



**Verified Carbon
Standard**

15 MW NAM HINBOUN DOWNSTREAM HYDROPOWER PROJECT



Document Prepared by Kosher Climate India Private Limited

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CONTENTS

1	PROJECT DETAILS	3
1.1	Summary Description of the Implementation Status of the Project	3
1.2	Sectoral Scope and Project Type	4
1.3	Project Proponent	4
1.4	Other Entities Involved in the Project	4
1.5	Project Start Date	5
1.6	Project Crediting Period	5
1.7	Project Location	5
1.8	Title and Reference of Methodology	6
1.9	Participation under other GHG Programs	6
1.10	Other Forms of Credit and Supply Chain (Scope 3) Emissions.....	6
1.11	Sustainable Development Contributions	7
2	SAFEGUARDS	9
2.1	No Net Harm	9
2.2	Local Stakeholder Consultation	9
2.3	AFOLU-Specific Safeguards	13
3	IMPLEMENTATION STATUS	13
3.1	Implementation Status of the Project Activity	13
3.2	Deviations.....	14
3.3	Grouped Projects	14
4	DATA AND PARAMETERS.....	14
4.1	Data and Parameters Available at Validation.....	14
4.2	Data and Parameters Monitored.....	18
4.3	Monitoring Plan.....	20
5	QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS	22
5.1	Baseline Emissions	22
5.2	Project Emissions	22
5.3	Leakage	23
5.4	Net GHG Emission Reductions and Removals	23

1 PROJECT DETAILS

1.1 Summary Description of the Implementation Status of the Project

Nam Hinboun Downstream Hydropower Project (hereafter referred to as the “the project”) is developed by Rasita Power Co., Ltd. in Songhong village, Hinboun District, Khammouane province, Lao PDR. The primary purpose of the project is to generate electricity to the Lao Power Grid.

Total installed capacity of the project is 15MW, provided by two (2) bulb turbine and the unit capacity is 7.5MW. Project is commissioned on 01/02/2021 with an average annual output of 79,740 MWh.

The project is expected to constantly contribute clean energy to the Lao Power Grid. It not only conforms to the present situation, but also can adapt to future changes in the electricity market. The baseline scenario of the project is continuation of the present situation, i.e electricity supplied from the power grid. By displacing part of the power generated by thermal power plants, the project is therefore expected to reduce CO₂ emissions by an estimation of 44,192 tCO₂e per year during the first crediting period.

In the current monitoring period (01/08/2022 to 31/10/2023), the project reduced total CO₂ emission of 33,952 tCO₂e by generating and supplying a net electricity of 61,266 MWh.

The project is not only supplying renewable electricity to grid, but also producing positive environmental and economic benefits and also, promotes the local sustainable development in the following aspects:

- During the construction period, plenty of job opportunities were provided to local residents,
- The infrastructure has been greatly improved. The enhancement of the transportation and electricity system brings substantial benefits to local villagers;
- The use of fossil fuel will be reduced because of displacement by grid electricity, this reduces the fossil fuel-based electricity generation;
- Provide clean & cheap electricity in this region, promote the sustainable development in this region and slowing down the increasing trend of GHG emissions.

The audit history is provided in the below table

Audit Type	Period	Program	VVB Name	Number of years
Joint Validation and Verification	01-February-2021 to 31-July-2022	VCS	4K Earth Science Private Limited	1 year 6 months

Verification (Current Verification)	01-August-2022 to 31- October-2023	VCS	4K Earth Science Private Limited	1 year 3 months
Total	01-February-2021 – 31- October-2023	VCS		2 years 9 month

1.2 Sectoral Scope and Project Type

Sectoral Scope : 01- Energy Industries (Renewable/non-renewable sources)

Project Type : Renewable Energy Project

The project is not AFOLU project and is not a grouped project.

1.3 Project Proponent

Organization name	Rasita Power Co. Ltd.
Contact person	Mr. Outdone Somphone
Title	General Manager
Address	Songhong Village, Hinboun District, Khammouane Province, Lao PDR
Telephone	+856 20 55511731
Email	rasita@live.cn

1.4 Other Entities Involved in the Project

Organization name	Kosher Climate India Private Limited
Role in the Project	Project Representative
Contact person	Vamsi Krishna M
Title	Director
Address	Zee Plaza, No.1678, 27 th Main Rd, Near KLM Mall, Sector 2, HSR Layout, Bengaluru, Karnataka 560102, India
Telephone	+91 99453 43475
Email	vamsi@kosherclimate.com narendra@kosherclimate.com

1.5 Project Start Date

01/02/2021 (Commercial Operation Date)

1.6 Project Crediting Period

Crediting Period Start date : 01-February-2022

Crediting Period End date : 31-January-2028

The project activity adopts renewable crediting period of 7 years period, with an option of two times of renewable up to 21 years.

Project Owner has chosen the renewable crediting period with first crediting of 7 Years which starts from 01/02/2021 to 31/01/2028 with an option of two times of renewable up to 21 years.

1.7 Project Location

The project is located in the Hinboun District, Khammouane province, Lao PDR.

Table.2: Project Location

Project Location	Latitude	Longitude
Songhong and Samakhixai Villages, Hinboun District, Khammouane, Lao PDR	17°43'38" N	104°34'19" E





- Tool to calculate the emission factor for an electricity system - Version 07.0²
- Demonstration of additionality of small-scale project activities – Version 13.1³.
- Investment analysis, version 12.0⁴

The project proponent hereby confirms that the project has not participated under other GHG Programs.

The project activity is not availing any form of benefits.

⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-27-v12.pdf>

The project also does not affect emissions associated with a goods or service that is included in the Supply Chain (Scope 3) Emissions.

1.11 Sustainable Development Contributions

The project activity is a run-of-river power project with a total installed capacity of 15 MW in Lao PDR. The project supplies clean electricity from the hydro power plant to the National grid hence displacing the electricity generated from grid connected fossil fuel power plants and thereby avoiding the equivalent Carbon dioxide which is a greenhouse gas. In the absence of the project activity, there won't be any avoidance of carbon dioxide.

During the construction, operation and maintenance of the hydro power plant, the project created many direct and indirect new job opportunities mostly to the local people in the project region. In the absence of the project activity, there would be no new jobs created in the project area.

As a part of regional development efforts associated with the project, PP has supported many education, health & infrastructure related needs for local people. These are funded from the revenue generated from the operation of the project activity. In the absence of project activity, there would be no revenue generated from the project and hence the activity would have not occurred in the absence of the project activity. The project activity is contributing to the SDGs 7, 8 and 13.

Table 1: Sustainable Development Contributions

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
1)	7.0	7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.	Implemented activities to increase	During the reported monitoring period (01/08/2022 to 31/10/2023), the net renewable electricity supplied to grid is 61,266 MWh	The project supplied 164,631 MWh renewable electricity to grid since the COD till end of this monitoring period.
2)	8.0	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value.	Implemented activities to increase	No incremental activities	The project generated 19 new employment opportunities since the COD.
3)	13.0	13.2 Integrate climate change measures into national policies, strategies, and planning	Implemented activities to decrease	During the reported monitoring period (01/08/2022 to 31/10/2023), the emission reduction achieved is 33,952 tCO ₂	The project achieved 92,229 tCO ₂ emission reduction since the COD.

2 SAFEGUARDS

2.1 No Net Harm

The project activity involves major construction activity and primarily requires the installation of the turbines, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories. Hydro Power project activity operations do not result in direct air pollution, noise pollution. Thus, there is no any significant impact due to implementation of project activity on air, water, soil quality and ambience are envisaged due to the project activity.

Safe-guarding Principles: The project does not involve and is not complicit in involuntary resettlement.

Relevance to the Project Activity: As per the final project design, there is no relocation involved. The project is being a run of river project, there is no considerable change in the water storage area. Hence, no negative impact due to the project.

2.2 Local Stakeholder Consultation

The details of stakeholder meetings are as follows:

Date of meeting: 12/07/2017

Location: Khamkeo village, meeting room, Hinboun district, Kanmouane province, Lao PDR

Stakeholders were invited to attend the meeting through different means including:

- Personal face to face invitations to government officer
- E-mail correspondence
- Invitation letter posted on the village Bulletin Board

Local people were invited to the meeting via personal face to face invitations and posters. Local government officers were invited to the meeting via face-to-face invitations and invitation letter. In addition, NGOs were invited to the meeting via e-mails sent.

Finally, 43 stakeholders participated in the meeting. The meeting was opened by the introduction of the project developers and the representative from the project owner company. The objective of the meeting was based on the non-technical summary, Environmental Management Plan and draft Passport Report of the project. Also, how the project might have some environmental effects, how these issues will be mitigated by the investor and also climate change and how the project will help the fight against climate change were discussed.

During the invitation process and the stakeholder meeting, the evaluation forms were handed out and the stakeholder were asked for their comments and requests about the project. The questions of the stakeholders were responded during the consultation meeting and their requests were assessed.

The question raised by the villagers are summarised in the table below:

Table.3: Stakeholder Comments

Stakeholder Comment	Explanation (Why? How?)	Remarks
Is the air in local context polluted?	Project Owner's representative confirmed that there would be no negative permanent effect to locals during the project construction and operation phase, instead there might be only minor temporally impact due to dust emission while the mitigation measure would be adopted.	The following mitigation measures followed during the construction to avoid dust: Localized sprinkling of water to suppress the dust and suspended particles
How is the air in local context before and during the construction?	The sources of air emission and fugitive dust will likely be from the drilling, crushing, and hauling associated with the construction activities. However, the dam construction is not directly linked to industrial processes, and thus the impact of emission from specific contaminants, organic chemical compounds and particulate matters will be minimized except where the work involves welding and aerosol spraying. Furthermore, the representative mentioned that a series of mitigation measure would be prepared for the local people to improve their local air.	The following mitigation measures followed during the construction to avoid dust: Localized sprinkling of water to suppress the dust and suspended particles
Does this project affect the quality and quantity of water?	Water quality issue in this stretch of the Nam Hinboun is complex as it involves many factors. The NHDHP will concern with ensuring that its activities will not lead to worsening the water quality of the river through applying the following measures: Strictly control the use of fuel and other hydrocarbon products such as grease, oils and lubricants to prevent leachate or run-off that can cause soil and water contamination. Fuel and hydrocarbon products should be stored in specially built containers in bounded areas with an impermeable base. Washing of vehicles or equipment will be required to designated wash down	All the mitigation measures mentioned are followed during the construction

	areas. These systems need to be maintained throughout the operation phase to enable the treatment of wastewater from all permanent site facilities. Long term monitoring would be essential for the successful management and mitigation of the impacts relating to waterborne disease in the local communities, both upstream and downstream of the sites. Therefore, there would be in or impact on the water utilization for nearby villages.	
Does this project affect the protection of biodiversity?	The project area is of predominantly secondary and disturbed forestland and patches of remnant woodland. There is no presence of primary forest nor are there any NPAs, PPAs or DPAs located within or nearby the Project area. These village conservation forests will, among other uses, provide habitats for wildlife and healthy forest ecosystem services. It is important for the project to make sure that threats to species will not be resulted from the presence of the construction workforce. At the same time, presence of the workforce should not result in increased pressures on the local harvest and use of NTFPs. For this reason, direct project impact on sensitive forest areas and resources will be minimal during the construction phase and negligible during operation.	NA
Do the project conditions affect the soil situation?	According to the IEE, to prevent soil erosion, the following measures will be undertaken, for example: (1) Schedule construction activities during the dry season (low flows), where possible; (2) Implement appropriate erosion control and drainage management measures to minimize the potential impacts associated with land clearance; (3)	All the mitigation measures mentioned are followed during the construction: - During site operations it was ensured that length and steepness of slopes is minimised - Construction debris and excavated materials was

	Minimize cleared areas and revegetate exposed sites with grass or plants to reduce sediment run-off, etc. Thus, status of soil erosion will be mitigated.	used for filling of low-lying areas. - Excavation activities were avoided during months for rainfall - Run-off control measures such as temporary bunding and slit traps were employed.
Does the pollution from the project include sound or light pollution?	For this, main resources of noise are dam construction blasting, drilling, dredging, operation of heavy machinery and equipment, transport operation. The mitigation's as follows: All construction equipment and machinery shall comply with noise emission standard. Avoid night shift work and work on Sundays unless special permit is granted. Use of PPE among workers and on-site personnel exposed to noisy work. The project doesn't exist light pollution. Therefore, this project will not cause light pollution and significant noise pollution.	NA
Will the implementation of the project help improve the working environment and quality of the workers?	The working environment of the workers will strictly implement as following measures: Promotion of preventive measures, eg, use of condoms. Regular site clean-ups, draining water bodies that can harbor disease vector (mosquito). Conduct hygiene and sanitation awareness programmed. Support local initiatives on disease prevention campaigns. Siting fuel depot away from the living buildings and residential areas.	NA
Will the project provide jobs and generate incomes?	Project Owner's representative mentioned that all the construction works would be open for local construction company, and would request the company to recruit locally.	NA

Ongoing communication with stakeholders:

The project proponent has a grievance mechanism. Stakeholders can anytime provide their inputs or concerns over the project through any of the following means:

- Complaint register- Stakeholders can provide the grievance in writing in the grievance register maintained at the site.
- Telephone access: Stakeholders can provide their grievances through calling site telephone ie, 00856-21-450062
- Email access: Stakeholders can provide their grievance through email using the email ID: 644520857@qq.com

The site manager is responsible for addressing the grievances received from stakeholders. The same is informed during the stakeholder consultation meeting. This mechanism will ensure to continue to engage with local stakeholder in an ongoing proactive manner. During the current monitoring period, no grievances received from any stakeholder.

2.3 AFOLU-Specific Safeguards

The project activity is the construction and generation of electricity from greenfield hydro power projects. This does not fall under AFOLU projects. Hence, this section is not applicable for this project activity.

3 IMPLEMENTATION STATUS

3.1 Implementation Status of the Project Activity

The project activity is a run-of-river Hydro power project with a total installed capacity of 15 MW provided by two (2) bulb turbine with unit capacity is 7.5MW each. The project is promoted by Rasita Power Co., Ltd.

The Project activity is a new facility (Greenfield) and the electricity generated by the project will be exported to the electricity grid. The project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid. The Project Proponent plans to avail the VCS benefits for the project.

The hydro project structure consists of release sluice, main powerhouse, and right-bank non overflow dam, etc.

Table.1: Main Technical Parameters of the project

Turbine		
Item	Value	Unit
Number of units	2	set
Rated Capacity	7.732	MW
Normal Pool level	144	m
Rated Head	5	m
Turbine speed	107.1	rpm

Rated flow	173.65	M3/s
Turbine Type	Bulb	
Lifetime	25	Years
Generator		
Item	Value	Unit
Number of Units	2	set
Rated Capacity	7.5	MW
Generator Rated Power Factor	0.85	-
Lifetime	20x	Years

The project is commissioned on 01/02/2021. Since the commissioning, the project is operating without any major outages. There are no events occurred that impacts the GHG emission reductions or carbon dioxide removals and monitoring.

3.2 Deviations

3.2.1 Methodology Deviations

No methodology deviation is applied during the monitoring period.

3.2.2 Project Description Deviations

There are no other project description deviations applied during this monitoring period or in previous monitoring reports.

3.3 Grouped Projects

The project is not a grouped project thus this is not applicable.

4 DATA AND PARAMETERS

4.1 Data and Parameters Available at Validation

Data / Parameter	$FC_{i,y}$
Data unit	mass or volume unit of the fuel i
Description	Amount of fossil fuel type i consumed in the project electricity system in year y
Source of data	- Fuel consumption in Lao PDR is calculated based on the Sustainability Report 2020, Banpu Power Public Company Limited. ⁵

⁵ https://www.banpupower.com/wp-content/uploads/2021/05/SD_Report_2020_EN_Final.pdf

	Fuel consumption in Thailand is from “Energy Balance of Thailand 2020”, EGAT
Value applied:	0.5542
Justification of choice of data or description of measurement methods and procedures applied	Data are from Banpu Power Public Company Limited (shareholder of Hongsa power plant) and Thailand authority, EGAT
Purpose of Data	Calculation of baseline emissions
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	$EF_{CO_2, i, y}$
Data unit	tCO ₂ /TJ
Description	The CO ₂ emission factor per unit of fuel i in year y
Source of data	- 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Chapter 1 Table 1.4
Value applied:	See the Table 5, 6 in Appendix 1.
Justification of choice of data or description of measurement methods and procedures applied	No specific local value available, the value form IPCC 2006, Guidelines for National Greenhouse Gas Inventories was adopted.
Purpose of Data	Calculation of baseline emissions
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	EGy
Data unit	GWh
Description	Net electricity generated and delivered to the grid by all power sources serving the system, including low-cost/must-run power plants/units, in year y.
Source of data	- The data of the electricity generated and delivered to Lao PDR National Power Grid are from Electricity Statistic (2020), EDL - The data of the electricity generated and delivered to Thailand National Power Grid are from Annual Report (2020& 2019), EGAT - The data of the electricity generated and delivered by Lao IPP directly supply to Thailand are from Electricity Statistic (2020), EDL

Value applied:	See the Table 1, 2, 3 in Appendix 1.
Justification of choice of data or description of measurement methods and procedures applied	Data used are from Thailand authority, EGAT and Lao authority, EDL.
Purpose of Data	Calculation of baseline emissions
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	$EG_{Import,y}$
Data unit	MWh
Description	The electricity (MWh) imported from Malaysia, China and Vietnam Power Grid in year y.
Source of data	- Annual report (2020, 2019, 2018), EGAT - Electricity Statistic (2020, 2019, 2018,), EDL
Value applied:	See the Table 4 in Appendix 1.
Justification of choice of data or description of measurement methods and procedures applied	Data used are from Thailand authority, EGAT and Lao authority, EDL.
Purpose of Data	Calculation of baseline emissions
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO ₂ /MWh
Description	Operating Margin CO ₂ emission factor in year y
Source of data	Calculated.
Value applied:	0.5542
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per "Tool to calculate the emission factor for an electricity system, version 07" as 3-year generation weighted average using data for the years 2018, 2019 & 2020
Purpose of Data	Baseline Emission calculation

Comments	This parameter is fixed ex-ante for the entire crediting period
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Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO ₂ /MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	Calculated
Value applied:	0
Justification of choice of data or description of measurement methods and procedures applied	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07”
Purpose of Data	Baseline Emission calculation
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	$EF_{grid,CM,y}$
Data unit	tCO ₂ /MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	Calculated
Value applied:	0.5542
Justification of choice of data or description of measurement methods and procedures applied	The combined margin emissions factor is calculated as follows: $EF_{grid,CM,y} = EF_{grid,OM,y} \cdot WOM + EF_{grid,BM,y} \cdot WBM$ Where: $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh) $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh) WOM = Weighting of operating margin emissions factor (%) = 100% (for simplified CM) WBM = Weighting of build margin emissions factor (%) = 0% (for simplified CM)

Purpose of Data	Baseline Emission calculation
Comments	This parameter is fixed ex-ante for the entire crediting period

Data / Parameter	Cap _{PJ}
Data unit	MW
Description	Installed capacity of the hydro power plant after the implementation of the project activity
Source of data	Project site
Value applied:	15
Justification of choice of data or description of measurement methods and procedures applied	Use the data in the FSR at start of the project. Measure by check the nameplate after operation
Purpose of Data	Project emission
Comments	-

4.2 Data and Parameters Monitored

Data / Parameter	EG _{PJ, y}
Data unit	MWh/y
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y in MWh
Source of data	Monthly joint meter reading reports
Description of measurement methods and procedures applied	The difference of final value of export and import is used for monthly values of net electricity supplied to the grid by the project activity and same value will be considered for ER calculations.
Frequency of monitoring/recording	Continuous measurement & Monthly recording
Value applied:	61,266
Monitoring equipment	The electricity exported / supplied by the plant to pooling substation and further to substation. This meter also measures

	electricity imported by the plant from the grid. The energy meter details are given below; <table><tr><th>Energy Meter</th><th>Meter details</th></tr><tr><td>Main</td><td>SI No: 219014734 Accuracy class: 0.2s Make: EDM I</td></tr><tr><td>Backup</td><td>SI No: 219014735 Accuracy class: 0.2s Make: EDM I</td></tr></table>	Energy Meter	Meter details	Main	SI No: 219014734 Accuracy class: 0.2s Make: EDM I	Backup	SI No: 219014735 Accuracy class: 0.2s Make: EDM I						
Energy Meter	Meter details												
Main	SI No: 219014734 Accuracy class: 0.2s Make: EDM I												
Backup	SI No: 219014735 Accuracy class: 0.2s Make: EDM I												
QA/QC procedures applied	The meters are approved, tested & sealed by the State Utility. The meters are in the custody of State Utility. The frequency of calibration is once in 5 years. The monthly electricity supplied/exported by the project activity in the JMR report is cross checked with the monthly invoices of sale. In the absence or delay in the meter calibration appropriate Guidelines will be applied appropriately to confirm the conservativeness of metering. The metering arrangement, accuracy class of meters, calibration frequency is under control of state electricity board and PP does not have any control on it. PP is getting value of net electricity supplied to grid and the same is considered the monitoring parameter. The billing is raised based on substation meters. The energy meter calibration details are given below: <table><tr><th>Energy Meter</th><th>Meter details</th><th>Calibration Date</th><th>Validity date</th></tr><tr><td>Main</td><td>SI No: 219014734 Accuracy class: 0.2s Make: EDM I</td><td>21/09/2022</td><td>20/09/2027</td></tr><tr><td>Backup</td><td>SI No: 219014735 Accuracy class: 0.2s Make: EDM I</td><td>21/09/2022</td><td>20/09/2027</td></tr></table>	Energy Meter	Meter details	Calibration Date	Validity date	Main	SI No: 219014734 Accuracy class: 0.2s Make: EDM I	21/09/2022	20/09/2027	Backup	SI No: 219014735 Accuracy class: 0.2s Make: EDM I	21/09/2022	20/09/2027
Energy Meter	Meter details	Calibration Date	Validity date										
Main	SI No: 219014734 Accuracy class: 0.2s Make: EDM I	21/09/2022	20/09/2027										
Backup	SI No: 219014735 Accuracy class: 0.2s Make: EDM I	21/09/2022	20/09/2027										
Purpose of data	Calculation of baseline emissions												
Calculation method	Net electricity supplied to the grid by the project plant in a given month = Export(kWh)– Import (kWh)												
Comments	Data will be archived in paper & electronic form for two years after the end of crediting period or of the last issuance of VERs for this project activity, whichever occurs later.												

4.3 Monitoring Plan

The purpose of the monitoring plan is to ensure that the monitoring and calculation of emission reductions of the project within the crediting period is complete, consistent, clear and accurate. The plan will be implemented by the project owner with the support of the grid corporation.

1. Monitoring organization

The monitoring process will be carried out and responsibility by the project owner. A monitoring panel will be established by the plant managers to be in charge of monitoring the data and information relating to the calculation of emission reductions with the cooperation of the Technical and Financial Department. A VCS manager will be assigned full charge the monitoring works. The operation and management structure is shown below:

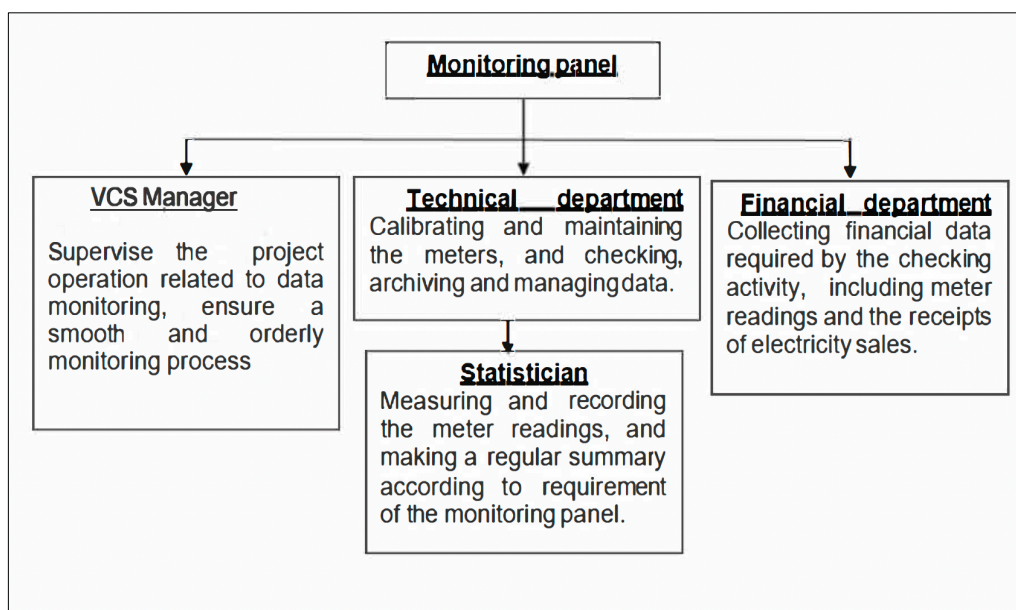


Fig. 3 Organization structure of the monitoring activity

2. Monitoring apparatus and installation

The meter(s) will be installed at the project site, to monitoring the input/output electricity at the grid side. The meter(s) will be installed in accordance with relevant national or international standard. The serial numbers of meters are provided section 6.1 below.

3.Data collection:

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

- During the crediting period, both the grid company and the project owner will record the values displayed by the main meter.
- Simultaneously to step a), the project owner will both record the values displayed by the backup meters.
- The meters will be calibrated according to the relevant regulation and request of EDL
- The main meter's readings will be cross-checked with record document confirmed by EDL.
- The project owner and the grid company will record both output and input power readings from the main meter. These data will be used to calculate the amount of net electricity delivered to the grid.

f) The project owner will be responsible of providing copies of record document confirmed by EDL to the DOE for verification.

If the reading of the main meter in a certain month is inaccurate and beyond the allowable error or the meter doesn't work normally, the grid-connected power generation shall be determined by following measures:

g) Read the data of the backup meters.

h) If the backup meter's data is not so accurate as to be accepted, or the practice is not standardized, the project owner and the grid corporation should jointly make a reasonable and conservative estimation method which can be supported by sufficient evidence and proved to be reasonable and conservative when verified by DOE.

i) If the project owner and the grid corporation don't agree on an estimated method, arbitration will be conducted according the procedures set by the agreement to work out an estimation method.

4. Calibration

The calibration frequency of the monitoring meters will be annually. The accuracy of the monitoring meters will not less than 0.5. Calibration of Meters should be implemented according to relevant standards and rules accepted by the grid company EDL. After the examination, the meters should be sealed. The lift of the seals requires the presence of both the project owner and the grid company. One party must not lift the seals or fiddle with the meters without the presence of the other party.

All the meters installed shall be tested by a qualified metering verification institution commissioned jointly by the project owner and the grid company within 10 days after:

- 1) Detection of a difference larger than the allowable error in the readings of both meters;
- 2) The repair of all or part of meter caused by the failure of one or more parts to operate in accordance with the specifications.

5. Data management system

Physical document such as the plant electrical wiring diagram will be gathered with this monitoring plan in a single place. In order to facilitate auditors' access to project documents, the project materials and monitoring results will be indexed. All paper-based information will be stored by the technical department of the project owner and all the material will have a copy for backup. All data, including calibration records, will be kept until 2 years after the end of the total crediting period.

6. Monitoring Report

During the crediting period, at the end of each year, the monitoring officer shall produce a monitoring report covering the past monitoring period. The report shall be transmitted to the General Manager who will check the data and issue a final monitoring report in the name of the project participants. Once the final report is issued, it will be submitted to the DOE for verification.

5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

5.1 Baseline Emissions

As per the approved consolidated methodology AMS – I.D (Version 18.0):

Baseline emissions include only CO₂ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

$$BE_y = EG_{PJ,y} \times EF_{grid,y} \quad (\text{Equation 1})$$

Where:

BE_y = Baseline emissions in year y (t CO₂)

$EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the VCS project activity in year y (MWh)

$EF_{grid,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (t CO₂/MWh). The value is calculated and fixed ex-ante as 0.5542 tCO₂/MWh

If the project activity is the installation of a greenfield power plant, then:

$$EG_{PJ,y} = EG_{PJ,facility,y} \quad (\text{Equation 2})$$

Where:

$EG_{PJ,facility,y}$ = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh). For the current monitoring period the quantity net electricity generation supplied by the project plant is 61,266 MWh

Hence the baseline emission factor is calculated as below:

Monitoring Period	$EG_{PJ,y}$ (MWh)	$EF_{grid,y}$ (tCO ₂ e/MWh)	Baseline Emission (tCO ₂)
1-Aug-2022 to 31-Dec-2022	17,176	0.5542	9,518
1-Jan-2023 to 31-Oct-2023	44,090	0.5542	24,434
1-Aug-2022 to 31-Oct-2023	61,266	0.5542	33,952

5.2 Project Emissions

Not applicable, since project emissions from the project activity is 0 as per the AMD – I.D methodology.

Hence, $PE_y = 0$.

5.3 Leakage

Not applicable, since leakage emissions from the project activity is 0 as per the AMD – I.D methodology.

Hence, LE = 0.

5.4 Net GHG Emission Reductions and Removals

The ex-ante emission reductions (ER_y) for the project activity are calculated as follows

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = Emission Reduction in year y (tCO₂)

BE_y = Baseline emission in year y (tCO₂) = 28,720 tCO₂e

PE_y = Project emissions in year y (tCO₂) = 0 tCO₂e

LE_y = Leakage Emissions in year y (tCO₂) = 0 tCO₂e

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2022 (01-August-2022 to 31-Dec-2022)	9,518	0	0	9,518
2023 (01-January-2023 to 31-October-2023)	24,434	0	0	24,434
Total	33,952	0	0	33,952

<u>Ex-ante emissions reduction s/removal s</u>	<u>Achieved emissions reductions /removals</u>	<u>Percent difference</u>	<u>Justification for the difference</u>
55,331 tCO ₂ e	33,952 tCO ₂ e	-31%	The achieved GHG emission is -39% lesser as compared to the estimated values in the registered VCS PD. The generation of electricity depends upon many other climatic conditions, and the availability of water is not within the control of the project participant.