Verification report form for GS project activities	
VERICATION REPORT	
Title of the project activity	Nam Pha Gnai Hydropower Project
GS Reference number of the project activity	GS ID: 3514
Version number of the Verification report	1.0
Completion date of the Verification report	18/01/2022
Monitoring period number and duration of this monitoring period	MP 1st 01/09/2019-31/12/2020 (Including both days)
Version number of monitoring report to which this report applies	1.1
Crediting period of the project activity corresponding to this monitoring period	Type: Renewable Start date: 01/09/2019 Length: 7 years
Project participant(s)	Nam Pha Gnai Hydropower Co., Ltd. (Project owner, Lao PDR) Swiss Carbon Assets Limited (Switzerland)
Host Party	Lao PDR
Applied methodologies and standardized baselines	ACM0002 Grid-connected electricity generation from renewable sources, Version 16.0 Standardized baselines: N/A
Mandatory sectoral scopes	Sectoral scope 1: Energy industries (renewable-/non-renewable sources)
Conditional sectoral scopes, if applicable	-
Estimated amount of GHG emission reductions or GHG removals for this monitoring duration in the registered PDD	97,246 tCO_2e 01/09/2019-31/12/2019: 24,311 tCO_2e 01/01/2020-31/12/2020: 72,934 tCO_2e
Certified amount of GHG emission reductions or GHG removals for this monitoring period	104,038 tCO_2e 01/09/2019-31/12/2019: 23,869 tCO_2e 01/01/2020-31/12/2020: 80,169 tCO_2e
Name of VVB	Shenzhen CTI International Certification Co., Ltd (CTI)
Name, position and signature of the approver of the Verification report	Guolian Wang Approver 

SECTION A. Executive summary

Swiss Carbon Assets Limited has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Gold Standard (GS) 1st periodic verification of the project "Nam Pha Gnai Hydropower Project" with regard to the relevant Gold Standard requirements. GS Registration Reference Number GS3514.

This report summarizes the findings of the verification of the Project, performed on the basis of Gold Standard 2.2 Requirements, as well as criteria given to provide for consistent project operations, monitoring and reporting. Verification is required for all registered GS project activities intending to confirm their achieved emission reductions and proceed with request for issuance of GS CERs. This report contains the findings from the verification and a certification statement for the certified emission reductions.

Verification is the periodic independent review and ex post determination of both quantitative and qualitative information by a Validation and Verification Body (VVB) of the monitored reductions in GHG emissions that have occurred as a result of the registered GS project during a defined monitoring period.

Certification is the written assurance by a VVB that, during a specific period in time, a project activity achieved the emission reductions as verified.

The objective of this verification is to verify and certify emission reductions reported for the "Nam Pha Gnai Hydropower Project" for the period 01/09/2019 to 31/12/2020 (including both days).

The purpose of verification is to review the monitoring results and verify that monitoring methodology was implemented according to monitoring plan and monitoring data, used to confirm the reductions in anthropogenic emissions by sources is sufficient, definitive and presented in a concise and transparent manner.

In particular, monitoring plan, monitoring report and the PA's compliance with relevant GS and host Party criteria are verified in order to confirm that the PA has been implemented in accordance with previously registered design and conservative assumptions, as documented and also if the monitoring plan is in compliance with the approved monitoring methodology.

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan.
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emission reduction data is free from material misstatement.
- To verify that reported GHG emission data is sufficiently supported by evidence.
- To verify that the project contributes to sustainability development continuously.
- Where sampling is involved, sampling guidelines are applied to ensure the adequate sampling and survey method is followed in reaching professional judgements.

The verification shall ensure that reported emission reductions are complete and accurate in order to be certified. The verification comprises a review of the monitoring report over the monitoring period 01/09/2019 to 31/12/2020 based on the registered PDD in part of the monitoring parameters and monitoring plan, emission reduction calculation spreadsheet, monitoring methodology and all related evidence provided by project participants. On-site visit and stakeholders' interviews are also performed as part of the verification process.

The verification has been performed as described in the Gold Standard version 2.2 Requirements/38/ and constitutes the following steps:

- Desk review of the MR (Version 1.0 dated 06/09/2021)/1/ and the relevant documents
- Online remote assessment (25/10/2021)
- Issuance of draft verification report & verification protocol
- Desk review of the revised MR and related documents
- Resolution of the raised CAR and CL
- Issuance of the final verification report

The project is a run-of-river grid-connected hydro power plant and locates in Xaysomboun District, Vientiane Province, Lao PDR. The geographical coordinates are 102.872314°E and 19.009331°N. The project activity was registered as a CDM project on 31/12/2015 and renewable crediting period was selected starting on 01/09/2019 (approved by CDM EB on 15/06/2021, PRC ref No. PRC-10241-001 and approved by GS registry on 27/10/2021). This monitoring period 01/09/2019 - 31/12/2020 is the 1st monitoring period of the project, which is within the first crediting period 01/09/2019 - 31/08/2026. The project's installed capacity is 19.2 MW equipped with 2 sets of 7.4 MW hydro turbine-generators in type of SH11 S900 and the other 1 set of 4.4 MW hydro turbine-generators in type of SSA 710. Since Thailand Power Grid is connected with Lao Power Grid, power supplied to the regional grid consisting of Thailand Power Grid and the Lao Power Grid, and the clean energy generated by the Project will also displace part of the electricity usage from Thailand power grid and the Lao power grid. The upstream Nam Ngum 3 hydropower project (hereinafter referred to as "NN3 project") has not started operation during this monitoring period. As per the approved PDD, the project is estimated to deliver 72,735 tonnes CO_2 emission reduction annually before the operation of NN3 project, and 48,117 tonnes CO_2 emission reduction annually after the operation of NN3 project.

The verification team identified 3 CAR in this monitoring period, and 1 CL are raised. The CAR(s) are satisfactorily addressed by the project participant in the revised monitoring report (refer to Appendix 4 for further details). All changes made to the monitoring report (Version 2.0 dated 06/01/2022) are as a result of the verification findings.

Basic technical details of the project are summarized in below table.

	Unit	**Value**	
Turbines:			
Type	-	Horizontal Francis Turbine	
Installed Capacity	MW	7.4	4.4
Number	-	2	1
Water head	m	117.85	117.85
Rotation Speed	rpm	750	1,000
Contractor	-	Voith Hydro Private Limited	
Generators:			
Type	-	Horizontal Synchronous Generator (Cylindrical Rotor Type)	
Model	-	SH11 S900	SSA 710
Installed Capacity	MW	7.4	4.4
Number	-	2	1
Voltage	kV	6.3	6.3
Frequency	HZ	50	50
Power Factor	-	0.85	0.85
Contractor	-	Voith Hydro Private Limited	

In CTI's opinion, the GHG emission reductions reported for the project in the monitoring report (Version 2.0 dated 06/01/2022) are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 (Version 16.0) and the monitoring plan contained in the approved PDD (version 2.3 dated 03/04/2021).

CTI confirmed that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI is able to certify that emission reductions from Nam Pha Gnai Hydropower Project during the period 01/09/2019 - 31/12/2020 amount to 104,038 tCO_2e.

SECTION B. Verification team, technical reviewer and approver

B.1. Verification team member

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)	Involvement in			
						Desk review	On-site inspection	Interview(s)	Verification findings
1.	Lead Auditor	IR	Du	Wenjun	CTI	√	×	√	√
2.	Auditor	IR	Tong	Dezheng	CTI	√	×	√	√

B.2. Technical reviewer and approver of the Verification report

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of VVB or outsourced entity)
1.	Technical reviewer / Approver	IR	Wang	Guolian	CTI

SECTION C. Application of materiality

C.1. Consideration of materiality in planning the verification

No.	Risk that could lead to material errors, omissions or misstatements	Assessment of the risk		Response to the risk in the verification plan and/or sampling plan
		Risk level	Justification	
1.	Human error in the quantification of emissions (which may be more likely to occur if personnel are unfamiliar with, or not well trained regarding, emissions processes or data recording);	Low	By checking CDM & GS Monitoring Training manual and Operation Training Record, it is confirmed the project owner has established the CDM & GS monitoring and management manual and appointed the CDM & GS technical staffs, CDM & GS accountant staffs and CDM & GS manager which were trained to responsible for power meters reading and recording, auditing of these metered data. The installation and calibration of monitoring meters was also stipulated in the manual. The CDM & GS monitoring and management manual has also established the QA/QC procedure to	Depending on the monitoring period being verified, conduct increased sampling during the months when there is a greater likelihood of errors and issues with data quality control due to project participants' leave schedules.
2.	Undue reliance on a poorly designed information system, which may have few effective quality controls; for example, the use of spreadsheets without adequate controls related to data changes/updates, version tracking, traceability, security, etc.	Low		Depending on the monitoring period being verified, conduct increased sampling during the months when there is a greater likelihood of errors and issues with data quality control due to project participants' leave schedules.
3.	Manual adjustment of otherwise automatically recorded activity levels; for example, manual input may be required if a flare meter becomes	Low		Depending on how data is generated, processed, and reported, place greater emphasis on verifying data captured and processed manually and/or in

	overloaded.		ensure the veracity and validity of the monitoring procedure and monitoring records. So the risk level is low.	spreadsheets versus those that are generated from an automated system.

C.2. Consideration of materiality in conducting the verification

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(1) As per the "Application of materiality in verifications (Version 02.0)" which enters into force on 01/04/2015, the project is a large-scale project activity achieving total emission reductions < 300,000 tons of CO_2e per year; as such, a 2 per cent materiality threshold is applied.

(2) As per the monitoring plan in the approved PDD, the parameter used for determining the project's baseline emissions is $EG_{facility,y}$, which is determined by Electricity supplied by the project to the grid in year y ($EG_{output,y}$), The electricity used by the project and input from the grid in year y ($EG_{input,y}$). $EG_{facility,y}$ is calculated as: $EG_{facility,y} = EG_{output,y} - EG_{input,y}$

(3) Readings of $EG_{input,y}$ and $EG_{output,y}$ are continuously monitored and monthly recorded. At 24:00 of the last day of each month, readings of $EG_{input,y}$ and $EG_{output,y}$ are collected, which is the basis of the Meter Reading Records (MRRs) and Electricity Receipts. For parameters $EG_{input,y}$ and $EG_{output,y}$, by cross-checking all the MRRs generated by the project owner against the Electricity Receipts issued by EDL, CTI confirms that all values of parameters are corrected.

(4) No errors are identified in the additional data set, and the DOE proceeds with the remaining elements of the verification as defined in its verification plan.

SECTION D. Means of verification

D.1. Desk review

Desk review of all documents provided by PP and publicly available documents relevant for the verification including monitoring plan, monitoring report, monitoring methodology, project design document, applicable tools in particular attention to the frequency of measurements, QA/QC procedures and other relevant documents was conducted by CTI.
The main documents are listed below:

- the registered GS PDD including the monitoring plan/3/,
- the registered GS validation report/4/,
- the registered GS Passport/9/,
- the approved PDD/5/,
- Assessment Opinion of Approved PDD (for PRC)/6/,
- Design Change Memo/7/,
- Validation report form for post-registration changes for GS project activities/8/,
- the monitoring report, including the claimed emission reductions for the project/1/,
- the emission reduction calculation spreadsheet/2/.

Other supporting documents, such as publicly available information on the Gold Standard website and background information were also reviewed.

D.2. On-site inspection

Due to the COVID-19 pandemic from the beginning of 2020 until now, CTI cannot easily to arrange the on-site inspection especially going abroad as the travel restrictions from Lao PDR and China. Taking the current situation into account, in April 2020, the Gold Standard Technical Advisory Committee approved guidance on measures that can be adopted by projects to ensure that they are not adversely impacted during the duration of this crisis, while still maintaining credibility and rigour. Currently, the Interim measures have been extended by GS from 30/06/2021 to 31/12/2021 and from 31/12/2021 to 30/06/2022. As per the COVID-19 Interim measures, VVBs may apply alternative measures relating to mandatory on-site visits until 31/12/2021. And if site visit cannot be postponed due to significant impact of delaying the site visit on VVB and/or project developer due to timeline/commitment as per validation/verification or GS-VERs delivery agreement, VVB may replace mandatory on-site visits with remote audits. CTI adopted an interview in form of teleconference instead of the on-site inspection.

In accordance with the requirement by GS, the reasons that the site visit cannot be postponed are justified as follow:

- As requested by PP, the site visit cannot be postponed due to GS CERs delivery commitment. Considering the procedure and time schedule of the requests for issuance as per GS requirements and the uncertainty of the COVID-19 pandemic, to avoid the risk on the GS CERs delivery delay, PP commissioned CTI to complete the verification before the end of the year 2021.

- The project is located in Lao PDR, while CTI is the DOE from China. As a result of the COVID-19 pandemic, the authority of Lao PDR has taken preventive measures for foreigners i.e. suspension of visa exemption policy and visa on arrival, a health certificate and insurance requested for visa application, self-isolate regulation and reduction of flights, etc. Thus, CTI cannot ensure site visit to be on scheduled.

CTI applied the standard auditing techniques for verification as referred to GS principles. An interview through teleconference with PP and relevant stakeholders were carried out on 25/10/2021 instead in order to understand the project status, implementation, monitoring activities, the grid system, SDG indicators etc. of this monitoring period. Moreover, CTI requests PP to provided supportive materials to conduct the verification. CTI obtained

adequate information to verify the status, implementation, monitoring activities, the grid system, SDG indicators of the project activity and the consistency between the registered GS PDD/3/, the registered passport /9/, the approved PDD /5/ with the presented situation. CTI confirms it is sufficient for the purpose of verification by these alternative means. The activities performed during online remote assessment were listed as follows:

Duration of online remote assessment: 25/10/2021				
No.	**Activity performed on-site**	**Site location**	**Date**	**Team member**
1.	Opening meeting	Nam Pha Gnai Hydropower Co., Ltd., Xaysomboun District, Vientiane Province, Lao PDR	25/10/2021	Du Wenjun Tong Dezheng
2	Interview with PP Representative, Operation Staff and local stakeholders	Nam Pha Gnai Hydropower Co., Ltd., Xaysomboun District, Vientiane Province, Lao PDR	25/10/2021	Du Wenjun Tong Dezheng
3	Documents check	Nam Pha Gnai Hydropower Co., Ltd., Xaysomboun District, Vientiane Province, Lao PDR	25/10/2021	Du Wenjun Tong Dezheng
4	Finding Summary	Nam Pha Gnai Hydropower Co., Ltd., Xaysomboun District, Vientiane Province, Lao PDR	25/10/2021	Du Wenjun Tong Dezheng
5	Close Meeting	Nam Pha Gnai Hydropower Co., Ltd., Xaysomboun District, Vientiane Province, Lao PDR	25/10/2021	Du Wenjun Tong Dezheng

D.3. Interviews

No.	**Interviewee**			**Date**	**Subject**	**Team member**
	Last name	**First name**	**Affiliation**			
1.	Sayasith	/	Nam Pha Gnai Hydropower Co., Ltd.	25/10/2021	- General aspects of the project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management	Du Wenjun Tong Dezheng
2.	Vilasone	/	Nam Pha Gnai Hydropower Co., Ltd.	25/10/2021		Du Wenjun Tong Dezheng

3.	Khamsri	/	Nam Pha Gnai Hydropower Co., Ltd.	25/10/2021	system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Number of the installed pumps on-site - Access to energy services - Water Quality and quantity - Soil condition - - Replantation - Other pollution - Biodiversity - Quality of employment - Quantitative employment and income generation - Air Quality	Du Wenjun Tong Dezheng
4.	Worra	/	Villager (Long Tieng Village)	25/10/2021	- Environmental aspects - Number of the installed pumps on-site - Access to energy services - Water Quality and quantity - Soil condition - - Replantation - Other pollution - Biodiversity - Quality of employment - Quantitative employment and income generation - Air Quality	Du Wenjun Tong Dezheng
5.	Xaiphra	/	Villager (Long Tieng Village)	25/10/2021		Du Wenjun Tong Dezheng
6.	Chanhsone	/	Villager (Thamkalong Village)	25/10/2021		Du Wenjun Tong Dezheng
7.	Pheangnar	/	Villager (Thamkalong Village)	25/10/2021		Du Wenjun Tong Dezheng
8.	LatVone	/	Villager (Ban Pha Gnai village)	25/10/2021		Du Wenjun Tong Dezheng
9.	VanSoy	/	Villager (Ban Pha Gnai village)	25/10/2021		Du Wenjun Tong Dezheng
10.	ThongSane Noi	/	Director (Water Resource of Environmental Administration of Vientiane Province)	25/10/2021		Du Wenjun Tong Dezheng
11.	KiNarPhet	/	Director (Xaysomboun District Office)	25/10/2021		Du Wenjun Tong Dezheng

12.	MaeSome	/	Director (Department of Energy and Mines of Vientiane Province)	25/10/2021		Du Wenjun Tong Dezheng
13.	Lin	Zexu	Beijing Karbon Energy Consulting Co., Ltd.	25/10/2021	- Monitoring data and Monitoring Report - GHG Calculations	Du Wenjun Tong Dezheng
14.	Duan	Zhijie	Swiss Carbon Assets Limited	25/10/2021		Du Wenjun Tong Dezheng

During the site visit, the verification team has randomly selected operation staffs and local stakeholders to confirm that the correctness of the parameters reported by the PP.

The asked questions were based on requirements of the Annex I, Rules, the Toolkit to the Gold Standard version 2.2/42/. The questions asked were basically based on requirements of Rules and Toolkit to the Gold Standard version 2.2/42/. The main topics included, but not limited to, the followings:

- Water quality and quantity - water flow in the dry season, demand for irrigation in the downstream, on site treatment of construction wastewater prior to discharge.
- Soil condition - Replantation - mitigation measures to prevent soil erosion
- Other pollution - noise control devises such as mufflers and hearing protection for construction workers
- Biodiversity - soil conservation actions
- Quality of employment - trainings for the positions created and Heath and Safety measurements
- Quantitative employment and income generation - job opportunities provided to local residents
- Air Quality - the dust emission minimization
- Livelihood of the poor - pumps installed for the water supply program
- Access to affordable and clean energy services - renewable energy generated

A summary of interview questions and feedback received are presented in the below table:

SD indicator	Questions for operation staffs and local stakeholders during the online interviews	Summary of feedback
Water quality and quantity	Is there any wastewater discharged to the river during the construction and operation period?	Never
	Is the water flow enough to maintain the eco-system in dry season (such as in winter)?	Yes
	Is the water flow fulfills downstream irrigation in dry season (such as in winter)?	Yes
Soil condition	How is the soil quality after the installation and operation of the project?	It is not affected.
	Are there any trees or grass planted in the non-plant slopes?	Yes
	Has the drain system been established in the quarry area and has the slag yard be covered during rainy season?	Yes
Other pollution	Was the drilling machines be equipped with noise control devises such as	Yes

SD indicator	Questions for operation staffs and local stakeholders during the online interviews	Summary of feedback
	mufflers to prevent noise impact?	
	Was the construction workers exposed to noise levels of 80 dB or more be provided with adequate hearing protection?	Yes
Biodiversity	Has the vegetations be revovered after construction of the project activity?	Yes
	. Has the fish passage be introduced?	Yes, more fishes in the river.
	.Do you think the project affects the ecological environment of the site?	No negative impact on local ecological environment
Quality of employment	Do you think that the trainings will be offered to workers in this project?	Yes
	Have Staffs been trained during the construction and operation period?	Yes, trainings were organized for the staff on the technology and the monitoring of the plant operation, and the emergency and safety procedures.
	Are there any Heath and Safety measurements applied?	Yes
Quantitative employment and income generation	Is there any permanent jobs and tentative jobs provided by the project?	Permanent and tentative jobs are offered by the project proponents
	Do you think that this project offers opportunities for employment?	Yes
	Do you think that this project offers job opportunities for women?	Yes, the project owner provides temporary jobs for 5 local women. They are responsible for regular cleaning of the camp.
Air Quality	What measures did the project owner take to minimize the dust emission during the construction period?	Wet damping, sprinklers were used.
Access to affordable and clean energy services	Do you have electricity access before and now?	Before the project activity, there were more blackouts. The same has been solved after operation of the project.
	How much on average do you have to pay for electricity in the past? How is it compared with the actual situation with the project?	In the past, although most of the area was connected to local grid, not enough power was provided and there were frequent power outages. Currently, the blackouts situation has been improved as compared with that before the project activity. Furthermore, the electricity bills are charged by local officials in accordance with EDL regulations, which are cheap and reliable.
	Do you think the project will contribute to a long lasting solution for your energy needs?	Yes, because the energy is generated locally.

SD indicator	Questions for operation staffs and local stakeholders during the online interviews	Summary of feedback
Livelihood of the poor	How many pumps were installed by the project activity to provide clean water?	4
	Is it easy to access the clean water?	Yes, the road to the pumps was constructed and it's easy to access the clean water.
	How many people were benefit from the water supply program?	Around 400 people.
-	How do you communicate your questions or comments to the PP?	The personnel of the plant organized public meetings periodically and always is possible to communicate directly with the designated personnel of the plant.

Verification Team along with observation during online remote assessment, objective evidence collections, data generation and recording analysis also considered the views obtained in these interviews while arriving at Verification Opinion.

D.4. Sampling approach

N/A

D.5. Clarification requests, corrective action requests and forward action requests raised

	No. of CL	No. of CAR	No. of FAR
Compliance of the monitoring report with the monitoring report form (E.1)	-	1	-
Compliance of the project implementation with the registered PDD (E.3)	-	-	-
Post-registration changes (E.4)	-	-	-
Compliance of the monitoring plan with the monitoring methodology including applicable tool and standardized baseline (E.5)	-	-	-
Compliance of monitoring activities with the registered monitoring plan (E.6)	-	2	-
Compliance with the calibration frequency requirements for measuring instruments (E.7)	-	-	-
Assessment of data and calculation of emission reductions or net removals (E.8)	1	-	-
Others (please specify)	-	-	-
Total	**1**	**3**	**-**

SECTION E. Verification findings

E.1. Compliance of the monitoring report with the monitoring report form

Means of verification	Document review the monitoring report against the monitoring report form. Further it has been checked whether the latest instructions for filling out the MR template have been followed. Every section has been checked against the respective guidance and GS requirements.
Findings	The MR (version 1.0 dated 06/09/2021) was finished based on CDM-MR-FORM (version 08.0). However, the CDM-MR-FORM version 09.0 was issued by EB on 08/10/2021. Therefore. CAR 01 was raised requiring PP to use the lastest version of MR template. By checking the MR (version 2.0 dated 06/01/2022), CTI confirmed that the latest version has been applied for the MR and the MR is complete and transparent and in accordance with the approved PDD, the registered GS passport, other relevant requirements as well as with the applicable monitoring report from. Therefore, CAR 01 was closed.
Conclusion	The Verification Team confirms that the monitoring report is compliance with the valid version of the CDM-MR-FORM.

E.2. Remaining forward action requests from validation and/or previous verification

This is the 1st periodic verification of the project. There is no FAR from validation via checking Validation report /4/, Validation report form for post-registration changes /8/, Registration Review Form /9/, Design Change Review Form /10/ of the project activity.

E.3. Compliance of the project implementation with the registered project design document

<table>
<tr><td>Means of verification</td><td>CTI conducted the document review and performed online remote assessment through teleconference with the project participant to:
- An assessment of the implementation and operation of the registered project activity is as per the approved PDD for the project activity;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the approved PDD and the selected methodology.</td></tr>
<tr><td>Findings</td><td>The project is a run-of-river grid-connected hydro power plant and locates in Xaysomboun District, Vientiane Province, Lao PDR. The project’s installed capacity is 19.2 MW equipped with 2 sets of 7.4 MW hydro turbine-generators in type of SH11 S900 and the other 1 set of 4.4 MW hydro turbine-generators in type of SSA 710. The actual implementation of the project during this verification period was verified through teleconference and in terms of photos of main/backup meters, nameplates of turbines and generators, central control room, and powerhouse, as well as Installation, Operation and Maintenance Manual issued by Voith Hydro Private Limited. the details of the turbines and generators with respect to their installation capacity and technical parameters have been verified to be consistent with description indicated in the approved PDD. The timeline of the project implementation has been verified as below:
<table>
<tr><th>Milestone</th><th>Timeline</th><th>Assessment</th></tr>
<tr><td>Start date of the project activity</td><td>29/10/2014</td><td>Verified by checking validation report and</td></tr>
<tr><td>Registration date</td><td>31/12/2015</td><td>Confirmed by checking UNFCCC website:
https://cdm.unfccc.int/Projects/DB/TUEV-RHEIN1451527911.4/view</td></tr>
</table>
</td></tr>
</table>

	Operation start date	01/09/2019	Verified by checking Certificate for Commercial Operation Date /11/ issued by EDL
	PRC approved date (PRC ref No. PRC-10241-001)	15/06/2021	Confirmed through checking UNFCCC website: https://cdm.unfccc.int/PRCContainer/DB/prcp409040175/view
	Design Change approved date	27/10/2021	Confirmed through email from GS registry
	The electricity generated by the project activity was supplied to Lao Power Grid, which can be confirmed by the Power Purchase Agreement (PPA) /13/ signed between Nam Pha Gnai Hydropower Co., Ltd. and EDL. All the monitoring system in operation period is consistent with the description in the approved PDD. By checking the daily operation and maintenance records, CTI can confirm that no serious malfunction happened and the plant was under a normal operation as expected in this monitoring period.		
Conclusion	CTI confirms that the project implementation is in accordance with the project description contained in approved PDD. The verification team confirmed through online remote assessment and document review that all physical features of the project activity including data collection systems and storage systems have been implemented in accordance with the approved PDD.		

E.4. Post-registration changes

E.4.1. Temporary deviations from the registered monitoring plan, monitoring methodology or standardized baseline

Not applicable. Through teleconference and checking operation log, electricity diagram, PPA, Installation, Operation and Maintenance Manual of equipment, It is confirmed that the project activity is not involved in any temporary deviations during the monitoring period.

E.4.2. Corrections

Not applicable. Through teleconference and checking operation log, electricity diagram, PPA, Installation, Operation and Maintenance Manual of equipment, It is confirmed that the project activity is not involved in any corrections during the monitoring period.

E.4.3. Changes to the start date of the crediting period

The start date of the crediting period has been changed from 01/01/2016 to 01/09/2019, which was approved by CDM EB on 15/06/2021 (PRC ref No. PRC-10241-001) and approved by GS registry on 27/10/2021.

The same has been confirmed through checking https://cdm.unfccc.int/PRCContainer/DB/prcp409040175/view and https://platform.sustain-cert.com/public-project/641. The change to the start date of the crediting period approved by CDM EB and GS registry affects the start of this monitoring period, i.e. the changed start date is the start of this monitoring period.

E.4.4. Inclusion of a monitoring plan

Not applicable. The approved PDD has included the monitoring plan.

E.4.5. Permanent changes from registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines or other methodological regulatory documents

Not applicable. Through teleconference and checking operation log, electricity diagram, PPA, Installation, Operation and Maintenance Manual of equipment, It is confirmed that the project activity is not involved in any permanent changes during the monitoring period.

E.4.6. Changes to the project design

Not applicable. Through teleconference and checking operation log, electricity diagram, PPA, Installation, Operation and Maintenance Manual of equipment, It is confirmed that the project activity is not involved in any changes to the project design during the monitoring period.

E.4.7. Types of changes specific to afforestation and reforestation project activities

Not applicable.

E.5. Compliance of monitoring plan with the monitoring methodology including applicable tool and standardized baseline

Means of verification	CTI conducted the document review and performed online remote assessment through teleconference with the compliance check of the monitoring plan with the applied methodology including applicable tools.
Findings	All parameters stated in the monitoring plan are in compliance with the applied methodology, i.e. ACM0002 (Version 16.0), and monitored and reported appropriately. The monitoring report lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, aggregation, recording, calculation and reporting) for these parameters is provided. By checking the training records, CTI verified that training for the CDM related procedures including monitoring, recording and reporting was in place and their implementation was confirmed by interview with the key operators and observing the operation during teleconference.
Conclusion	CTI confirmed that the monitoring plan is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 (Version 16.0).

E.6. Compliance of monitoring activities with the registered monitoring plan

E.6.1. Data and parameters fixed ex ante or at renewal of crediting period

Means of verification	"Data and parameters fixed ex ante" in the MR are checked against the registration PDD.
Findings	The parameters $FC_{i,y}$, $NCV_{i,y}$, $EF_{CO2,i,y}$, EG_y, $EG_{import,y}$ were used to determine ex-ante the combined emission factor of the grid,($EF_{grid,CM,y}$) at the validation stage and will not be updated during the first crediting period from 01/09/2019 to 31/08/2026. The value of the parameter for $EF_{grid,CM,y}$ is 0.5595 tCO_2e which was calculated according to the procedure outlined in B.6 of the approved PDD. The parameters A_{BL} and Cap_{BL} are fixed ex ante in this monitoring period, which is consistent with that in the approved PDD.
Conclusion	CTI verified and confirmed that all the parameters determined ex-ante in the monitoring report is in compliance with the approved PDD.

E.6.2. Data and parameters monitored

D.6.2.1 Carbon Data and parameters monitored

Means of verification	CTI conducted document review and performed online remote assessment

	through teleconference with project stakeholders to: - A review of information flows for generating, aggregating and reporting the monitoring parameters; - Determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the PDD; - A cross-check between information provided in the monitoring report and data from other sources such as plant logbooks and electricity transaction notes; - An identification that quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.
Findings	The monitoring has been carried out in accordance with the approved monitoring plan. CTI confirms that all parameters stated in the monitoring plan are monitored and reported appropriately. All parameters required to be monitored by the monitoring plan as per the monitoring methodology ACM0002 (Version 16.0) and the management system were assessed during the site visit. The monitoring report lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, aggregation, recording, calculation and reporting) for these parameters is provided. The information flow for each parameter in further verified in the following sections. According to the approved PDD, the parameters to be monitored are as below: - Quantity of net electricity generation supplied by the project plants/units to the grid in year y ($EG_{facility,y}$) - Electricity supplied by the project to the grid in year y ($EG_{output,y}$) - The electricity used by the project and input from the grid in year y ($EG_{input,y}$) - Installed capacity of the hydropower plant after the implementation of the project activity (CAP_{PJ}). Quantity of net electricity generation supplied by the project plants/units to the grid in year y ($EG_{facility,y}$) are calculated by 2 parameters as below formula: $EG_{facility,y} = EG_{output,y} - EG_{input,y}$ The parameters $EG_{output,y}$ and $EG_{input,y}$ are continuously measured by the bidirectional electricity meters (main meter M1 and back-up meter M2) installed at the grid access points. Both meters are bidirectional. All the monitoring facilities and system have been verified by CTI through teleconference. The verification team has checked the location of the meters during teleconference against the diagram of power connection system /20/ and found them to be consistent, and also CTI verified that the meters were installed in accordance with the approved PDD. The backup meter data will be used when the main meter doesn't work normally. By checking the operation log /16/, the verification team confirmed that during this monitoring period, the main meter functioned well. At 24:00 of the last day of every month, the meter reading of main meter M1 are recorded by the Electricite du Laos (EDL) and project owner, the project owner will form Meter Reading Records (MRRs) while Electricite du Laos (EDL) will issue Electricity Receipts accordingly. The data reported in the monitoring report and ERs calculation spreadsheet can cover the monitoring period from 01/09/2019 - 31/12/2020 and have checked by the verification team. Supporting references and data required to determine the net electricity delivered to the grid is found to be complete and transparent. In the Monitoring Report (Version 1.0 dated 06/09/2021), the monitoring

	information of electricity meters, including installed location, type, accuracy, serial number, calibration as well as the cut off time of meter reading between EDL and project owner, are not mentioned. Therefore, CAR 02 was raised requiring PP to supplement the same. In the Monitoring Report (Version 2.0 dated 06/01/2022), the the monitoring information of electricity meters, including installed location, type, accuracy, serial number, calibration as well as the cut off time of meter reading between EDL and project owner have been correctly supplemented. Therefore, CAR 02 was closed. The project consists 3 units of turbines (7.4MW+7.4MW+4.4MW). The installed capacity 19.2MW of the project was verified by through teleconference and checking photos of nameplates of turbines and generators, as well as Installation, Operation and Maintenance Manual /12/ issued by Voith Hydro Private Limited. The Cap_{PJ} was monitored once at the beginning of the crediting period which meets the description in the approved PDD.
Conclusion	Monitoring of data and parameters related to the GHG emission reductions in the project activity have been carried out in accordance with the approved monitoring plan.

D.6.2.2 Sustainable Development Indicators monitored

Means of verification	The monitoring of the contribution to sustainable development during this monitoring period according to the sustainability monitoring plan in GS registered Passport is verified.	
Findings	**Indicator:**	Air Quality
	Chosen parameter:	The air quality indicators
	Parameter value:	Not applicable
	Mitigation Measures:	The project caused dust emission due to the construction work. The level of emission was complied with the legal dust emission limits. The project owner used wet damping, sprinklers to minimize the dust emission during the construction period.
	Data Source:	Air Quality Monitoring Report /43/, Dust and sprinkler Record /44/
	Original situation of parameter:	Not applicable
	Baseline situation of parameter:	Not applicable
	Target achieved?	Yes, by checking Air Quality Monitoring Report /43/ issued by the project owner during the construction period, it is confirmed that the air quality indicator such as SO_2, PM2.5, PM10 and NO_2 are all lower than the requirement in the WHO Air quality guidelines /45/ for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. By checking Dust and sprinkler Record /44/, it is confirmed wet damping, sprinklers had been used to minimize the dust emission during the construction period. Moreover, by checking stakeholder meeting memo /35/ and complaints book /47/ placed on the project site and online interview with stakeholders, the assessment team confirm the local people consider there are no negative impact from the project during the construction period for air quality.
	Procedure of monitoring:	Air quality indicators during the construction had been monitored and recorded. On site examination by the project owner and mitigation measurement during the construction period had been recorded. The same was monitored by the project owner on 20/09/2017, 27/08/2018 and 09/07/2019 during this monitoring period.

Means of verification:	By checking Air Quality Monitoring Report /43/ issued by the project owner during the construction period, it is confirmed that the air quality indicator such as SO_2, PM2.5, PM10 and NO_2 are all lower than the requirement in the WHO Air quality guidelines /45/ for particulate matter, ozone, nitrogen dioxide and sulfur dioxide. By checking Dust and sprinkler Record /44/, it is confirmed wet damping, sprinklers had been used to minimize the dust emission during the construction period. Moreover, by checking stakeholder meeting memo /35/ and complaints book /47/ placed on the project site and online interview with stakeholders, the assessment team confirm the local people consider there are no negative impact from the project during the construction period for air quality.
Cross-check:	Not applicable

Indicator:	Water quality and quantity
Chosen parameter:	Flow rate of water released from the weir The water quality indicators
Data Source:	Water flow monitoring records /39/ and Water Quality Analysis Report /40/
Parameter value:	Not applicable
Mitigation Measures:	The minimum flow which is no less than the natural flow in the dry season will be released to maintain the eco-system and meet demand for irrigation in the downstream. On-site treatment of construction wastewater prior to discharge.
Original situation of parameter:	Not applicable
Baseline situation of parameter:	Not applicable
Target achieved?	Yes, after checking Water flow monitoring records /39/ and Water Quality Analysis Report /40/ and interview with the stakeholders, it is confirmed that water flow is always above the minimum water flow which was indicated in the Final IEE (Initial Environmental Examination) Report /30/ of project and the water quality in the weir and powerhouse meet the requirement of WHO Guidelines for Drinking-water Quality /46/. By checking stakeholder meeting memo /35/, it is able to confirm there was no negative impact identified for wastewater due to the construction of the project.
Procedure of monitoring:	Examination by the environment monitoring department according to the relevant standards and regulations. The water quality examination will be conducted at least monthly; the water flow will be examined and recorded daily.
Means of verification:	After checking Water flow monitoring records /39/ and Water Quality Analysis Report /40/ and interview with the stakeholders, it is confirmed that water flow is always above the minimum water flow which was indicated in the Final IEE (Initial Environmental Examination) Report /30/ of project and the water quality in the weir and powerhouse meet the requirement of WHO Guidelines for Drinking-water Quality /46/. By checking stakeholder meeting memo /35/, it is able to confirm there was no negative impact identified for wastewater due to the construction of the project.
Cross-check:	Not applicable

Indicator:	Soil condition

Chosen parameter:	Replantation
Data Source:	Confirmation letter for the Soil Condition Protection and Recovery /41/
Parameter value:	Not applicable
Mitigation Measures:	To prevent soil erosion, lots of mitigation measures, such as afforestation, stockpiling removed soil and reuse, will be taken. Furthermore, trees and grass will be planted in the non-plant slopes. Drain system will be established in the quarry area and slag yard will be covered during rainy season. Thus, the construction of the project will not lead to observable change in soil quality.
Original situation of parameter:	Not applicable
Baseline situation of parameter:	Not applicable
Target achieved?	Yes, after online remote assessment and photos of project site /17/, it is confirmed that the project has no negative effect for the soil condition, even soil condition was recovered and improved. The same has been confirmed by interview with stakeholders. By checking Confirmation letter for the Soil Condition Protection and Recovery /41/ issued by Water Resource of Environmental Administration of Vientiane Province (local EPB), it is confirmed that the bared soil due to the project construction has been covered during rainy season in construction period and most of bared ground have been replanted by grass lawn and palm, proper irrigation facilities have been equipped. By checking stakeholder meeting memo /35/, it is able to confirm there was no negative impact identified for soil due to the construction of the project. Therefore, the verification team confirmed that the project has no negative effect for the soil condition; even soil condition was recovered and improved.
Procedure of monitoring:	The soil condition is monitored yearly, the same was observed by the project owner during site visits and examined by Water Resource of Environmental Administration of Vientiane Province (local EPB) on 20/09/2019 during this monitoring period.
Means of verification:	After online remote assessment and photos of project site /17/, it is confirmed that the project has no negative effect for the soil condition, even soil condition was recovered and improved. The same has been confirmed by interview with stakeholders. By checking Confirmation letter for the Soil Condition Protection and Recovery /41/ issued by Water Resource of Environmental Administration of Vientiane Province (local EPB), it is confirmed that most of bared ground have been replanted by grass lawn and palm, proper irrigation facilities have been equipped. By checking stakeholder meeting memo /35/, it is able to confirm there was no negative impact identified for soil due to the construction of the project. Therefore, the verification team confirmed that the project has no negative effect for the soil condition; even soil condition was recovered and improved.
Cross-check:	Not applicable

Indicator:	Other pollution
Chosen parameter:	Noise
Data Source:	Noise Monitoring Report /42/

Parameter value:	Not applicable
Mitigation Measures:	To prevent noise impact, the drilling machines should be equipped with noise control devises such as mufflers. Construction workers exposed to noise levels of 80 dB or more should be provided with adequate hearing protection.
Original situation of parameter:	Not applicable
Baseline situation of parameter:	Not applicable
Target achieved?	Yes, by checking the Noise Monitoring Report /42/ issued by Water Resource of Environmental Administration of Vientiane Province (local EPB), it is confirmed that the noise generated due to the project during both construction and operation period are all lower than 80 dB which meet the related requirement. The same has been confirmed through online interview with stakeholders.
Procedure of monitoring:	Other pollution was examined by Water Resource of Environmental Administration of Vientiane Province (local EPB) yearly during operation. The same was examined by Water Resource of Environmental Administration of Vientiane Province (local EPB) on 12/11/2019 and 30/09/2020 during this monitoring period.
Means of verification:	By checking the Noise Monitoring Report /42/ issued by Water Resource of Environmental Administration of Vientiane Province (local EPB), it is confirmed that the noise generated due to the project during both construction and operation period are all lower than 80 dB which meet the related requirement. Furthermore, workers exposed to noise levels has been provided with adequate hearing protection, the drilling machines were equipped with noise control devises, and the construction time is strictly limited to reduce the impact. The same has been confirmed through online interview with stakeholders and staff from the project owner.
Cross-check:	Not applicable

Indicator:	Biodiversity
Chosen parameter:	Recovery the vegetation
Data Source:	Stakeholder meeting memo /35/
Parameter value:	Not applicable
Mitigation Measures:	The project owner will enforce soil conservation actions during and after the construction period according to relevant local regulation.
Original situation of parameter:	Not applicable
Baseline situation of parameter:	Not applicable
Target achieved?	Yes, through checking photos /17/ and online remote assessment, it is able to confirm the vegetation has been recovered and fish passage have been introduced. By checking stakeholder meeting memo /35/, it is able to confirm none of the locals thought the project's construction and operation leads to negative impact on biodiversity. The same has been confirmed through online interview with stakeholders.
Procedure of monitoring:	Monitored during site visit by the project owner and through interviewing with local stakeholders

Means of verification:	Through checking photos /17/ and online remote assessment, it is able to confirm the vegetation has been recovered and fish passage have been introduced. By checking stakeholder meeting memo /35/, it is able to confirm none of the locals thought the project's construction and operation leads to negative impact on biodiversity. The same has been confirmed through online interview with stakeholders.
Cross-check:	Not applicable

Indicator:	Quality of employment
Chosen parameter:	Training Plan
Parameter value:	Not applicable
Data Source:	Training Record /34/
Mitigation Measures:	Staff will be trained for the positions created during construction & operation phases. All Health and Safety measurements will be applied according to local regulations.
Original situation of parameter:	Not applicable
Baseline situation of parameter:	Not applicable
Target achieved?	Yes, 2 trainings sessions were provided by the project owner.
Procedure of monitoring:	The training were conducted by the project owner yearly and training records were kept.
Means of verification:	By checking all the training records /34/, it is confirmed that the project owner provides sufficient training for the employee for operation, maintenance, safety and health, as well as environmental protection. The training during this monitoring period were conducted during 16/08/2019 to 19/08/2019 and from 07/09/2020 to 10/09/2020. Each training lasts four days. The same has been confirmed through online interview with employees of the project owner.
Cross-check:	Not applicable

Indicator:	Livelihood of the poor
Chosen parameter:	Number of the installed pumps on-site
Data Source:	Statement from villager leads of local area /37/
Parameter value:	4 pumps have been installed.
Mitigation Measures:	Water supply program was prepared for the local people to improve their water supply system.
Original situation of parameter:	Local residents lack the basic water supply system
Baseline situation of parameter:	Local residents lack the basic water supply system.
Target achieved?	Yes, by checking photos of pumps /17/, as well as interview stakeholders during online remote assessment, the verification team confirmed that 4 pumps were installed due to the installation of the project activity in order that clean water could be accessed by local villagers. By checking Statement from villager leads of local area /37/, it is confirmed that 421 persons including 205 females in 2019 and 430 persons including 209 females in 2020 were benefited from

	the 4 pumps.
Procedure of monitoring:	The project owner records the number of pump and people involved yearly.
Means of verification:	By checking photos of pumps /17/, as well as interview stakeholders during online remote assessment, the verification team confirmed that 4 pumps were installed due to the installation of the project activity in order that clean water could be accessed by local villagers. By checking Statement from villager leads of local area /37/, it is confirmed that 421 persons including 205 females in 2019 and 430 persons including 209 females in 2020 were benefited from the 4 pumps.
Cross-check:	Not applicable

Indicator:	Access to affordable and clean energy services
Chosen parameter:	Net electricity generation by project activity
Data Source:	Meter Reading Records (MRRs) /19/ and Electricity Receipts /21/
Parameter value:	185,945.621 MWh
Mitigation Measures:	Not applicable
Original situation of parameter:	Local residents adopt firewood as the main energy source, which may lead damage to forest and biodiversity.
Baseline situation of parameter:	Local residents adopt firewood as the main energy source, which may lead damage to forest and biodiversity.
Target achieved?	Yes. 185,945.621 MWh Affordable and clean energy were generated during this monitoring period.
Procedure of monitoring:	Quantity of net electricity generation supplied by the project plants/units to the grid in year y ($EG_{facility,y}$) are calculated by 2 parameters as below formula: $EG_{facility,y} = EG_{output,y} - EG_{input,y}$ The parameters $EG_{output,y}$ and $EG_{input,y}$ are continuously measured by the bidirectional electricity meters (main meter M1 and back-up meter M2) installed at the grid access points. Both meters are bidirectional.
Means of verification:	Meter Reading Records (MRRs) formed by the project owner and Electricity Receipts issued by Electricite du Laos (EDL) have been checked. Data in the MRRs were used to report through a cross check with the Electricity Receipts. The most conservative values were applied to calculate electricity supplied by the project to the grid in year y ($EG_{output,y}$) and the electricity used by the project and input from the grid in year y ($EG_{input,y}$).
Cross-check:	Not applicable

Indicator:	Quantitative employment and income generation
Chosen parameter:	Number of jobs created
Data Source:	Statement for salary and welfare of employee /36/
Parameter value:	15 long-term work positions for local people have been created, the salary of all the workers is far beyond 1,100,000 LAK per month, which is the lowest salary standard of Laos.
Mitigation Measures:	During the construction period, job opportunities were provided to local residents, and the existence of the project in the area

		will bring local people especially the poor and disadvantaged groups lots of employment chances
	Original situation of parameter:	No employment opportunities.
	Baseline situation of parameter:	No employment opportunities.
	Target achieved?	Yes. After checking Statement for salary and welfare of employee /36/, it is confirmed that 15 long-term work positions for local people (including 5 females) have been created yearly, the salary of all the workers is far beyond 1,100,000 LAK per month, which is the lowest salary standard of Laos /50/. The same has been confirmed through online interview with employees of the project owner.
	Procedure of monitoring:	The project owner records the quantity of the work position and salary monthly.
	Means of verification:	After checking Statement for salary and welfare of employee /36/, it is confirmed that 15 long-term work positions, including 5 female positions, for local people have been created yearly, the salary of all the workers is far beyond 1,100,000 LAK per month, which is the lowest salary standard of Laos /50/. The same has been confirmed through online interview with employees of the project owner.
	Cross-check:	Not applicable
	In the Monitoring Report (Version 1.0 dated 06/09/2021), for SD indicators, the times of training provided by the project owner (Quality of employment) is missing; evidence to demonstrate the number of local persons benefit from the pumps (Livelihood of the poor) does not provided; the detailed value of lowest salary standard of Laos (Quantitative employment and income generation) is missing. Therefore, CAR 03 was raised requiring PP to supplement to provide the same. In the Monitoring Report (Version 2.0 dated 06/01/2022), the times of training provided by the project owner and the detailed value of lowest salary standard of Laos have been supplemented, and evidence to demonstrate the number of local persons benefit from the pumps has been provided. Therefore, CAR 03 was closed.	
Conclusion	Therefore, based on the document review and onsite verification, according to Gold Standard version 2.2 and based on the verification team's local and sectorial knowledge, it is confirmed that the SD monitoring activities comply with the monitoring plan of the registered GS passport including the SD indicators monitoring requirements. CTI is of the opinion that the project activity contributed positively to the SD during the 1st monitoring period.	

E.6.3. Implementation of sampling plan

Means of verification	Not applicable
Findings	Not applicable
Conclusion	Not applicable

E.7. Compliance with the calibration frequency requirements for measuring instruments

Means of verification	The documents review was carried out. Particular attention was paid to the frequency of measurements, the quality of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the PDD and the selected methodology and corresponding tool(s), and the quality assurance and quality control procedures.

<table>
<tr><td>Findings</td><td>The meters installed for the project activity have been calibrated periodically as per the relevant industrial standard by the accredited qualified third party to ensure the monitoring equipment' accuracy and in good conditions. The relevant information of meters' calibration is listed as below:

<table>
<tr><th>Item</th><th>Main meter M1</th><th>Backup meter M2</th></tr>
<tr><td>Type</td><td>Mk6E</td><td>Mk6E</td></tr>
<tr><td>Serial Number</td><td>218256993</td><td>218256994</td></tr>
<tr><td>Accuracy</td><td>0.2s</td><td>0.2s</td></tr>
<tr><td>Calibration Frequency</td><td>Annually</td><td>Annually</td></tr>
<tr><td>Calibration Date</td><td>15/07/2019
01/07/2020</td><td>25/07/2019
01/07/2020</td></tr>
<tr><td>Validity</td><td>14/07/2020
30/06/2021</td><td>24/07/2020
30/06/2021</td></tr>
<tr><td>Calibration Institute</td><td colspan="2">EDL</td></tr>
</table>
The calibration for meters was conducted by the Electricite du Laos (EDL), which is the state corporation of Laos and operates electricity generation, electricity transmission and electricity distribution assets in Lao PDR. Calibration records have been verified by the verification team. The accuracy of both meters is 0.2s, higher than the requirement 0.5 indicated in the approved monitoring plan. The calibration frequency of meters is annually, which is in line with the sectoral requirement and consistent with the monitoring plan in the approved PDD.

Hence, CTI confirmed that the meters' accuracy and calibration interval are in line with the requirement of the approved monitoring plan, and the calibrations of meters are verified to be valid for the whole reporting period.</td></tr>
<tr><td>Conclusion</td><td>The meters have been installed and calibrated in accordance with the approved monitoring plan. The meters' accuracy and calibration interval are in line with the requirement of the approved monitoring plan, and the calibrations of meters are verified to be valid for the whole reporting period.</td></tr>
</table>

E.8. Assessment of data and calculation of emission reductions or net removals

E.8.1. Calculation of baseline GHG emissions or baseline net GHG removals by sinks

<table>
<tr><td>Means of verification</td><td>Cross-checking the baseline GHG emissions calculation in the MR against that in the ER spreadsheet and the approved PDD.</td></tr>
<tr><td>Findings</td><td>According to the applied methodology ACM0002 (Version 16.0), the baseline GHG emissions (BE_y) are calculated from quantity of net electricity generation supplied by the project plants/units to the grid in year y ($EG_{facility,y}$) by the project activity multiplied by the baseline emission factor ($EF_{grid,CM,y}$);

As per the approved PDD, the baseline emission factor ($EF_{grid,CM,y}$) is confirmed to be 0.5595 tCO_2e/MWh. Quantity of net electricity generation supplied by the project plants/units to the grid in year y ($EG_{facility,y}$) is calculated by:

$EG_{facility,y} = EG_{output,y} - EG_{input,y}$

Data in the MRRs were used to report through a cross check with the Electricity Receipts. The most conservative values were applied to calculate electricity supplied by the project to the grid in year y ($EG_{output,y}$) and the electricity used by the project and input from the grid in year y ($EG_{input,y}$).

Electricity supplied by the project to the grid in year y ($EG_{output,y}$) during this monitoring period is shown as below:

<table>
<tr><th rowspan="2">Period</th><th>Values from MRRs</th><th>Values from Electricity Receipts</th><th>Conservative value for ER calculation</th></tr>
<tr><th>A</th><th>B</th><th>C=MIN (A, B)</th></tr>
</table></td></tr>
</table>

	MWh	MWh	MWh
01/09/2019~30/09/2019	10,030.909	10,030.909	10,030.909
01/10/2019~31/10/2019	10,455.677	10,455.677	10,455.677
01/11/2019~30/11/2019	11,028.024	11,028.024	11,028.024
01/12/2019~31/12/2019	11,147.297	11,147.297	11,147.297
01/01/2020~31/01/2020	11,408.308	11,408.308	11,408.308
01/02/2020~29/02/2020	11,487.097	11,487.097	11,487.097
01/03/2020~31/03/2020	11,735.273	11,735.273	11,735.273
01/04/2020~30/04/2020	12,005.209	12,005.209	12,005.209
01/05/2020~31/05/2020	12,106.255	12,106.255	12,106.255
01/06/2020~30/06/2020	12,281.225	12,281.225	12,281.225
01/07/2020~31/07/2020	12,740.250	12,740.250	12,740.250
01/08/2020~31/08/2020	12,475.704	12,475.704	12,475.704
01/09/2020~30/09/2020	12,153.578	12,153.578	12,153.578
01/10/2020~31/10/2020	12,328.518	12,328.518	12,328.518
01/11/2020~30/11/2020	11,382.865	11,382.865	11,382.865
01/12/2020~31/12/2020	11,183.043	11,183.043	11,183.043
Total	**-**	-	**185,949.232**

The electricity used by the project and input from the grid in year y ($EG_{input,y}$) during this monitoring period is shown as below:

Period	**Values from MRRs**	**Values from Electricity Receipts**	**Conservative value for ER calculation**
	A	**B**	**C=MAX (A, B)**
	MWh	**MWh**	**MWh**
01/09/2019~30/09/2019	0.207	0.207	0.207
01/10/2019~31/10/2019	0.195	0.195	0.195
01/11/2019~30/11/2019	0.179	0.179	0.179
01/12/2019~31/12/2019	0.177	0.177	0.177
01/01/2020~31/01/2020	0.214	0.214	0.214
01/02/2020~29/02/2020	0.205	0.205	0.205
01/03/2020~31/03/2020	0.258	0.258	0.258
01/04/2020~30/04/2020	0.198	0.198	0.198
01/05/2020~31/05/2020	0.245	0.245	0.245
01/06/2020~30/06/2020	0.211	0.211	0.211
01/07/2020~31/07/2020	0.239	0.239	0.239
01/08/2020~31/08/2020	0.288	0.288	0.288
01/09/2020~30/09/2020	0.255	0.255	0.255
01/10/2020~31/10/2020	0.261	0.261	0.261
01/11/2020~30/11/2020	0.262	0.262	0.262
01/12/2020~31/12/2020	0.217	0.217	0.217
Total	-	-	**3.611**

It is confirmed by CTI that electricity supplied by the project to the grid in year y is 185,949.232 MWh, The electricity used by the project and input from the grid in year y is 3.611 MWh within this monitoring period through checking MRRs and Electricity Receipts during the online remote assessment through teleconference. Thus, quantity of net electricity generation supplied by the

	project plants/units to the grid in year y is calculated to be 185,945.621 MWh. Hence, the baseline emissions during this monitoring period 01/09/2019 - 31/12/2020 was calculated as: $BE_y = EG_{facility} \times EF_{grid,CM,y} = 185,945.621 \times 0.5595\ tCO_2e/MWh = 104,038\ tCO_2e$
Conclusion	The verification team confirmed that the calculation of the baseline emissions is correct.

E.8.2. Calculation of project GHG emissions or actual net GHG removals by sinks

Means of verification	The calculation process of the project GHG emissions has been verified against the methodology and the approved PDD.
Findings	By checking the approved PDD and verified through teleconference, CTI confirmed that the project activity does not involve the fossil fuel consumption and geothermal power, so $PE_{FF,y} = 0$, $PE_{GP,y} = 0$, and the project activity do not involve the reservoir, so $PE_{HP,y} = 0$. Therefore, the project emission (PE_y) is considered as zero ($PE_y = 0$). Therefore, no project emissions are envisaged from the project activity.
Conclusion	The verification team confirmed that the project GHG emissions during this monitoring period are 0 tCO_2e.

E.8.3. Calculation of leakage GHG emissions

Means of verification	According to the applied methodology ACM0002 (Version 16.0), the leakage of the project is not considered.
Findings	According to the applied methodology ACM0002 (Version 16.0), the leakage of the project is not considered.
Conclusion	According to the applied methodology ACM0002 (Version 16.0), the leakage of the project is not considered.

E.8.4. Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

Means of verification	Cross-checking the data applied for ER calculation with all the relevant documents as listed in Appendix 3, and the ER calculation in the MR against that in the ER spreadsheet and the approved PDD.
Findings	According to the applied methodology ACM0002 (Version 16.0), the emission reductions are determined as the difference between the baseline emissions, project emissions and leakage: $ER_y = BE_y - PE_y$ As verified in section E.8.2 and section E.8.3, the PE_y is 0 and leakage is not considered. Thus, the emission reductions for the project are accounted as follows: $ER_y = BE_y = EG_{facility} \times EF_{grid,CM,y} = 104,038\ tCO_2e$ All the figures as per the monitoring report were cross-checked by the verification team against all monitored data as assessed in the section E.6.1 and E.6.2 of this report.
Conclusion	The verification team has confirmed that the calculation of the emission reductions is correct.

E.8.5. Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PDD

Means of verification	The section E.5 of MR is cross-checked against the approved PDD.
Findings	By checking Statement from Entura Hydro Tasmania Pvt Ltd. /18/ (involved as detailed engineering consultants for the project activity), NN3 project has not started operation during this monitoring period of the project activity. The emission reductions claimed are 104,038 tCO_2e in this monitoring period (488 days) and the yearly expected emission reductions are 72,735 tCO_2e (before operation of NN3 project) in the approved PDD. The actual emission reductions reported are 6.98% higher than the expected value of 97,246 tCO_2e (72,735 * 488 / 365).
Conclusion	CTI verified the input data for calculating emission reductions and the calculating process, and confirmed the result were complete and transparent.

E.8.6. Remarks on difference from estimated value in registered PDD

Means of verification	The section E.6 of MR is cross-checked against the approved PDD.
Findings	The reported emission reductions in this monitoring period 6.98% higher than the expected value. CTI consider this is under normal variation. The increase is mainly due to the fluctuation of rainfall and water flow during this monitoring period. Moreover, according to the approved PDD only if the electricity increases by 31.18% in each year during the lifetime can the project reach the benchmark. Therefore, the verification team confirmed that the increasement of emission reductions (also the net electricity generation) is far less than 31.18%, which will not affect the additionality of the project activity. In the Monitoring Report (Version 1.0 dated 06/09/2021), the impact on additionality caused by increasement of electricity generation as expected during this monitoring period was not clarified. Therefore, CL 01 was raised requiring PP to clarify the same. In the Monitoring Report (Version 2.0 dated 06/01/2022), PP clarify the impact on additionality as per data in the approved PDD and confirmed by CTI to be correct and reasonable. Therefore, CL 01 was closed.
Conclusion	Considering the fluctuation of rainfall and water flow, and actual operational status of hydro turbines, CTI confirms that the actual power supply and also emission reductions reported in this monitoring period are reasonable and appropriate.

E.8.7. Actual GHG emission reductions or net anthropogenic GHG removals by sinks during the first commitment period and the period from 1 January 2013 onwards

Means of verification	The section E.4 of MR is cross-checked against the approved PDD.
Findings	This monitoring period is from 01/09/2019 - 31/12/2020. As verified in section E.8.4, the emission reductions achieved is verified by the verification team as below:

Item	Actual values achieved up to 31/12/2012	Actual values achieved from 01/01/2013 onwards (01/09/2019 - 31/12/2020)	Actual values achieved from 01/01/2021 onwards

	ER_y (tCO_2)	0	104,038	0
Conclusion	CTI verified the input data for calculating emission reductions and the calculating process, and confirmed the result were complete and transparent.			

SECTION F. Double Counting Assessment

The VVB has checked for double counting by reviewing all relevant registries including CDM /48/, VCS /49/ and other GHGs programs such as EU ETS, IREC or subnational, various regional schemes such as the Canadian and American provincial/state-based schemes. CTI confirmed that there is no potential exists for Double Counting of emissions reductions due to issuance of Gold Standard VERs/CO2-certificates from the considered project activity. Therefore, It is concluded that the double counting of the ER calculation was avoided and the risk of double counting is unlikely to happen.

SECTION G. Internal quality control

This final verification report including the initial findings underwent a technical review before being submitted to the project participant and requesting issuance of CERs of the project activity according to CTI internal procedure. The technical reviewers were not part of the verification team, and the technical review was independently of the verification team.

SECTION H. Verification opinion

In CTI's opinion, the GHG emission reductions reported for the project in the monitoring report (Version 2.0 dated 06/01/2022) are fairly stated. The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 (Version 16.0) and the monitoring plan contained in the Project Design Document (Version 2.3 dated 03/04/2021).

CTI confirmed that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI is able to certify that emission reductions from "Nam Pha Gnai Hydropower Project" during the period 01/09/2019 - 31/12/2020 amount as follows:

Baseline emissions: 104,038 tCO_2e

Project emissions: 0 tCO_2e

Leakage: 0 tCO_2e

Emission reductions: 104,038 tCO_2e

SECTION I. Certification statement

Shenzhen CTI International Certification Co., Ltd (CTI) has performed the verification of the emission reductions that have been reported for the CDM project activity 10241 "Nam Pha Gnai Hydropower Project" in Lao PDR for the period 01/09/2019 - 31/12/2020.

The verification is based on the baseline and monitoring methodology ACM0002 (Version 16.0), the approved PDD, and the monitoring report (Version 2.0 dated 06/01/2022) for this monitoring period 01/09/2019 - 31/12/2020. The verification consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification and certification report.

The project participant is responsible for the collection, calculation and determination of the GHG data in accordance with the monitoring plan and the reporting of GHG emission reductions on the basis set out within the project monitoring report.

It is CTI's responsibility to provide an independent verification statement on the reported GHG emission reductions for the project. Based on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these, CTI planned and performed our work to obtain the information and explanations that we considered necessary to provide reasonable assurance that reported GHG emission reductions are fairly stated.

CTI confirmed that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI confirms the emission reduction credits from the "Nam Pha Gnai Hydropower Project" in Lao PDR during the period of 01/09/2019 - 31/12/2020 amount to 104,038 tCO_2e.

Mr. Du Wenjun

Team Leader

18/01/2022

Ms. Wang Guolian

Technical Reviewer

18/01/2022

Appendix 1. Abbreviations

Abbreviations	Full texts
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CL	Clarification request
CO2	Carbon dioxide
CO_2e	Carbon dioxide equivalent

CTI	Shenzhen CTI International Certification Co., Ltd
DOE	Designated Operational Entity
EDL	Electricite du Laos
EF	Emission Factor
ER	Emission Reduction
ETN	Electricity Transaction Note
FAR	Forward Action Request
GS	Gold Standard
GSR	Gold Standard Requirement
GST	Gold Standard Toolkit
GSP	Gold Standard Passport
MP	Monitoring Plan
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
MR	Monitoring Report
LPG	Lao Power Grid
TPG	Thailand Power Grid
PDD	Project Design Document
PPA	Power Purchase Agreement
PS	Project Standard
tCO_2e	Tonnes of CO_2 equivalents
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Clean Development Mechanism Validation and Verification Standard

Appendix 2. Competence of team members and technical reviewers

Mr. Wenjun DU

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	√	√	√	√	-	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by: Wu Lin

Wu LIN

Technical Competent Manager

Shenzhen, 01/01/2021

Mr. Dezheng TONG

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification					
GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
√	√	√	√	-	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 8: Mining/mineral production	TA 8.1: Mining/mineral production
SS 10: Fugitive emissions from fuels (solid, oil and gas)	TA 10.1: Fugitive emissions from oil and gas

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by: Wu Lin
Wu LIN
Technical Competent Manager
Shenzhen, 01/07/2019

Ms. Guolian WANG

Satisfies the requirements of competence management system of CTI Certification, and is hereby appointed as:

Qualification						
Status	GHG Auditor	Validator	Verifier	Team Leader	Technical Reviewer	Technical Expert
Date	√	√	√	√	√	√

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 3: Energy demand	TA 3.1: Energy demand
SS 4: Manufacturing industries	TA 4.1. Cement and lime production
SS 5: Chemical industry	TA 5.1: Chemical industry
	TA 5.2: Caprolactam, nitric and adipic acid
SS 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	TA 11.1: Emissions of fluorinated gases
	TA 11.2: Refrigerant gas production
SS 12: Solvents use	TA 12.1: Chemical industry

This appointment is valid for 3 years from its date of approval below and is bound by internal requirements of management system of the Certification Body of CTI.

Approved by:

Wu LIN Wu Lin

Technical Competent Manager

Shenzhen, 01/01/2021

Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
/1/	Project Owner	Monitoring Report during the 1st monitoring period	Version 1.0 dated 06/09/2021 and Version 2.0 dated 06/01/2022	Project participant
/2/	Project Owner	Emission reduction calculation spreadsheet during the 1st monitoring period	Version 01 dated 26/09/2021 Version 02 dated 06/01/2022	Project participant
/3/	Beijing Karbon Energy Consulting Co., Ltd.	Registered GS PDD of project activity	Version 2.1 dated 03/11/2015	Project participant
/4/	TÜV Rheinland (China) Ltd.	Validation report of project activity	Version 2.1 dated 25/11/2015	Project participant
/5/	Project Owner	Approved CDM PDD (for PRC)	version 2.3 dated 03/04/2021	Project participant
/6/	Shenzhen CTI International Certification Co., Ltd	Assessment Opinion of Approved PDD (for PRC)	Version 01 dated 12/04/2021	Project participant
/7/	Beijing Karbon Energy Consulting Co., Ltd.	Design Change MemO	16/09/2021	Project participant
/8/	Shenzhen CTI International Certification Co., Ltd	Validation report form for post-registration changes for GS project activities	Version 02.1 dated 12/10/2021	Project participant
/9/	GS	Registered Passport	Version 05 dated 05/05/2016	Project participant
/10/	GS	Registration Review Form Design Change Review Form	20/05/2016 16/06/2021	Project participant
/11/	Project Owner	Certificate for Commercial Operation Date	28/08/2019	Electricite Du Laos
/12/	Voith Hydro Private Limited	Installation, Operation and Maintenance Manual	2016	Project participant
/13/	Project Owner	Power purchase agreement for Nam Pha Gnai Hydropower Project	December 2013	Project participant
/14/	Project Owner	CDM & GS Monitoring Manual	-	Project participant
/15/	Project Owner	Planning and records of training for on-site staff	-	Project participant
/16/	Project Owner	Operation Log	01/09/2019 - 31/12/2020	Project participant
/17/	Project Owner	photos of main/backup meters, nameplates of turbines and generators, central control room, and powerhouse, pumps, road, vegetation, soil, noise control devises etc.	-	Project participant
/18/	Entura Hydro Tasmania Pvt Ltd.	Statement for the project activity	08/03/2021	Project participant
/19/	Project Owner	Meter Reading Records	01/09/2019 - 31/12/2020	Project participant
/20/	Project Owner	Diagram of power connection system	-	Project participant

/21/	Power Grid Company	Electricity Receipts	01/09/2019 - 31/12/2020	Project participant
/22/	EDL	Calibration certificates of the meter M1	15/07/2019 01/07/2020	Project participant
		Calibration certificates of the meter M2	25/07/2019 01/07/2020	
/23/	EB	CDM project standard for project activities	Version 03.0	EB
/24/	EB	CDM validation and verification standard for project activities	Version 03.0	EB
/25/	EB	ACM0002: Grid-connected electricity generation from renewable sources	Version 16.0	EB
/26/	EB	Standard for application of the global warming potential to clean development mechanism project activities and programmes of activities for the second commitment period of the Kyoto Protocol, Annex 3 of EB69	13/09/2012	EB
/27/	EB	Guideline- Completing the monitoring report form	Version 09.0	EB
/28/	EB	Guideline- Completing the verification and certification report form for CDM project activities	Version 04.0	EB
/29/	EB	CDM project cycle procedure for project activities	Version 03.0	EB
/30/	Somsanouk (SSN) Consultant Co., Ltd.	Initial Environmental Examination (IEE) Report	August 2012	Project participant
/31/	Ministry of Natural Resource and Environment of Lao PDR	IEE Approval No.1542	02/08/2012	Project participant
/32/	Arne Winther Anderson,	Feasibility Study Report (FSR)	March 2013	Project participant
/33/	Department of Electricity of Ministry of Energy and Mines of Lao PDR	FSR Approval No. 057	19/04/2013	Project participant
/34/	Nam Pha Gnai Hydropower Co., Ltd.	Training Records	In relation with operation, maintenance, safety,	Project participant
/35/	Local stakeholders	stakeholder meeting memo	stakeholder meeting memo for SDG monitoring	Project participant
/36/	Nam Pha Gnai Hydropower Co., Ltd.	Statement for salary and welfare of employee	2019 - 2020	Project participant
/37/	Nam Pha Gnai Hydropower Co., Ltd.	Statement from villager leads of local area	20/12/2021	Project participant
/38/	GS	The Gold Standard Toolkit Version 2.2	/	Project participant
/39/	Water Resource and Environmental Administration of Luang Namtha Province	Monthly Water Flow Rate from the Weir	/	Project participant
/40/	Water Resource and Environmental	Water Quality Analysis Report	23/12/2019 20/12/2020	Project participant

	Administration of Luang Namtha Province			
/41/	Water Resources and Environment Administration of Luang Namtha Province	Confirmation letter for the Soil Condition Protection and Recovery	20/09/2019	Project participant
/42/	WREA office, Long District, Laungnumtha Provice	Noise Monitoring Report	12/11/2019 30/09/2020	Project participant
/43/	Luang Paseuth Construction Sole Co. ltd.	Air Quality Monitoring Report	20/09/2017 27/08/2018 09/07/2019	Project participant
/44/	Nam Pha Gnai Hydropower Co., Ltd.	Dust and sprinkler Record of construction period	/	Project participant
/45/	WHO	WHO Global Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide	http://www.ghd.pku.edu.cn/docs/2021-09/2f00edbd847d4b3183f17393e43afa86.pdf	Public Website
/46/	WHO	WHO Guidelines for Drinking-water Quality	https://sites.unicef.org/cholera/Chapter_4_prevention/01_WHO_Guidelines_for_drinking_water_quality.pdf	Public Website
/47/	Project Owner	Complaints Book	/	Project participant
/48/	UNFCCC	UNFCCC website	https://cdm.unfccc.int	Public Website
/49/	VERRA	VCS	https://verra.org/project/vcs-program/	Public Website
/50/	Nam Pha Gnai Hydropower Co., Ltd.	Lowest salary standard of Laos	https://wageindicator.org/salary/minimum-wage/laos	Public Website
/51/				

Appendix 4. Clarification requests, corrective action requests and forward action requests

Table 1. Remaining FAR from validation and/or previous verifications

FAR ID	NA	**Section no.**	NA	**Date:** NA
Description of FAR				
Project participant response				**Date:** NA
Documentation provided by project participant				
DOE assessment				**Date:** NA

Table 2. CL from this verification

CL ID	01	**Section no.**	E.8.6	**Date:** 25/10/2021
Description of CL				
As mentioned in E.5.1 and E.6 of the monitoring report, the emission reduction generated during this monitoring period is 6.98% higher than expected. PP is required to clarify the impact on additionality due to the higher emission reduction as expected in this monitoring period.				
Project participant response				**Date:** 06/01/2022
According to the additionality demonstration in the registered PDD, only if the power supplied amount is increased by 31.18%, the project IRR can reach the benchmark. During the monitoring period from 01/09/2019 to 31/12/2020 (488 days in total), the net power supplied to the gird was 185,945.621MWh. The corresponding value in PDD (488 days and when NN3 is not in production) is 130,000 MWh * 488/365 = 173,808.219 MWh. The actual power supplied amount is just 6.98% higher than the value in PDD, so the project is still additional. The above description has been added in the MR.				
Documentation provided by project participant				
Updated MR				
DOE assessment				**Date:** 07/01/2022
In the Monitoring Report (Version 2.0 dated 06/01/2022), PP clarify the impact on additionality as per data in the approved PDD and confirmed by CTI to be correct and reasonable. According to the approved PDD only if the electricity increases by 31.18% in each year during the lifetime can the project reach the benchmark. Therefore, the verification team confirmed that the increasement of emission reductions (also the net electricity generation) is far less than 31.18%, which will not affect the additionality of the project activity. Therefore, CL 01 was closed.				

Table 3. CAR from this verification

CAR ID	01	**Section no.**	E.1	**Date:** 25/10/2021
Description of CAR				
The MR (version 1.0 dated 06/09/2021) was made publicly available on the UNFCCC website when the latest available version of the CDM-MR-FORM is the version 08.0. However, the CDM-MR-FORM version 09.0 was issued by EB on 08/10/2021. Therefore. PP was required to use the latest version of MR template.				
Project participant response				**Date:** 06/01/2022
The MR has been updated using MR template Version 09.0.				
Documentation provided by project participant				
Updated MR				
DOE assessment				**Date:** 07/01/2022
By checking the MR (version 2.0 dated 06/01/2022), CTI confirmed that the latest version has been applied for the MR and the input is according to the instructions for filling out the monitoring report form. Therefore, CAR 01 was closed.				

CAR ID	02	**Section no.**	E.6.2	**Date:** 25/10/2021

Description of CAR	
Please supplement the monitoring information of electricity meters, including but not limited to: installed location, type, accuracy, serial number and calibration. Also, please supplement the cut off time between EDL and project owner.	
Project participant response	**Date:** 06/01/2022

The relative information has been added in the parameter table in D.2 of the updated MR.
The main and backup meters are installed at the grid access points. During the 1st monitoring period, the meter functioned well, and the meter validity period covered all of monitoring period. The backup meter data will be used when the main meter doesn't work normally. The cut-off time of the power between EDL and project owner is the 24:00 on the last day of every month.

Bidirectional electronic meter	Main meter(M1)	Backup meter(M2)
Type:	Mk6E	Mk6E
Accuracy class	0.2s	0.2s
Serial Number	218256993	218256994
Calibration frequency:	At least once a year	At least once a year
Calibration history	Calibrated on 15/07/2019 valid to 14/07/2020 01/07/2020 valid to 30/06/2021	Calibrated on 25/07/2019 valid to 24/07/2020 01/07/2020 valid to 30/06/2021

Documentation provided by project participant	
Updated MR	
DOE assessment	**Date:** 07/01/2022
In the Monitoring Report (Version 2.0 dated 06/01/2022), the the monitoring information of electricity meters, including installed location, type, accuracy, serial number, calibration as well as the cut off time of meter reading between EDL and project owner have been correctly supplemented. Therefore, CAR 02 was closed.	

CAR ID	03	Section no.	E.6.2	Date: 25/10/2021
Description of CAR				
For SD indicators, : 1. Quality of employment: please supplement the times of training provided by the project owner; 2. Livelihood of the poor: please provide evidence to demonstrate the number of local persons benefit from the pumps; 3. Quantitative employment and income generation: please supplement the detailed value of lowest salary standard of Laos.				
Project participant response				**Date:** 06/01/2022
1. Based on the training document and the training records from 16/08/2019 to 19/08/2019, and from 07/09/2020 to 10/09/2020, a total of two training sessions were conducted, each lasting 4 days. 2. According to the statement issued by the village head of Ban Pha Gnai, a total of 4 pumps have been installed. And there were 421 people in 2019 and 430 people in 2020 benefited from the pumps. 3. On April 20, 2018, the Lao Prime Minister's Office issued Circular No. 560/PMO to amend the minimum wage in Laos to LAK 1,100,000 per month. The notice is valid until January 2022. Information can be found at the following links: https://wageindicator.org/salary/minimum-wage/laos				
Documentation provided by project participant				
Updated MR and statement from the village lead				
DOE assessment				**Date:** 07/01/2022
In the Monitoring Report (Version 2.0 dated 06/01/2022), the times of training provided by the project owner and the detailed value of lowest salary standard of Laos have been supplemented, and evidence to demonstrate the number of local persons benefit from the pumps has been provided. Therefore, CAR 03 was closed.				

Table 4. FAR from this verification

FAR ID	NA	Section No.	NA	Date: NA
Description of FAR				
NA				
Project participant response				**Date:** NA
NA				

Documentation provided by project participant	
NA	
DOE assessment	**Date:** NA
NA	