

# Validation Report

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## Maduru Oya Left Bank Main Canal at 24+140 Drop 9 Mini- hydro Power Project

Report No: SLCCS/VDR/2023/01

Version : 02

Sri Lanka Climate Fund (Pvt) Ltd.

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<b>Client</b>	Eagle Power (Pvt) Ltd
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<b>Summary of the validation report</b>	
<p>Validation Division of Sri Lanka Climate Fund has conducted the validation of Maduru oya Left Bank Main Canal at 24+140 Drop 9 Mini Hydro Power Project which is located in Dimbulagala Divisional Secretariat Division in Polonnaruwa district, on the basis of Sri Lanka Carbon Crediting Scheme (SLCCS) eligibility criteria and CDM methodologies, as well as criteria given to provide for consistent project operations, monitoring and reporting.</p> <p>The project activity aims at reducing GHG emissions by installing a hydro power plant at the 24+240 m location of the left bank main canal of Maduru Oya Reservoir. The annual average emission reduction to be achieved through the implementation of this project is about 4512 tCO<sub>2</sub>e.</p> <p>Validation Division of Sri Lanka Climate Fund confirms that the project correctly applies the baseline and monitoring methodology AMS I.D Version 18 and meets all relevant SLCCS requirements. Validation Division of Sri Lanka Climate Fund thus requests the registration of the project as a SLCCS project activity.</p>	
<b>Project Title</b>	Maduru Oya Left Bank Main Canal at 24+140 Drop 9 Mini Hydro Power Project
<b>Report No</b>	SLCCS/VDR/2023/01
<b>Work carried out by</b>	Validation Division - Sri Lanka Climate Fund
<b>Work Approved by (Name &amp; Designation)</b>	Ms. Harshani Abeyrathna Chief Executive Officer Sri Lanka Climate Fund (Pvt) Ltd
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## 1 INTRODUCTION

### 1.1 Objective

The purpose of a validation is to have an independent review of the Carbon Management Assessment. In particular the project's baseline, the monitoring plan (MP), and the project's compliance with SLCCS standard are validated in order to confirm that the Carbon Management Assessment is sound and reasonable and meets the stated requirements and identified criteria. Validation is seen as necessary to provide assurance to stakeholders on the quality of the project and its intended generation of Sri Lankan certified emission reductions (SCERs).

The information included in the CMA and the supporting documents were reviewed against the requirements as set out by the SLCCS. The validation team has, based on the requirements in the Validation and Verification Standard, carried out a full assessment of all evidences to assess the compliance of the project with the SLCCS. The validation is not meant to provide any consulting to the project participants. However, stated requests for clarifications and/or corrective actions may provide input for improvement of the Carbon Management Assessment.

### 1.2 Scope and Criteria

The validation scope is given as a thorough independent and objective assessment of the project design including especially the correct application of the methodology, the project's baseline study, local stakeholder commenting process, environmental impacts and monitoring plan, which are included in the CMA and other relevant supporting documents, to ensure that the proposed SLCCS project activity meets all relevant and applicable SLCCS criteria.

### 1.3 Involved Parties and Project Participant

<b>Title of the Project Activity</b>	<i>Maduru Oya Left Bank Main Canal at 24+140 Drop 9 Mini Hydro Power Project</i>
<b>Project Participant(s)</b>	<i>Eagle Power (Pvt) Ltd</i>
<b>Host Party(ies)</b>	<i>Sri Lanka</i>
<b>Consultant of the Project</b>	-

### 1.4 Summary description of the project

The main purpose of the project activity is to generate electricity using the left bank irrigation canal of a Maduru Oya reservoir owned and operated by Mahaweli Development Authority, Sri Lanka. The project is located in the Left Bank Main Canal Regulator 09, at 24 + 140 taking into consideration of the available drop. The energy generated from the power plant is exported to the national grid operated by Ceylon Electricity Board (CEB), thereby reduces the emission of off-site fossil fuel burning required for the generation of electricity. The estimated annual power generation output of Maduru Oya LB Main Canal Drop at 24+140 Hydropower project is 6009.36 MWh/year. The crediting period set for the project activity runs for seven (07) starting from 1<sup>st</sup> of March 2021 to 29<sup>th</sup> of February 2028. The project is intended to be registered as a single renewable energy project complying the methodological requirements of *Sectoral scope 1, Type I, AMS-I.D, Grid connected*

renewable electricity generation, Version 18.0. The expected annual GHG emission reduction resulting in the operation of project is 4512 tCO<sub>2</sub>e/year and the expected total GHG emission reductions in first crediting period 31,584 is tCO<sub>2</sub>e

## 2 GHG PROJECT DISCRIPTION

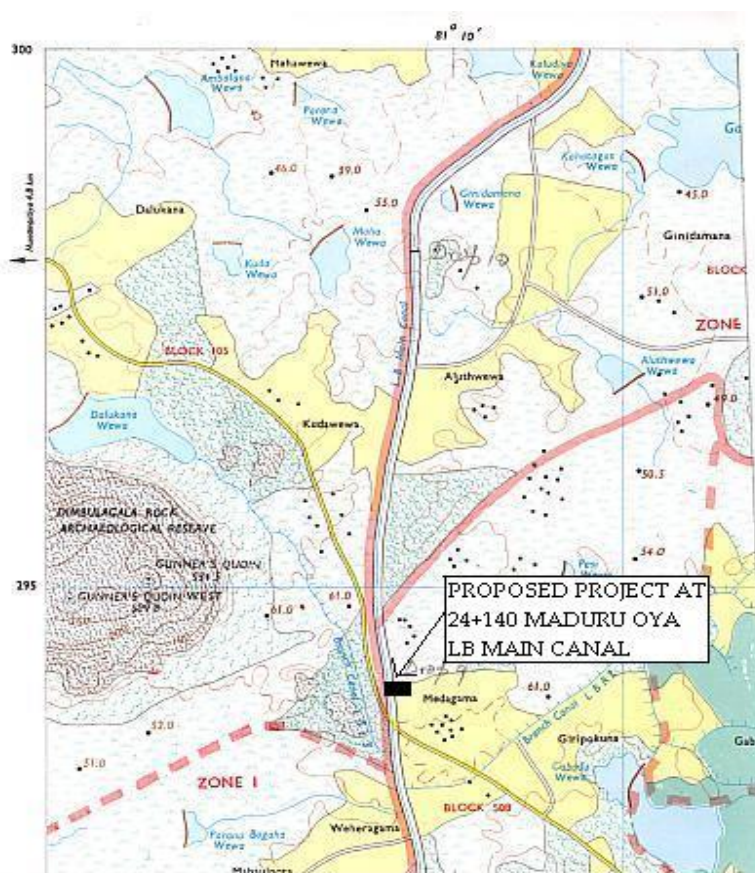
### 2.1 Project Characteristics

Essential data of the project is presented in the following table.

Item	Data		
Project Title	Maduru Oya Left Bank Main Canal at 24+140 Drop 9 Mini Hydro Power Project		
Project size	<input type="checkbox"/> Large Scale <input checked="" type="checkbox"/> Small Scale		
Project Scope <i>(according to UNFCCC sectoral scope numbers for CDM)</i>	1	Energy industries (Renewable/ Non-renewable)	<input checked="" type="checkbox"/>
	2	Energy distribution	<input type="checkbox"/>
	3	Energy demand	<input type="checkbox"/>
	4	Manufacturing industries	<input type="checkbox"/>
	5	Chemical industries	<input type="checkbox"/>
	6	Chemical industry	<input type="checkbox"/>
	7	Construction	<input type="checkbox"/>
	8	Transport	<input type="checkbox"/>
	9	Mining / Mineral production	<input type="checkbox"/>
	10	Fugitive emissions from fuels (solid, oil and gas)	<input type="checkbox"/>
	11	Fugitive emissions from production and consumption of halocarbons and hexafluoride	<input type="checkbox"/>
	12	Solvents use	<input type="checkbox"/>
	13	Waste handling and disposal	<input type="checkbox"/>
	14	Afforestation and Reforestation	<input type="checkbox"/>
	15	Agriculture	<input type="checkbox"/>
Applied Methodology	AMS-I.D ver. 18.0		
Technical Area(s)	Renewable Energy (Hydropower)		
Crediting period	Renewal crediting Period (7 years)		
Start Date of crediting period	2 years prior to the actual project registration date		

## 2.2 Project Location

<b>Location of Project Activity</b>	Maduru Oya Left Bank Main Canal Sluice
<b>Province</b>	North Central Province
<b>District</b>	Polonnaruwa
<b>DS Division</b>	Maduru Oya
<b>City/Town</b>	Aralaganwilla
<b>Community</b>	Medagama
<b>Coordinates</b>	Latitudes 7 <sup>0</sup> 86' 11 52" N Longitudes 81 <sup>0</sup> 16' 37" E



**Figure 1 : Location Map**  
Source: Survey Department

## 2.3 Technical Project description

As per the feasibility report and post project implementation records, the technical details of Maduru Oya Left Bank Main Canal at 24+140 Drop 9 Mini Hydro Power Project is as follows

### Parameters related to the Power Project

#### Hydrology

Maximum discharge observed	19.3	cumecs
Minimum discharge observed	1.01	cumecs
Average mean discharge	11.55	cumecs
Rainfall	1000 – 4000	mm

#### Canal regulator cum drop head

Maximum	11.5	m
Designed head	11.0	m
Outlet canal water level	78.0	m

#### Proposed power plant

Installed Capacity	2 MW (as proposed in LOI)
Expected Energy Output	8.32 GWh annually
Type of the turbine	Dual operation Kaplan – Vertical Bulb turbine or K-tec
Efficiency of the flow variation	60%
Generation	Synchronous/semi umbrella type
Generating Voltage	6.6 kV
Frequency	50 Hz
Line of connectivity and Voltage	500 m/ 33 kV

#### Cost and financial status

Total Project Cost	130 m SLRs
Equity of the Project Proponent	40 %
Lending Banks	60 %
Internal Rate of Return	> 18.46%
Royalty to MASL	27 % from generated power

#### Operational Conditions

Water operations - as per MASL seasonal operating plans/RPM sys 'B' directives

### Parameter of Project and E & M equipment

#### Hydrology

Reservoir full supply level	96.0 m msl
Minimum operating level	84.5 m msl
Maximum observed discharge	36.11 m <sup>3</sup> /sec
Designed discharge	22.0 m <sup>3</sup> /sec
Head variation	18 ~ 6 m



### **Turbine Inlet valve**

Type	Butterfly
Diameter	2.6 m

### **Turbine**

Type	vertical shaft – Kaplan
Maximum net head	18.0 m
Minimum net head	06.0 m
Rated net head	16.0 m
Rated speed	350 rpm
Runaway speed	750 rpm
Power at rated head	2500 kW
Power at the maximum loading	3000 kW
Sense of rotation	anti clockwise

### **Generator**

Phase	Three
Frequency	50 Hz
Rated Voltage	6600 V
Maximum output	3000 kVA
Power factor	0.9 lead or lag
Synchronous speed	350 rpm
Runaway speed	750 rpm

### **Main transformer**

Frequency	50 Hz
Phase	three
Rated voltage	6.6 kV/33kV
Rated output	3000 kVA
Power factor	0.9 lead or lag
Off load tap changer	- 10% to + 10% in steps of 5%

## **3. VALIDATION METHODOLOGY**

### **3.1 Method and Criteria**

The validation of the project consisted of the following steps:

- Appointment of team members and technical reviewers
- Publication of the Carbon Management Assessment (CMA)
- Desk review of the CMA and supporting documents
- Validation planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the project developer and its contractors
- Draft validation reporting
- Resolution of corrective actions (if any)
- Final validation reporting



- Technical review
- Final approval of the validation

### 3.1.1 Appointment of team members and technical reviewers

On the basis of a competence analysis and individual availabilities, a validation team, consisting of team leader, team member as well as the one technical review personnel was appointed.

The list of involved personnel and their qualification status are summarized in the section 07.

Name	Company	Function	Task Performed
Mr. Gayan Madusanka	Sri Lanka Climate Fund	TL	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input checked="" type="checkbox"/> RI <input type="checkbox"/> TR
Mr. Wageesha Alankara	Sri Lanka Climate Fund	TM	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input type="checkbox"/> RI <input type="checkbox"/> TR
Mr. Chamara Ariyathilaka	Sri Lanka Climate Fund	ITR	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RI <input checked="" type="checkbox"/> TR

TL -Team Leader TE- Technical Expert TM- Team Member ITR- Internal Technical Reviewer  
DR- Document Review SV- Site Visit RI- Report Issuance TR- Technical Review

### 3.1.2 Publication of the Carbon Management Assessment for Public Review

According to the SLCCS requirement the draft CMA, as received from the project participants, has been made publicly available on the dedicated SLCCS website prior to the validation activity commenced. Stakeholders have been invited to comment on the CMA within the 30 days public commenting period.

No comments were received for this project

### 3.1.3 Desk Review of CMA and supporting documents

Desk review was conducted on 26- 27 April 2023 at the office of Sri Lanka Climate Fund. The objective of desk review is to confirm the accuracy and validity of information provided in the CMA against the respective supporting documents. As part of desk review, following documents were reviewed by the validation team.

- Carbon Management assessment report
- Feasibility studies and preliminary assessments undertaken for the individual project activities.
- Contract agreements entered into with suppliers
- Completion / taking over certificate
- Inspection and certification report by Eagle Power (Pvt.) Ltd.
- Compliance certificates issued to the equipment manufactures
- Power purchasing agreements, Testing and Commissioning certificates,
- Data management systems adopted by individual facilities
- Competency of personnel engaged in the defined monitoring process

### 3.1.4 On- Site Inspection

As part of the validation process, a site visit was conducted by the validation team on 28th April 2023. The purpose of this visit was to assess whether the design of the project aligns with the description provided in the CMA. Moreover, the site inspection aimed to verify that the project description, as stated in the CMA, accurately reflects the actual implementation on the ground.

During the site visit, the validation team thoroughly examined the proposed monitoring plan, monitoring parameters, and the responsibilities assigned to the project monitoring team. This assessment allowed for the validation team to review and confirm the validity and appropriateness of these aspects in line with the project's monitoring requirements and objectives. The insights gained from this on-site inspection contributed significantly to the overall evaluation and validation process.

### 3.1.5. Background investigation and follow-up interviews

Personnel and stakeholders relating to the project activity were interviewed to confirm the background information of issues raised by the validation team. A summary of information resulted in the interviews are given in the following tabulated format

Name	Designation	Organization/Entity	Method (Face to face/ Telephone)	Matters discussed
Kapila Wijesekara	Director /General Manager	Eagle Power (Pvt) Ltd	Face to Face	Project start date, commissioning date, crediting period, Procurement procedures, Issues and challenges associated with the operation of power plant, funding options and regular maintenance and operation
H.M.C.A. Herath	Project manager/ Mechanical engineer	Eagle Power (Pvt.) Ltd	Face to Face	Mechanical properties of power plant (Turbine, Generator, Governor, bearing cooling system) Emergency shutdown, Overall data management system, QA/QC procedures applicable to data reporting and communication.
Lasith Wanigathunga	Maintenance Manager- Civil engineer	Eagle Power (Pvt) Ltd	Face to Face	Monitoring parameters, Monitoring plan, personnel engaged in monitoring activities. Data gathering, reporting and archiving

### 3.2 Definition of Clarification Request, Forward and Corrective Action Request

A **Clarification Request (CL)** will be issued where information is insufficient, unclear or not transparent enough to establish whether a requirement is met.

A **Corrective Action Request (CAR)** will be issued where:

- mistakes have been made in assumptions, application of the methodology or the project documentation which will have a direct influence on the project results,
- the requirements deemed relevant for validation of the project with certain characteristics have not been met or

A **Forward Action Request (FAR)** will be issued when certain issues related to project implementation should be reviewed during the first verification.

### 3.3 Draft Validation

After reviewing all relevant documents and taken all other relevant information into account, the validation team issues all findings in the course of a draft validation report and hands this report over to the project proponent in order to respond on the issues raised and to revise the project documentation accordingly.

### 3.4 Resolutions of findings

The findings of validation process are summarized in the tables below

Type of the Finding	<input type="checkbox"/> CL	<input checked="" type="checkbox"/> CAR	<input type="checkbox"/> FAR
Finding No	CAR-1		
Ref. To CMA	Section 1.11		
Action requests by validation team	In section 1.11 of the CMA, version 01, the first crediting period is set for seven (07) years starting from 01 <sup>st</sup> March 2021. However the ending date is not compliant with the given reporting format.		
Summary of Project owner response	Due to an inadvertent oversight, the crediting period has been inaccurately stated in the CMA version 01. As a measure to rectify this situation, a comprehensive examination of the stipulations provided by the SLCCS pertaining to the establishment of the crediting period was undertaken. Consequently, the ending date of the crediting period has been duly corrected and can be verified in the CMA version 02, dated 15.05.2023.		
Validation team Assessment	Verification team reviewed the latest version of the CMA to confirm the correctness and the applicability of the revised crediting period. As indicated by the PP, the revised crediting period starts from 01 <sup>st</sup> March 2021 and ends by 29 <sup>th</sup> February 2028. This is fully compliant with the procedures and modalities of SLCCS.		
Conclusion	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> Project documentation was corrected correspondingly		

	<input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CAR-1 is closed</b>
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<b>Type of the Finding</b>	<input type="checkbox"/> CL <input checked="" type="checkbox"/> CAR <input type="checkbox"/> FAR
<b>Finding No</b>	CAR-2
<b>Ref. To CMA</b>	Section 6.2 & 7.2
<b>Action requests by validation team</b>	<p>PP has identified fuel consumed by the on-site back-up generator as a project emission in section 6.2. However,</p> <ol style="list-style-type: none"> <li>PP has not documented the methodology applied in the project emission calculation.</li> <li>Further the monitoring parameters applicable to the accounting of emissions from onsite diesel generator is not provided in section 7.2</li> </ol>
<b>Summary of Project owner response</b>	<p>The PP is not sufficiently familiarized with the GHG programme related standard, procedures and modalities. Hence, the methodology and parameters applicable to the emission calculation of on-site diesel generator is not included in the relevant sections.</p>
<b>Validation team Assessment</b>	<p>The methodology applicable to the calculation of project emission is obtained from <i>Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.0</i> published by Clean Development mechanism. As per the methodological description provided in <i>revised CMA, version 02</i>, PP requires to monitor following parameters.</p> <p><math>FC_{i,j,y}</math> (Yearly fuel consumption in cubic meters)  <math>\rho_{i,y}</math> (Mass /cubic meters)  <math>NCV_{i,y}</math> (GJ/mass unit)  <math>EF_{CO_2,i,y}</math> (tCO<sub>2</sub>/GJ)</p> <p>As per the PP's description, the quantities of top-up fuel are obtained from the fuel issuance book, which is orderly maintained at the power plant. Furthermore, it was observed that the responsibility of conducting periodic reviews of the fuel top-up and generator maintenance records lies with the project manager.</p> <p>The density attributable to the fuel type <i>diesel</i> is derived from the official website of CEYPETCO available at <a href="https://ceypetco.gov.lk/">https://ceypetco.gov.lk/</a>. NCV and the fuel specific emission factor that require to calculate the energy content of the fuel is obtained from the IPCC guideline, 2006. The utilization of these factors in the calculation is justified as per the provisions given in <i>Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.0</i></p> <p>Subject to the above corrective actions and measures taken by the PP, the CAR was closed by the validation team.</p>
<b>Conclusion</b>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> Project documentation was corrected correspondingly

	<input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CAR-2 is closed</b>
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<b>Type of the Finding</b>	<input type="checkbox"/> CL <input checked="" type="checkbox"/> CAR <input type="checkbox"/> FAR
<b>Finding No</b>	CAR-3
<b>Ref. To CMA</b>	Section 6.1
<b>Action requests by validation team</b>	In the estimation of emission reduction, latest available emission factor (EF) published by Sri Lanka Sustainable Authority is not used. (Combined Margin 2019: 0.7724, 2020: 0.7512 t-CO <sub>2</sub> /MWh)
<b>Summary of Project owner response</b>	PP noted that Energy Balance report of 2020 was published by SLSA recently, hence the latest available emission factor (Combine Margin) was not applied in the baseline emission reduction calculation. Upon the issuance of the CAR, the calculation was updated using the latest available factor 0.7512 t-CO <sub>2</sub> /MWh
<b>Validation team Assessment</b>	Emission factor used for the baseline emission calculation was checked and confirmed to be correct. Further the ex-ante calculations performed for the first crediting period was reviewed and found to be both accurate and compliant with the required methodologies.
<b>Conclusion</b>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> Project documentation was corrected correspondingly <input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CAR-3 is closed</b>

<b>Type of the Finding</b>	<input type="checkbox"/> CL <input checked="" type="checkbox"/> CAR <input type="checkbox"/> FAR
<b>Finding No</b>	CAR-4
<b>Ref. To CMA</b>	Section 1.5 & 5.3
<b>Action requests by validation team</b>	<p>a. The location map provided in section 1.5 is not relevant to the project activity described in the document</p> <p>b. Emission sources included and excluded from the project activity are not clearly documented and justified in the section 5.3 of CMA version 01</p>
<b>Summary of Project owner response</b>	<p>a) The location map displayed in section 1.5 was mistakenly included in the document. This error has been rectified, and the correct site map has been provided instead.</p> <p>b) The table indicating the reporting boundary of the project activity was expanded with justification for inclusion and exclusions of emission sources.</p>

<b>Validation team Assessment</b>	<p>The location map provided in revised CMA was verified to be correct and appropriate during the validation assessment. The map is developed based on the 1:50000 map published by the Survey Department</p> <p>Complying with <i>AMS-1.D "Grid connected renewable electricity generation" Version 18.0</i>, a table has been included to justify the inclusions and exclusions of baseline and project level emissions. The emission resulting from the operation of on-site back-up generator was identified as a project emission and included in the section of project emissions. The major emission source attributable to this process is CO<sub>2</sub> which was added in the table with a justification.</p>
<b>Conclusion</b>	<p><input type="checkbox"/> To be checked during the first periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input type="checkbox"/> Project documentation was corrected correspondingly</p> <p><input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CAR-4 is closed</b></p>

<b>Type of the Finding</b>	<input type="checkbox"/> CL <input checked="" type="checkbox"/> CAR <input type="checkbox"/> FAR
<b>Finding No</b>	CAR-5
<b>Ref. To CMA</b>	Section 7.3
<b>Action requests by validation team</b>	<p>a. A clear diagram is not available to show the project boundary of the project activity.</p> <p>b. Organization Structure (OS) given in section 7.3 is not compliant with the evidence documents gathered during the validation assessment. The diagram should be redrawn to address the latest changes in the organization structure</p>
<b>Summary of Project owner response</b>	<p>a. A diagram illustrating the key components of power plant; main canal, forebay canal, power house, transformer, control room, main CEB energy meters, Auxiliary energy meter was included in the revised CMA to show the boundary of the project activity.</p> <p>b. Organization structure was revised including the key positions responsible for the safe operation of power plant, Civil Engineer- maintenance, Electrical engineer and assistant operators.</p>

<b>Validation team Assessment</b>	<p>a. The diagram illustrating the project boundary of the project activity was verified to be in order during the post validation assessment. Further it was confirmed that diagram is clear enough to address the requirements of paragraph 18 given in <i>AMS-1.D "Grid connected renewable electricity generation" Version 18.0</i></p> <p>b. Validation team reviewed revised organization structure in revised CMA and confirmed the full compliance with the latest changes of the administration system. Additionally, the roles and responsibilities of positions effectively contributing to the operation of power plant were verified during the validation assessment</p>
<b>Conclusion</b>	<p><input type="checkbox"/> To be checked during the first periodic verification</p> <p><input type="checkbox"/> Additional action should be taken (finding remains open)</p> <p><input type="checkbox"/> Project documentation was corrected correspondingly</p> <p><input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CAR-5 is closed</b></p>

<b>Type of the Finding</b>	<input type="checkbox"/> CL <input checked="" type="checkbox"/> CAR <input type="checkbox"/> FAR
<b>Finding No</b>	CAR-6
<b>Ref. To CMA</b>	Section 6.4
<b>Action requests by validation team</b>	<p>Plant Load Factor (PLF) applied in the ex-ante emission reduction calculation is obtained from the feasibility study conducted for the project activity in 2007. It was found that the factor has overestimated the operational efficiency of the hydropower plant unrealistically. Hence, Project proponent needs to calculate and apply an appropriate and reliable plant factor in the ex-ante emission reduction calculation.</p>
<b>Summary of Project owner response</b>	<p>In the initial feasibility study, plant factor has been overestimated due the consideration of high average water flow at 24+140, Maduru Oya LB Canal. When it comes to the implementation level of project activity, it was understood that the expected average discharge rate is not always available at the 24+140, Maduru Oya LB Canal. This has led to the application of an inappropriate plant load factor in the emission</p> <p>Upon the issuance of CAR by the assessment team, a more reliable and accurate PLF was calculated by the responsible party. In this calculation, actual energy generation data from 2018 to 2022 was considered. Using the annual energy generation data, PLF was separately calculated for each year. Subsequently, the average of five year PLFs was calculated which was finally applied in the ex-ante emission reduction calculation. The methodology followed in the calculation of the PLF provided in the appendix 01/CMA version 03, dated 15 August 2023.</p>



<b>Validation team Assessment</b>	During final validation assessment, the assessment team reviewed and confirmed the accuracy and suitability of the newly calculated PLF. It was found that the project proponent has considered actual energy generation of five years in the calculation of current PLF. As per the appendix 01, provided in CMA version 03, dated 15 August 2023, the average PLF is calculated to be 34.3%.
<b>Conclusion</b>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> Project documentation was corrected correspondingly <input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CAR-5 is closed</b>

<b>Type of the Finding</b>	<input checked="" type="checkbox"/> CL <input type="checkbox"/> CAR <input type="checkbox"/> FAR
<b>Finding No</b>	CL-01
<b>Ref. To CMA</b>	Section 6.2
<b>Action requests by validation team</b>	The power plant developed by the PP operates with canal water supplied by a reservoir. It is important to clarify that the reservoir does not contribute to any project emissions during the project period.
<b>Summary of Project owner response</b>	<p>The reservoir supplying water to the power plant is not purposefully built for its operation. In the initial Mahaweli Plan, the reservoir was planned to be built to address multiple benefits, including the irrigation of farmlands, resettlement of people in the dry zone, controlling floods in the lowlands. Thus the development of power plant has not been a cause to build the reservoir named Maduru Oya Reservoir.</p> <p>Regarding the clarification request, as per the methodology AMS-1.D "Grid connected renewable electricity generation" Version 18.0, section 5.(a), the reservoir utilized for the Maduru Oya Left Bank Main Canal Drop At 24+140 hydropower plant falls under the category of an existing reservoir. According to the defined criteria in the mentioned methodology, reservoirs that have been in operation for a minimum of three years before the implementation of the project activity are considered as existing reservoirs.</p> <p>The Maduru Oya Reservoir was constructed and commissioned in 1982 as part of the Accelerated Mahaweli Development Project. Consequently, there is a substantial gap of more than 25 years between the commissioning of the Maduru Oya reservoir and the current hydro project activity. Thus, it can be duly claimed that the project activity is based on an existing reservoir, which does not contribute to any project emissions.</p>

<b>Validation team Assessment</b>	Validation team assessed the clarification provided by the PP during post-validation assessment. It has been mentioned that project activity is built to effectively utilize the water flow of Maduru Oya Left Bank Canal for power generation. As defined by the applied methodology, the reservoir falls under the definition of Existing Reservoir and has not resulted in the increase of volume of the reservoir. Under these circumstances, PP does not require to calculate reservoir related CH <sub>4</sub> emission as a project emission.
<b>Conclusion</b>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> Project documentation was corrected correspondingly <input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CL-01 is closed</b>

<b>Type of the Finding</b>	<input checked="" type="checkbox"/> CL <input checked="" type="checkbox"/> CAR <input type="checkbox"/> FAR
<b>Finding No</b>	CL 02
<b>Ref. To CMA</b>	Section 6.4
<b>Action requests by validation team</b>	In April 2022, power plant has exported only 342 kWh. PP needs to provide a clarification for this abnormal reduction.
<b>Summary of Project owner response</b>	During April 2022, CEB (Ceylon Electricity Board) faced a severe fuel crisis, resulting in the failure to maintain the national grid energized 24/7. In the initial two weeks of April, the situation reached a critical point, leading the power plant management to advise shutting down the power plant until further notice. Technically, without power in the grid, the power plant cannot operate and supply energy to the grid. The crisis persisted until the end of April, causing the power plant to remain inactive throughout the entire month. Consequently, the total energy export from the power plant drastically decreased in April.
<b>Validation team Assessment</b>	Validation team reviewed the PP's response against the third party confirmation received from CEB. During, April 2022, CEB has undergone a severe fuel crisis resulting in failure to maintain a continuous power supply to the national grid. In this backdrop, CEB has taken a decision to disconnect power plants from the national grid until further notice. The issue has persisted through the end of April and it has adversely impacted on the continuous operation of the power plant.
<b>Conclusion</b>	<input type="checkbox"/> To be checked during the first periodic verification <input type="checkbox"/> Additional action should be taken (finding remains open) <input type="checkbox"/> Project documentation was corrected correspondingly <input checked="" type="checkbox"/> <b>Appropriate action was taken. The finding CL-02 is closed</b>

In the following table the findings from the desk review of the published CMA, Site visits, interviews and supporting documents are summarised:

Table: Summary of CARs, CLs and FARs issued

Validation Category	Specific section	No. of CAR	No. of CL	No. of FAR
General description of project activity	General description Project Location Project boundary	01		
	Involved Parties and Project Participants			
	Project specification			
	Start date /Commissioning date/ project crediting period	01		
	Technical project description			
	Contribution to sustainable development			
	Technology employed			
Project Baseline, Additionality and Monitoring Plan	Application of the Methodology			
	Baseline identification			
	Calculation of GHG emission reductions Project emissions Baseline emissions Leakage	02	02	
	Additionality determination			
	Monitoring Methodology			
	Monitoring Plan	01		
	Project management planning			
Duration of the Project / Crediting Period				
Environmental impacts				
Stakeholder Comments				
<b>SUM</b>		<b>05</b>	<b>02</b>	

### 3.5 Final Validation

The final validation starts after issuance of the proposed corrective action (CA) of the CARs CLs and FARs by the project proponent. The project proponent was replied on those and the requests are “closed out” by the validation team in case the responses were assessed as sufficient. In case of raised FARs the project proponent has to respond on this, identifying the necessary actions to ensure that the topics raised in this finding are likely to be resolved at the latest during the first verification. The validation team was assessed whether the proposed action is adequate or not.

In case the findings from CARs and CLs cannot be resolved by the project proponent or the proposed action related to the FARs raised cannot be assessed as adequate, no positive validation opinion

can be issued by the validation team. In this project activity positive validation opinion is granted by Executive board (EB).

### **3.6 Internal Technical Review**

Carbon Management Assessment (CMA) and additional background documents related to the project design submitted by Eagle Power (Pvt) Ltd and baseline was reviewed. Furthermore, the validation team has used additional documentation by third party legislation, technical reports referring to the project design or to the basic conditions and technical data.

Technical data was reviewed by technical team based on information given in the CMA, supporting documents and observations on validation site visit. Before submission of the final validation report a technical review of the whole validation procedure was carried out. The technical reviewer is a competent GHG auditor being appointed for the scope this project falls under. As a result of the technical review process the validation opinion and the topic specific assessments as prepared by the validation team leader may be confirmed or revised. Furthermore reporting improvements might be achieved.

### **3.7 Final approval**

After successful technical review of the final report an overall assessment of the complete validation was carried out validation team of SLCCS and final approval is granted by EB.

## **4. DATA FOR VALIDATION PROCESS**

### **4.1 Project Details**

#### **4.1.1 General Description**

The primary objective of the project activity is to generate electricity using the left bank irrigation canal of the Maduru Oya reservoir, which is owned and operated by Mahaweli Development Authority in Sri Lanka. The specific location of the project is at the Left Bank Main Canal Regulator 09, situated at 24 + 140, taking advantage of the available drop for power generation.

The electricity generated from the power plant is exported to the national grid operated by Ceylon Electricity Board (CEB), leading to a reduction in off-site fossil fuel burning required for electricity generation. The estimated annual power generation output of the Maduru Oya LB Main Canal Drop at 24+140 Hydropower project is 6009.36 MWh/year.

The project's crediting period spans seven years, commencing from 1st March 2021 to 29<sup>th</sup> February 2028. The intention is to register the project as a single renewable energy project, in full compliance with the methodological requirements of Sectoral Scope 1, Type I, AMS-I.D, Grid-connected renewable electricity generation, Version 18.0

Prior to this project activity, there was no hydro power project belonging to project participant in that region. Hence the project can be considered as a Greenfield project activity. Baseline scenario for this project activity will be the electricity from the grid.

#### 4.1.2 Employed Technology

Maduru Oya LB canal is fed by Maduru Oya reservoir having a catchment area of 453 Km<sup>2</sup>. The reservoir has an active storage reservoir volume of 473.5 mcm for irrigation water usage. In addition to the natural catchment, there is also a tunnel, which diverts water from the River Mahaweli Ganga, through Ulhitiya –Rathkinda to Maduru Oya Reservoir. This link tunnel has a maximum capacity of 34m<sup>3</sup>/s. Total inflow to Maduru Oya is approximately 550 mcm for a year.

The Left Bank Canal has been designed to carry maximum of 56 m<sup>3</sup>/s of water to irrigate 27.000 Ha of existing and new land under the command of Maduru Oya LB canal. However, approximately 18000 Ha have been developed so far and water release are limited and not reached the maximum. As the records of the canal flow a maximum of 21.66 m<sup>3</sup>/sec is being discharged for irrigation of the land from the proposed location and present average is 11.55 m<sup>3</sup>/s.

The primary purpose of the reservoir operation and canal flows is for irrigation purposes. Consequently, any alterations to the water flow pattern and flow rates to accommodate electrical power generation are not permitted. Despite this limitation, the project proponent undertakes the optimization of the electrical power plant within the constraints of irrigation flow, ensuring efficient operation under these conditions.

The power plant is installed in underground concrete enclosure allowing to utilize the maximum head difference of 11.5 m. The water diverting from the main canal is fed into a steel penstock with the diameter of 2.6 m. The penstock drives Dual Operation Kaplan – Vertical Bulb turbine of which shafts connected to the Synchronous/ semi umbrella type generator. The installed capacity of generator is 2 MW which runs at its peak efficiency in the maximum water release from the reservoir.

Power generated by the power house is exported to national transmission lines of 33 kV through a step-up transformer rated 3000 kVA supplied by CEB. The control room attached to the power plant is equipped with modern safety systems and equipment. The staff employed in the power plant is well trained to handle and undertake emergency plant shut downs and overhauls as per the best protocols.

Project activity produces electricity from the hydro power. Hence it eliminates the generation of carbon dioxide which was happening earlier due to the fossil fuel burning from thermal power plants sites in the National Grid. Thus, the technology eliminates use of fossil fuel for generation of electricity, uses hydro power and helps in avoidance of CO<sub>2</sub> emissions. The expected annual GHG emission reduction is 4512 tCO<sub>2</sub>e. Therefore, the technology employed can be said to be environmentally safe.

Validation team has confirmed the accuracy of the project description through a combination of steps consisting of review of purchase agreement related to the project activity, commissioning and taking over certificate for the project, physical site visit and interview of the project participant and their representatives. The confirmation that the electricity will be exported to the grid is available through SPPA with Ceylon Electricity Board. The Project will result in annual emission reductions of 4512 tCO<sub>2</sub>e. The processes undertaken by the validation team to validate the accuracy and completeness of the CMA include conducting a physical site inspection, sampling, reviewing available designs and feasibility studies, conducting comparison analysis with equivalent projects. SLCF Validation Division hereby confirms that the project description in the final CMA is accurate and complete in all respects.

## 4.2 Approvals

Project Proponent has obtained all approvals regarding the projects activities from related institutions operating under Government of Sri Lanka and validation team was checked those approvals during site visit.

## 4.3 Application of Methodology

### 4.3.1 Title and reference

Since CDM methodologies are applicable to SLCCS registration, Type I: Renewable Energy Projects and rightly applies the approved methodology AMS-I.D. Grid connected renewable electricity generation, Version 18.0 and associated Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.3

### 4.3.2 Applicability

All criteria for applicability of selected methodology are fulfilled. The project is a grid connected renewable hydro power project which is confirmed from feasibility study and the validation site visit. The project activity is Greenfield projects activity and there will be no significant emission from the fossil fuel burning except for emissions reported for on-site back-up generator

The project activity is renewable energy project and the capacity is less than 15 MW supplying power to the grid and the project activity fulfils the conditions of small scale project. Hence the project activity fulfils all the criteria of the small scale methodology AMS-ID Version 18 "Grid connected renewable energy generation.

Table: Applicability of selected methodology

No	Applicability Criteria	Project Activity	Applicability Criteria Met?
1	This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity comprises renewable energy generation through a hydro power that supplies electricity to CEB grid, which has been dominated by several fossil fuels fired generating units. The developer has no intention to increase the capacity of the project from 2 MW during the chosen crediting period.	Yes
2	Illustration of respective situations under which each of the methodology (i.e. AMS-I.D, AMS-I.F and AMS-I.A)	The project is hydro power project supplying electricity to the national grid, so methodology AMS I.D is only applicable.	Yes



3	This methodology is applicable to project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition; (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a rehabilitation of (an) existing plant(s)/unit(s) or (e) Involve a replacement of (an) existing plant(s).	The project was concerned with the installation of new hydro power plant and there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant)	Yes
4	<p>Hydropower plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <ul style="list-style-type: none"> <li>• The project activity is implemented in an existing reservoir with no change in the volume of reservoir;</li> <li>• The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>;</li> <li>• The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m<sup>2</sup>.</li> </ul>	The project activity is implemented in an existing reservoir with no change in the volume of reservoir;	Yes
5	If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The project comprises of only renewable components. The capacity of 2 MW which is less than limit of 15 MW. The developer has no intention to increase the plant capacity during the crediting period,	Not applicable
6	Combined heat and power (co-generation) systems are not eligible under this category.	This is not a co-generation system and project activity comprises hydro electricity generation only.	Not applicable
7	In the case of project activities that involve the addition of renewable energy generation units at an	Project activity does not involve any addition of renewable energy generation	Not applicable



	existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	units at an existing renewable power generation facility.	
8	In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	As a project activity is a greenfield project. There was no retrofit or replacement of existing power plant. PP has no intention to increase the capacity of power plant beyond 2 MW during the chosen crediting period. Therefore, the project shall not exceed the limit of 15 MW.	Not applicable
9	In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or without electricity" shall be explored.	No recovered methane used for this project activity	Not applicable
10	In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	No biomass used for this project activity	Not applicable

#### 4.3.3 Project Boundary

The project boundary of Maduru Oya Left Bank Main Canal Drop at 24+140 hydropower plant encompasses the physical, geographical site of the power plant and associated physical structure. The project boundary which includes, penstock, turbine and generator, control panel, transformer and national electricity grid of power plant pictorially presented below.

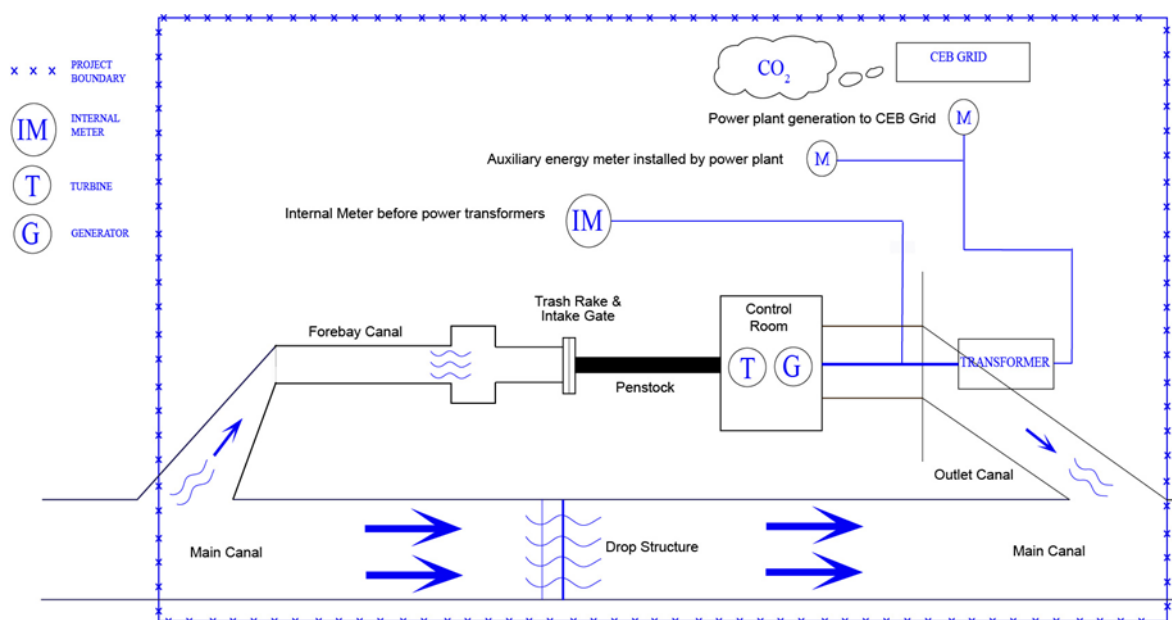


Figure 2: Project boundary of Maduru Oya Left Bank Main Canal Drop at 24+140 hydropower plant

#### 4.3.4 Baseline Identification

This project activity is grid connected hydro power generation and purpose of the project is to generate electricity through renewable resources (hydro) and displace equivalent amount of electricity in the national grid which is predominantly fossil fuel based. In the absence of the project activity, equivalent amount of power would have been drawn from the grid which is the baseline scenario. Calculations are based on data from the published by Sri Lanka Sustainable Energy Authority. The baseline for the project activity is the carbon intensity of the national grid.

The baseline for the project activity is power generated from renewable energy source multiplied by the grid emission factor of the National grid which is published by Sri Lanka Sustainable Energy Authority.

*The grid emission factor for year 2020 calculated and published by SLSEA has used for determining emission reductions.*

#### 4.3.5 Formulas used to determine Emission Reductions

The baseline under the adopted methodology AMS I.D Version 18.0 is the product of energy baseline  $EG_{BL,y}$  expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor ( $tCO_2e/MWh$ )

#### 4.3.6 Quantification of GHG Emission Reductions and Removal

##### Calculation of baseline emission factor

As per AMS I.D and AMS I.F, the grid emission factor was calculated using the latest approved version of "Tool to calculate the emission factor for an electricity system" CDM methodology. The grid emission factor calculated and published by the Sustainable Energy Authority in Sri Lanka is used.

Grid Emission Factor ( $EF_{CM,Grid,y}$ )	0.7512	tCO <sub>2e</sub> /MWh	Published by SLSEA (2020)
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### Plant factor

GHG emission reduction achieving through the project activity is purely determined by the average annual energy output from the system. Project proponent has accounted average energy output in a conservative approach using a valid plant factor which is about 34.3%. Given the plant factor computed in the feasibility study is not reliable enough to represent the actual operational scenario of the power plant, project proponent sought to calculate the plant factor based on the historical energy generation data. In this case, the project proponent considered five year historical data spanning from the year 2018 to 2022. As per the methodological approach, (provided in CMA/Version 03/Appendix 01) the annual plant factor has been separately calculated for each year. Then the average plant factor has been calculated based on the annual actual plant factors. The accuracy and validity of this calculation was reviewed and verified during the validation assessment.

Power plant is equipped with a diesel generator as a back-up power source. The emission due to operation of this back-up generator is estimated using the Methodological tool: Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.0

### Annual Emission Reduction Calculation

Project proponent has set crediting period for seven year (07) starting from 01<sup>st</sup> March 2021. Baseline emission was calculated complying with the requirements provided in AMS-1.D "Grid connected renewable electricity generation" Version 18.0. The summary of emission reduction calculation validated by validation team is as follows

### Baseline Emission

Parameter	Value	Units	Source
Plant Factor	34.3	%	Feasibility Study
Plant Capacity	2	MW	Proposed capacity
Average Energy Output	6009.36	MWh/year	Calculated
Emission Factor	0.7512	tCO <sub>2e</sub> /MWh	Energy Balance-2020, SLSEA
Emission Reduction	4514	tCO <sub>2e</sub> /year	Calculated

### Project Emission

Project emission is calculated as per the CDM tool, Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.3

Parameter	Value	Units	Source
Quantity of fuel combustion	600	L	Calculated
	0.6	m <sup>3</sup>	
Mass unit/volume unit (Fuel Density)	840	Kg/ m <sup>3</sup>	Ceylon Petroleum Corporation (CEYPETCO)

Net Calorific Value (NCV)	0.043	GJ/kg	IPCC Guideline, 2006
CO <sub>2</sub> emission factor	0.0741	tCO <sub>2</sub> e/GJ	IPCC Guideline, 2006
Project emission from combustion of diesel	1.6	tCO <sub>2</sub> e/year	Calculated
Rounded emission for conservativeness	2	tCO <sub>2</sub> e/year	Calculated

### Leakage Emission

The current project activity does not involve biomass plantation, processing and any treatment after harvesting, hence, no leakage emissions applicable to this project activity.

$$LE_y = 0$$

### Estimated net emission reduction

Year	Estimated baseline emissions or removals (tCO <sub>2</sub> e)	Estimated project emissions or removals (tCO <sub>2</sub> e)	Estimated leakage emissions (tCO <sub>2</sub> e)	Estimated net GHG emission reductions or removals (tCO <sub>2</sub> e)
2021.03.01-28.02.2022	4514	2	0	4512
2022.03.01-28.02.2023	4514	2	0	4512
2023.03.01-28.02.2024	4514	2	0	4512
2024.03.01-28.02.2025	4514	2	0	4512
2025.03.01-28.02.2026	4514	2	0	4512
2026.03.01-28.02.2027	4514	2	0	4512
2027.03.01-28.02.2028	4514	2	0	4512
<b>Total</b>	<b>31598</b>	<b>14</b>	<b>0</b>	<b>31584</b>
<b>Total number of crediting years</b>	7 years			
<b>Annual average over the crediting period</b>	4514	2	0	4512

### 4.3.7 Methodology deviations

Applied methodology was AMS-1.D "Grid connected renewable electricity generation" Version 18.0. The project activity is a Greenfield hydro power which is in operational stage. This project does not imply any methodology deviations observed in validation process.

#### 4.3.8 Monitoring Plan

Validation team assessed the compliance with the requirements of monitoring plan, as follows:

i) Compliance of the monitoring plan with the approved methodology:

- Project proponent has identified data and parameters to be monitored within the project activity. The available data and parameter identified and reported in the CMA is grid emission factor. It was published at the point of validation by the national responsible entity; Sri Lanka Sustainable Energy Authority. As data and parameters to be monitored in the due monitoring period has been identified as average annual energy output. These parameters satisfy the requirements of selected approved methodology, AMS I.D. AMS I.D, Version 18
- Validation team confirmed that the monitoring plan contains all necessary parameters, that they are clearly described and that the means of monitoring described in the plan complies with the requirements of the applied methodology AMS I.D. AMS I.D, Version 18. The project involves measuring, recording, reporting, monitoring and controlling of various key parameters of the hydro power plant. These monitoring and controls would be the part of the Control Systems proposed for the project activity.
- It was evident that project proponent has identified and taken adequate measures to put the proposed monitoring plan into action. The project has employed qualified and experienced persons for undertaking monitoring activities. The project maintains standard log sheets and formats to record the monitoring parameters. The Project Manager is the designated person to verify, compile and archive all the monitored data. The parameters to be monitored during the crediting period is provided in a tabular format to the designated person. The Plant operators are provided with necessary training with respect to maintenance of the relevant monitoring records to enable him/her to deal the monitoring independently. As part of the monitoring mechanism, project team is committed to keeping the records of Electricity Export, Electricity Import, Gross electricity generated, fuel consumption by stand-by generator, Parameter of the plant, such as bearing temperature, electrical properties, Fault/Breakdown recording etc.

ii) QA/QC Procedures

It was verified that project proponent has identified and established proper QA/QC procedures under the monitoring plan. In order to measure import and export energy, the project proponent seeks to install a main meter and a check meter at the power plant. The main meter is owned and installed by the utility service provider, Ceylon Electricity Board to measure and report the monthly energy export by power plant for which the payment will be disbursed at the agreed tariff rate. The check meter is installed by the Project proponent as a back-up meter. The meter readings from this check meter and main meter are taken on daily basis by the designated person and recorded for the cross-checking purposes. If any discrepancy found at the routine internal verifications and audits conducted by the project manager, the respective issues are immediately reported to the CEB for corrective actions. Further, it was found that the CEB conducts annual meter calibrations to ensure whether the meters are functioning properly and generating the accurate export quantities. The findings

of these meter testing are duly maintained by the project proponent for the verification purposes.

It was confirmed that a procedure is in place to ensure the accuracy and completeness of fuel quantities burnt in the on-site diesel generator. The plant operators are primarily responsible for maintaining the fuel top-up records of the generator. These records are periodically collected and verified the Project Manager. Additionally, the fuel consumed by the generator is cross-checked with the fuel purchased records maintained for the corresponding monitoring period. Thus, the project proponent has established a robust and effective QA/QC procedure at the power plant.

iii) Implementation of the plan:

- The monitoring arrangements described in the monitoring plan are feasible within the project design;
- The means of implementation of the monitoring plan, including the data management and quality assurance and quality control procedures, are sufficient to ensure that the emission reductions achieved by/resulting from the project activity can be reported and verified.

The assessment has been conducted by the validation team by means of reviewing of the documented procedures, interviewing with relevant personnel, project plans and physical inspections of the project activity site.

#### **4.4 Carbon Management Assessment**

Sri Lanka Climate Fund Validation Division hereby confirms that the CMA complies with the latest forms of the guidance documents for completion of CMA version 2.0 is comply with Sri Lanka Carbon Crediting Scheme.

#### **4.5 Changes of the Project Activity**

The project has already commissioned and did not change the project activity during crediting period.

#### **4.6 Environment Impact**

The project has been strategically located, avoiding environmentally sensitive areas and settlement regions that could disrupt the social life of surrounding communities. As a result, the project's operation does not pose any environmental risks. On the contrary, the project makes a positive impact by contributing to the improvement of the local environment. By reducing emissions like CO<sub>2</sub>, SO<sub>x</sub>, and NO<sub>x</sub> from thermal power plants that would have been utilized to generate an equivalent amount of power without this project's implementation, it plays a crucial role in mitigating environmental impacts.

#### **4.7 Comments of Stakeholders**

The project activities are not implemented in the community-owned or related premises, the facilities is operated and maintained by Eagle Power (Pvt) Ltd under the supervision of Mahaweli

Development Authority, Sri Lanka. Thus projects do not lead to community issues and therefore the stakeholder consultation process has not been executed as a part of the project activities.

## **5. VALIDATION OPINION**

Eagle Power (Pvt) Ltd has granted the SLCF Validation Division to conduct the validation of Maduru Oya Left Bank Main Canal at 24+140 Drop 9 Mini Hydro Power Project with regard to the relevant requirements of the SLCCS for GHG reduction project activities, as well as criteria for consistent project operations, monitoring and reporting. The validation team confirmed that the project is a small scale project applied AMS-I.D version 18 and Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.3

The validation consisted of the following phases:

- i. Desk review of the CMA and additional background documents;
- ii. Follow-up interviews with project stakeholders;
- iii. Issue of checklist with corrective action requests (CARs) and the draft validation report
- iv. Desk review of revised CMA applying AMS.I.D Version 18 and Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.3
- v. Review of proposed corrections and clarifications
- vi. Issue of the final validation report and opinion
- vii. Resolution of outstanding issues and the issuance of the final validation report and opinion.

In the course of the validation, five (05) Corrective Action Requests (CARs) and two (02) CLs were raised and all were successfully closed.

The review of the CMA and additional documents related to baseline and monitoring methodology; the subsequent background investigation, follow-up interviews and review of comments by parties, stakeholders have provided SLCF Validation Division with sufficient evidence to validate the fulfillment of the stated criteria.

In detail the conclusions can be summarized as follows:

- The project is in line with criteria in Sri Lanka and all relevant SLCCS requirements for carbon credits. This is to be verified at verification. Further the project activity is in compliance with the requirements set up by the applied approved CDM methodology AMS-I.D ver.18 and Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, version 03.3
- The monitoring plan is transparent and adequate.
- The calculation of the project emission reductions is carried out in a transparent and conservative manner, so that the calculated emission reductions are most likely to be achieved within the crediting period.

The conclusions of this report show that the project, as it was described in the project documentation, is in line with all criteria applicable for the validation.



.....  
**Chamara Ariyathilaka**

Internal Technical Reviewer

Date : 21.08.2023

.....  
**Gayan Madusanka**

Team Leader

Date : 21.08.2023

## 6. REFERENCES

*Documents provided by the Client that relate directly to the project*

1. Carbon Management assessment (CMA) for Small-Scale project Activity
2. Feasibility Study reports

*Documents referred by the validation team that relate directly to the project*

3. Grid emission factor  
<https://www.energy.gov.lk/images/energy-balance/energy-balance-2020.pdf>
4. SRI LANKA ELECTRICITY ACT, No. 20 OF 2009  
<http://powermin.gov.lk/english/wp-content/uploads/2017/11/2009-Act-No.-20-Sri-Lanka-Electricity-Act-E.pdf>  
  
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5. CEB LONG TERM GENERATION EXPANSION PLAN 2015-2034  
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6. CDM Validation and Verification Manual  
[https://cdm.unfccc.int/public\\_inputs/2008/VVM/vvm.pdf](https://cdm.unfccc.int/public_inputs/2008/VVM/vvm.pdf)
7. IPCC guideline on national greenhouse gas inventories (2006)
8. AMS-I.D Grid connected renewable electricity generation --- (Version 18)  
[https://cdm.unfccc.int/filestorage/2/P/7/2P7FS6ZQAR84LG3NMKYUH50WI9ODBC/EB81\\_r\\_eplan24\\_AMS-I.D\\_ver18.pdf?t=c2h8cHk0Y3k4fDC2EXQVmns07VteREFAW8\\_M](https://cdm.unfccc.int/filestorage/2/P/7/2P7FS6ZQAR84LG3NMKYUH50WI9ODBC/EB81_r_eplan24_AMS-I.D_ver18.pdf?t=c2h8cHk0Y3k4fDC2EXQVmns07VteREFAW8_M)
9. Tool to calculate project or leakage CO2 emissions from fossil fuel combustion  
<https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-03-v3.pdf>
10. CDM Methodology Booklet  
[https://cdm.unfccc.int/methodologies/documentation/meth\\_booklet.pdf#AMS\\_I\\_D](https://cdm.unfccc.int/methodologies/documentation/meth_booklet.pdf#AMS_I_D)

## 7. APPENDIX

### Appendix 01: Validation Team

<b>Mr. R A Gayan Madusanka</b>	<b>Sri Lanka Climate Fund</b>	<b>Team Leader</b>  Having bachelor degree in Geography, he has specialization in environment management and organizational level GHG quantification and verification. He has undergone and completed management system ISO 14064:2018 and ISO 9001:2015. For last three years he has worked as a verifier for more than 15 GHG assessments conducted in service based and industrial facilities. In the project: Third National Communication on climate change implemented by Ministry of Mahaweli Development and Environment, he contributed for the preparation of GHG inventory for the forestry and land use sector.
<b>Ms. Wageesha Alankara</b>	<b>Sri Lanka Climate Fund</b>	<b>Team Member</b>  B.Sc. (Hons) degree in Agriculture specializing in Postharvest Horticulture and engaged over 10 verification assessments conducted by SLCF

<b>Mr. G A M C Ariyathilaka</b>	<b>Sri Lanka Climate Fund</b>	<b>Internal Technical Reviewer</b>  <p>Educational Qualification: B.Sc. Engineering (Chemical and process) He has more than 8 year experience in GHG verification in the industrial sector ranging from service facilities to various industrial processing facilities. He has successfully completed management system ISO 14064 and has been working as the team leader for the verification team of Sri Lanka Climate Fund which has been accredited for organizational GHG verification against ISO 14064-3. Being a project specialist for the GEF funded Bio-Energy Technology Project, he has contributed to develop MRV system for commercial biomass energy generation systems. Further he has engaged in development of project design document for the Clean Development Mechanism (CDM</p>
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<b>01.0</b>	21-08-2019	Initial issuance