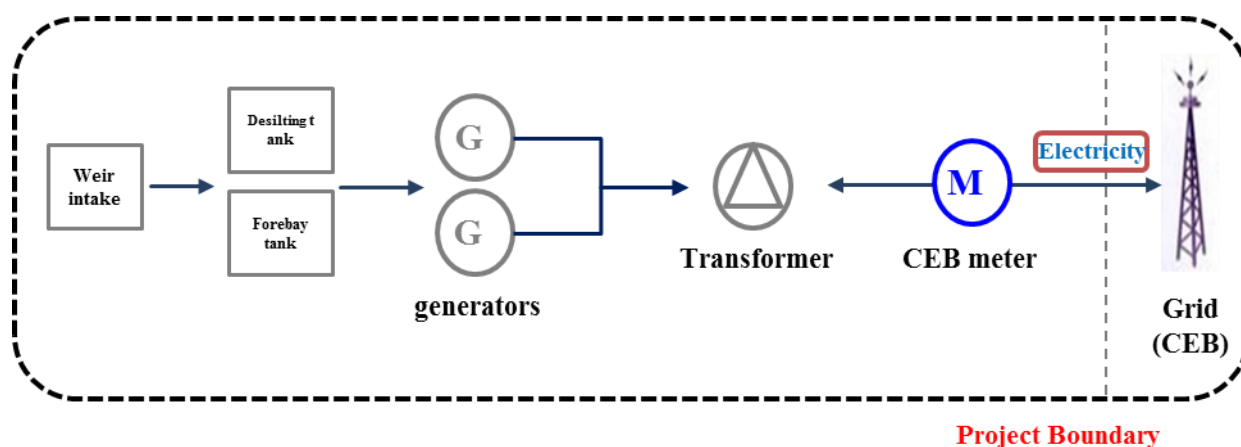
[Table D.2] Relevant dates for the specific-case CPA

No	Date/Month/Year	Implementation Schedule
1	22/05/2013	Environmental Approval Letter from Central Environmental Authority
2	28/04/2015	Standardised Power Purchase Agreement(SPPA)
3	05/02/2013	The start date of validation for PoA
4	01/09/2015	Purchasing Contract of equipment for CPA

CPA specific technical specification	
Installed Capacity	1,576kW
No. of Generator Units	2
Capacity of each Generator	1,090kVA, 700kVA
Hydraulic Turbine	Francis
Plant load factor	35%
Yearly generation (ex-ante)	4,676 MWh

The proposed project activity is the implementation of the small-scale hydro power plant project that supplies electricity to national grid. The Moragaha Oya power plant will consist of construction of weir, headrace channel, fore-bay, penstock lines, tailrace, switch yard, power house equipped with two turbines & generators, access road and transmission line. The moving

water rotates the turbine, which spins shaft. The motion of the shaft was used for mechanical processes, such as pumping water, or it was used to power alternator or generator to generate electricity.



[Figure A.1 Project boundary]

CPA Names		Turbine	Generator	Transformer
9705-P1-0005-CP1 3.25 Dambulu Oya Small Hydropower Project	Type	Kaplan	Synchronous	
	No	2	2	2
	Capacity	2047kW/1538kW (3585 kW)	1920 kW 1442 kW	2400 kVA 1800 kVA
9705-P1-0006-CP1 1.4MW Gomale Oya Small Hydropower Project	Type	Pelton	Synchronous	
	No	1	1	1
	Capacity	1387 kW	1600 kVA	1800 kVA
9705-P1-0007-CP1 1.5MW Moragaha Oya Small Hydropower Project	Type	Francis	Synchronous	
	No	2	2	2
	Capacity	960.2 kW/616 kW (1576.2 kW)	1090 kVA 700 kVA	1100 kVA 700 kVA

[Table C.1. Installed Equipments for the CPAs]

Implementation and actual operation of the CPAs

CPA Names		construction start date	Commission date	Operation start date
9705-P1-0005-CP1 3.25 Dambulu Oya Small Hydropower Project	PH 1	January 2015	07/12/2016	07/12/2016
	PH 2	July 2015		
9705-P1-0006-CP1 1.4MW Gomale Oya Small Hydropower Project		January 2015	12/08/2016	12/08/2016
9705-P1-0007-CP1 1.5MW Moragaha Oya Small Hydropower Project		March 2016	16/03/2017	16/03/2017

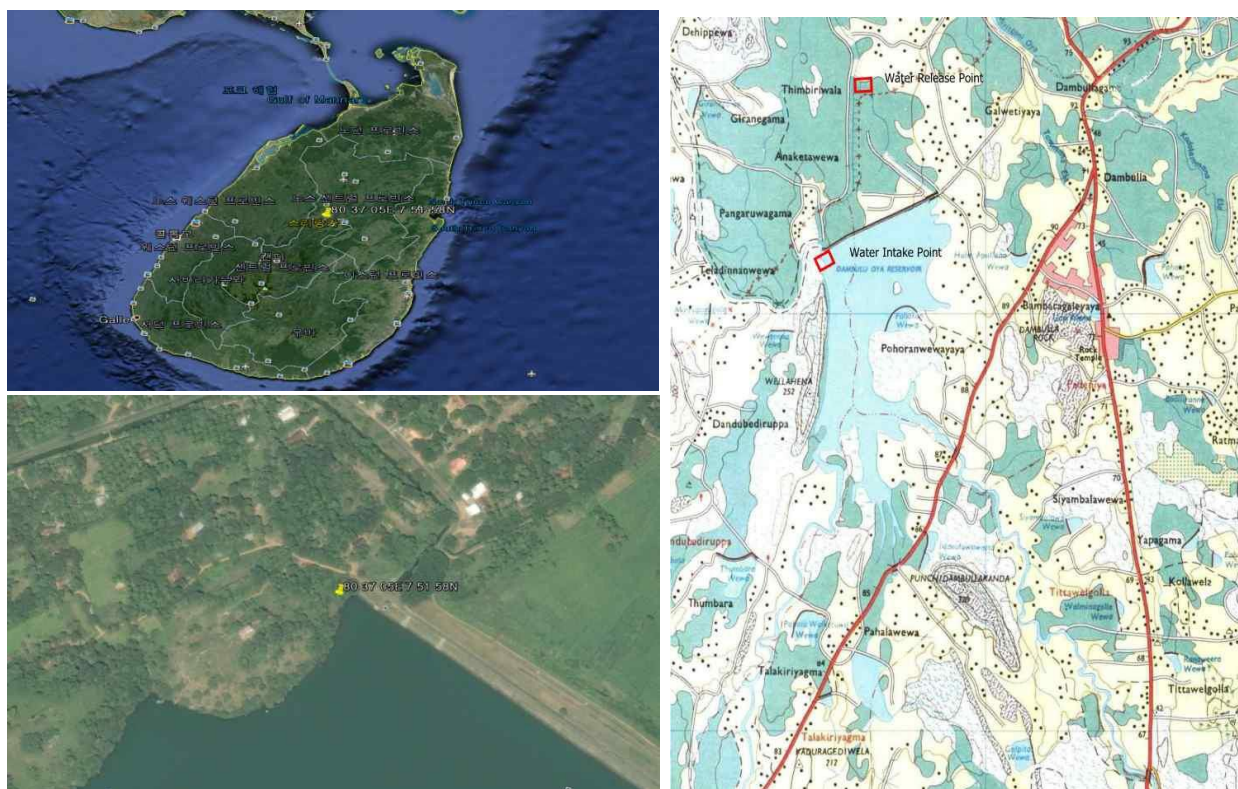
[Table C.2. Implementation and Operation Status of the CPAs]

C.2. Location of CPAs

>>

9705-P1-0005: 3.25MW Dambulu Oya Small Hydropower Project:

Component	Details
Address of CPA site	Dambulu Oya, Anakatawa village
Name of relevant entity which is responsible for management of the power plant used for the proposed CPA	HPD Power (Pvt) Limited
Geographic Reference based on GPS	<div>Longitude Latitude</div> <div>Intake : 80°37'05"E 7°51'58"N</div> <div>Power house1: 80°37'22"E 7°53'02"N</div> <div>Power house2: 80°37'22"E 7°52'29"N</div>



9705-P1-0006: 1.4MW Gomale Oya Small Hydropower Project

>>

This site is located close to the Maliboda Township in the Deraniyagala. The project can be accessed through Avissawella (A7). Details of administrative set up are as follows;

Province: Sabaragamuwa

District: Kegalle

Divisional Secretariat Area: Deraniyagala Grama Niladari Division: Malgala

Component	Details
-----------	---------

Address of CPA site	Malgala, Deraniyagala
Name of relevant entity which is responsible for management of the power plant used for the proposed CPA	Gomale Oya Hydro Power (Private) Limited
Geographic Reference based on GPS	Weir: 6° 51' 38.6" N 80° 25' 57.5" E Power House: 6° 52' 0" N 80° 26' 1" E



[Figure A.2 Project location]

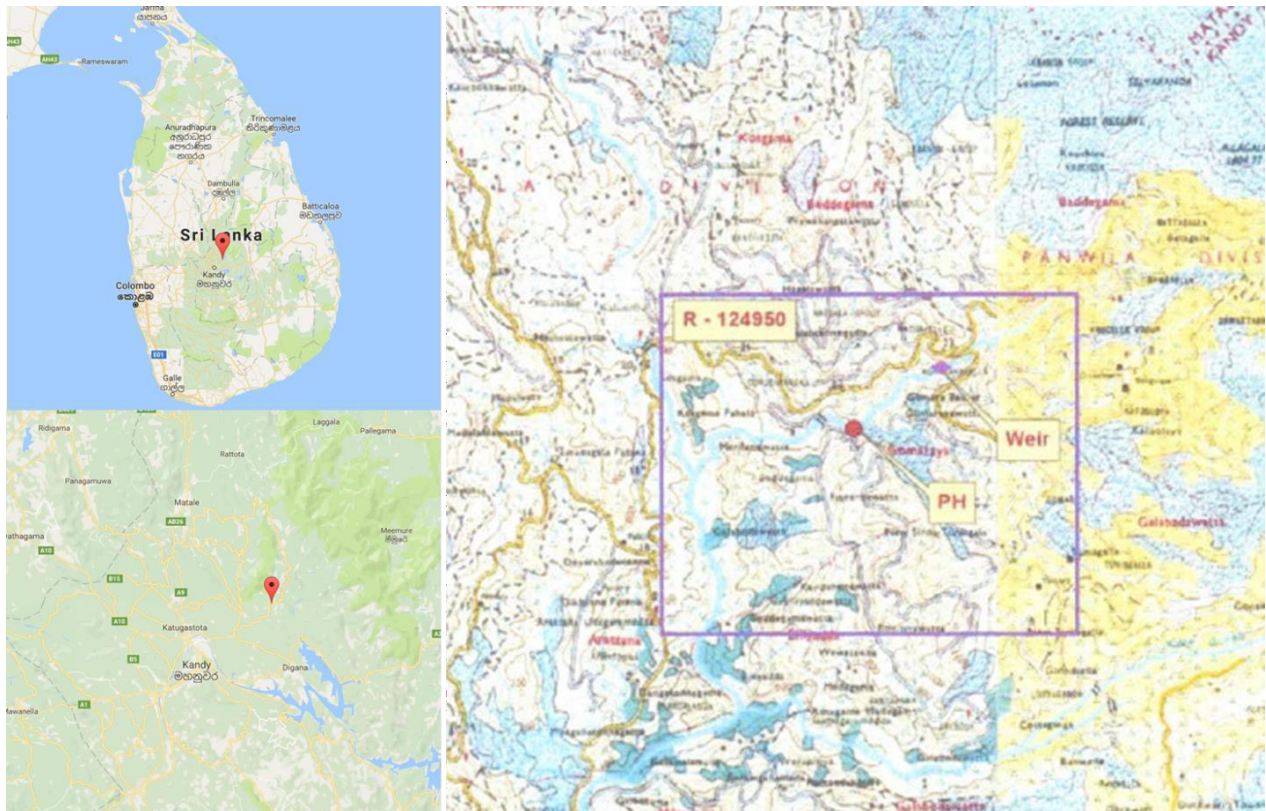
9705-P1-0007-CP1: 1.5MW Moragaha Oya Small Hydropower Project

The project is located on Moragaha Oya, which is tributary of Hulu Ganga, which is one of major tributaries of Mahaweli Ganga. Details of administrative set up are as follows;

Province: Central District: Kandy

Divisional Secretariat Area: Panwila Grama Niladari Division: Gomare

Component	Details
Address of CPA site	Gomare, Panwila
Name of relevant entity which is responsible for management of the power plant used for the proposed CPA	Moragaha Oya (Private) Limited
Geographic Reference based on GPS	Weir: 8° 46' 10" E 07° 24' 02" N Power House: 8° 45' 32" E 07° 23' 43" N



[Figure A.2 Project location]

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

>>

Not Applicable

C.3.2. Corrections

>>

Not Applicable

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

>>

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

>>

Not Applicable

C.3.6. Changes to project design

>>

CPA-DDs were written based on the feasibility report and the contract capacity with power providers. However, the power equipment suppliers have no capacity to custom-made power supply for small-scale projects, so they provide the capacity close to designed capacity. Thus, the installed capacity in CPA-DD is revised to designed capacity, and CPA-DD includes actual installed capacity additionally.

Ref. No.	Project name	Designed capacity	Installed capacity
9705-P1-0005	3.25MW Dambulu Oya Small Hydropower Project	3.25MW	3.585 MW
9705-P1-0006	1.4MW Gomale Oya Small Hydropower Project	1.4MW	1.387MW
9705-P1-0007	1.5MW Moragaha Oya Small Hydropower Project	1.5MW	1.576MW

The designed capacity is the same as the capacity written in the power contacts. The actual installed capacity was considered in calculating the expected power generation and emission reductions, with the existing power load factor, and no critical effect on the result was found.

C.3.7. Changes specific to afforestation or reforestation CPA

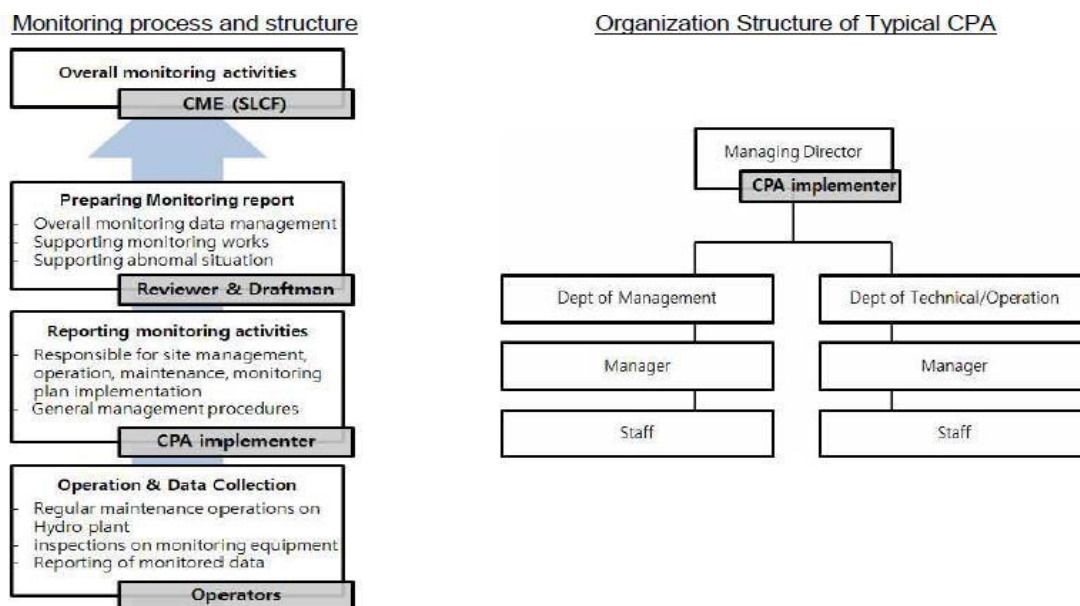
>>

Not Applicable

SECTION D. Description of monitoring system of CPAs

>>

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



[Figure F.1] Monitoring System

Data Collection and Archiving Procedures

Monitoring and its recording activity are implemented by the CPA implementer. 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

- The CPA Implementer 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 - $EFCO_{2,grid} = EF_{grid,CM,y} = wOM \cdot EF_{grid,OM,y} + wBM \cdot EF_{grid,BM,y}$ 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	MWh/yr																												
Monitoring equipment	<table border="1"> <tr> <td>Type</td><td colspan="3">Electricity Meter</td></tr> <tr> <td>Calibration frequency</td><td colspan="3">Annually</td></tr> <tr> <td>Validity</td><td colspan="3">Until next test/calibration</td></tr> <tr> <td>CPA Ref. no.</td><td>Serial No.</td><td>Accuracy Class</td><td>Date of last calibration</td></tr> <tr> <td>9705-P1-0005-CP1</td><td>EDMI 214586203</td><td>0.5</td><td>19/12/2018</td></tr> <tr> <td>9705-P1-0006-CP1</td><td>EDMI 214312835</td><td>1.0</td><td>29/06/2018</td></tr> <tr> <td>9705-P1-0007-CP1</td><td>EDMI 214586134</td><td>1.0</td><td>13/06/2017</td></tr> </table>	Type	Electricity Meter			Calibration frequency	Annually			Validity	Until next test/calibration			CPA Ref. no.	Serial No.	Accuracy Class	Date of last calibration	9705-P1-0005-CP1	EDMI 214586203	0.5	19/12/2018	9705-P1-0006-CP1	EDMI 214312835	1.0	29/06/2018	9705-P1-0007-CP1	EDMI 214586134	1.0	13/06/2017
Type	Electricity Meter																												
Calibration frequency	Annually																												
Validity	Until next test/calibration																												
CPA Ref. no.	Serial No.	Accuracy Class	Date of last calibration																										
9705-P1-0005-CP1	EDMI 214586203	0.5	19/12/2018																										
9705-P1-0006-CP1	EDMI 214312835	1.0	29/06/2018																										
9705-P1-0007-CP1	EDMI 214586134	1.0	13/06/2017																										
Measuring/reading/recording frequency	Monthly																												
Calculation method (if applicable)	N/A																												
QA/QC procedures	Calibration frequency: According to manufacturer's specifications or national standards. And 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

>>

Not Applicable

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

>>

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

EF_{CO2,grid,y} Where;BE_y Baseline Emissions in year y (tCO₂)EF_{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)

$EG_{BL,y}$ is estimated as follows: [Electricity output(MWh) – Electricity Input(MWh)] * $EF_{CO_2,grid,y}$

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

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

9705-P1-0005: 3.25MW Dambulu Oya Small Hydropower Project:

(Year 2017)

$$= 5,100.34 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 3,706.93 \text{ tCO}_2\text{e}$$

(Year 2018)

$$= 12,035.67 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 8,747.53 \text{ tCO}_2\text{e}$$

(Year 2019)

$$= 9,706.87 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 7,054.95 \text{ tCO}_2\text{e}$$

The sum of baseline emissions ($BE_{2016}+BE_{2017}+BE_{2018}+BE_{2019}$) = 19,509.41 tCO₂e

9705-P1-0006: 1.4MW Gomale Oya Small Hydropower Project

(Year 2017) for the two monitoring period

$$= 374.51 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 272.20 \text{ tCO}_2\text{e}$$

(Year 2018)

$$= 2,686.14 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 1,952.29 \text{ tCO}_2\text{e}$$

(Year 2019)

$$= 2,503.87 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 1,819.81 \text{ tCO}_2\text{e}$$

The sum of baseline emissions ($BE_{2016}+BE_{2017}+BE_{2018}+BE_{2019}$) = 4,044.30 tCO₂e

9705-P1-0007-CP1: 1.5MW Moragaha Oya Small Hydropower Project

(Year 2017) for the two monitoring period

$$= 1,339.96 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 973.88 \text{ tCO}_2\text{e}$$

(Year 2018)

$$= 5,675.97 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 4,125.30 \text{ tCO}_2\text{e}$$

(Year 2019)

$$= 3,504.79 \text{ MWh/y} \times 0.7268 \text{ tCO}_2\text{e/MWh}$$

$$= 2,547.28 \text{ tCO}_2\text{e}$$

The sum of baseline emissions ($BE_{2016}+BE_{2017}+BE_{2018}+BE_{2019}$) = 7,646.46 tCO₂e

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

>>

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.

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

Thus $ER_y = BE_y$

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

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
9705-005	19,509	0	0	0	19,509	19,509
9705-006	4,044	0	0	0	4,044	4,044
9705-007	7,646	0	0	0	7,646	7,646
Total	31,199	0	0	0	31,199	31,199

* All numbers are rounded-down

F.4. Calculation of emission reductions or net anthropogenic removals**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)
9705-005	19,509	36,525
9705-006	4,044	5,397
9705-007	7,646	7,362
Total	31,199	49,284

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

>>

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:

9705-P1-0005: 3.25MW Dambulu Oya Small Hydropower Project:

$$EG_{BL,y} = (\text{Capacity} * 365\text{days} * 24\text{hours} * 56.7\%) * (1-4.0\%)*(1-2.0\%)$$

$$= (3.585\text{MW} * 365 * 24 * 56.7\%)*(1-4.0\%)*(1-2.0\%)$$

$$= 16,752 \text{ MWh/yr}$$

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

$$= 16,752 * 0.7268$$

$$= 12,175 \text{ tCO}_2/\text{yr}$$

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 (LEy):

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.

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

$$LE_y = 0$$

Leakage Emissions (LE_y):

$$ER_y = BE_y - PE_y - LE_y$$

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 2017	12,175	0	0	12,175
Year 2018	12,175	0	0	12,175
Year 2019	12,175	0	0	12,175
Total	36,525	0	0	36,525

9705-P1-0006: 1.4MW Gomale Oya Small Hydropower Project

$$EG_{BL,y} = (\text{Capacity} * 365\text{days} * 24\text{hours}) * (\text{Plant factor} - \text{Auxiliary Consumption})$$

$$= (1.387 \text{ MW} * 365 * 24) * (0.2822 - 0)$$

$$= 3,428 \text{ MWh/yr}$$

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

$$= 3,428 * 0.7268$$

$$= 2,491 \text{ tCO}_2/\text{yr}$$

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.

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

$$LE_y = 0$$

Leakage Emissions (LE_y):

$$ER_y = BE_y - PE_y - LE_y$$

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 2017 (for the two monitoring periods)	415	0	0	415
Year 2018	2,491	0	0	2,491
Year 2019	2,491	0	0	2,491
Total	5,397	0	0	5,397

9705-P1-0007-CP1: 1.5MW Moragaha Oya Small Hydropower Project

$$EG_{BL,y} = (\text{Capacity} * 365\text{days} * 24\text{hours}) * (\text{Plant factor} - \text{Auxiliary Consumption})$$

$$= (1.576 \text{ MW} * 365 * 24) * (0.35 - 0.0113)$$

$$= 4,676 \text{ MWh/yr}$$

$$BE_{y,} = EG_{BL,y} * EF_{\text{grid CM},y}$$

$$= 4,676 * 0.7268$$

$$= 3,398 \text{ tCO}_2/\text{yr}$$

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 project activity. Since this does not apply for the project activity, there is no leakage associated with the project activity and therefore, leakage is zero.

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

$$LE_y = 0$$

Leakage Emissions (LE_y):

$$ER_y = BE_y - PE_y - LE_y$$

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 2017 (for the two monitoring periods)	566	0	0	566
Year 2018	3,398	0	0	3,398
Year 2019	3,398	0	0	3,398
Total	7,362	0	0	7,362

F.6. Remarks on increase in achieved emission reductions

>>

9705-P1-0005: 3.25MW Dambulu Oya Small Hydropower Project

Not Applicable

9705-P1-0006: 1.4MW Gomale Oya Small Hydropower Project

Not Applicable

9705-P1-0007-CP1: 1.5MW Moragaha Oya Small Hydropower Project

The emission reduction is higher than the estimated in CPA-DD. According to CPA-DD, the estimation of emission reduction during this monitoring period was 7,362 tCO₂e. However, the actual emission reduction was 7,646 tCO₂e, which was about 3.9% higher than the estimated amount. The deviation between the actual and the estimated annual net power supplied to the grid could be resulted from weather fluctuations. Heavy rainfall in year 2018 led the increase of hydro power generation, so this led the increase in achieved emission reductions.¹²

Therefore, the deviation between CPA-DD estimates and actual values reached during the monitoring period can be reasonably explained by the abnormal weather condition in Sri Lanka.

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

>>

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.

¹ <https://reliefweb.int/disaster/fl-2018-000425-lka>

² <https://www.hindustantimes.com/world-news/16-killed-over-1-lakh-affected-due-to-rains-winds-in-sri-lanka/story-MnfvccYLkFNSrarE87jdEI.html>

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.
01.0	1 April 2015	Initial publication.
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