



48 MW HOUQIAO HYDROPOWER PROJECT, YUNNAN, CHINA



Document Prepared By TÜV NORD CERT GmbH

Project Title	48 MW Houqiao Hydropower Project, Yunnan, China
Version	02
Report ID	8003045494 – 22/041

Report Title	2 nd periodical VCS Verification report for 48 MW Houqiao Hydropower Project, Yunnan, China
Client	Yunnan Baoshan Binglang River Hydropower Development Co., Ltd.
Pages	48
Date of Issue	27-June-2023
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Summary:

- **A brief description of the verification and the project**

The project activity developed in Tengchong County, Baoshan City, Yunnan Province, P. R. China, is a project that generate clean form of electricity through water sources. The installed capacity of the project activity is 48 MW. The utilization of water sources from Binglang River is for generation of power, the average annual power delivered to the grid by the project is expected to be 235,000 MWh. The Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in China Southern Power Grid (CSPG). The project started operation on 23-September-2005 and it was registered as a VCS project activity with the Ref. No. 192.

- **The purpose and scope of verification**

The objective of the verification is to have an independent review ex post determination by a VVB (Validation and Verification Body) of the monitored GHG emission reductions that have occurred as a result of the implementation of the project activity during a defined monitoring period.

- **The monitoring period**

This is the 2nd monitoring period started from 01-December-2011 to 31-March-2016.

- **The method and criteria used for verification**

Verification is conducted using TÜV NORD CERT GmbH procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques. The verification team assessed the project activity's compliance against the VCS Standard Version 4.4, the selected CDM methodology and the project monitoring report. The project is eligible under Project Scope 1. Energy (renewable/non-renewable). The verification criteria followed the guidance documents provided by VCS included the following:

VCS Standard Version 4.4, VCS Program Guide Version 4.3 and the applied CDM methodology ACM0002 – “Consolidated methodology for grid-connected electricity generation from renewable sources” (version 10.0).

- **The number of findings raised during verification**

In the course of the verification, 11 Corrective Action Requests (CARs), 5 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

- **Any uncertainties associated with the verification**

There are no restrictions of uncertainty.

- **Summary of the verification conclusion**

Yunnan Baoshan Binglang River Hydropower Development Co., Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Verified Carbon Standard 2nd periodic verification of the project, “48 MW Houqiao Hydropower Project, Yunnan, China” (No.192) with regard to the relevant requirements of VCS standard Version 4.4. TÜV NORD confirms all verification activities including objectives, scope and criteria, level of assurance, monitoring and monitoring report adhere to VCS Standard Version 4.4 and all associated updated as documented in this report, are complete.

TÜV NORD concludes that the project activity “48 MW Houqiao Hydropower Project, Yunnan, China” in China, as described in the Final Monitoring Report version, meets all relevant requirements for VCS and CCB verification activity and correctly applied the methodology ACM0002 version 10.0. Hence TÜV NORD is able to certify that the GHG emission reductions from the project during the monitoring period from 01-December-2011 to 31-March-2016 amount to 596,949 tCO₂e.

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1 INTRODUCTION

1.1 Objective

Yunnan Baoshan Binglang River Hydropower Development Co., Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Verified Carbon Standard (VCS) 2nd periodical verification of the project for the monitoring period from 01-December-2011 to 31-March-2016. The objective of verification is to have an independent review ex-post determination by a VVB of the monitored GHG emission reductions that have occurred as a result of the project activity implemented during a defined monitoring period. The evaluation is done against the requirements of the VCS Standard Version 4.4 based on the monitoring report. In order to confirm that the GHG emission reductions sound reasonable and meet the identified criteria, the verification involves the assessment of monitoring plan conformance to VCS rules and applied methodology. Verification is requirement and is seen as necessary to provide assurance on the generation of VCUs.

1.2 Scope and Criteria

The scope of the verification is to verify that: (a) the actual monitoring system and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan; (b) the GHG emission reductions data and express a conclusion with a reasonable level of assurance about whether he reported GHG emission reductions data are free from material misstatement; (c) the reported GHG emissions data is sufficiently supported by evidence. Verification shall ensure that the reported GHG emission reductions are complete and accurate in accordance with the applicable VCS criteria in order to be certified. Verification is conducted using TÜV NORD procedures in line with the requirements specified in the VCS Program and ISO14064-3 requirements and applying auditing techniques. Verification team assessed and determines that the implementation and operation of the project activity, and steps to report GHG emission reductions comply with the VCS rules. The verification involved a document review of relevant documentation and interview with the project participants. Verification is not meant to provide any consultancy towards the project participants; however, stated request for clarifications and/or corrective actions may have provided input for improvement of the monitoring.

1.3 Level of Assurance

All GHG sinks, sources and GHG emissions equal to or greater than 5% of the total GHG assertions are considered. The project is expected to generate average of 178,615 VCUs per year, and therefore can be considered as a project per the VCS rules, in regards to its scale, subject to a 5% materiality threshold. The assessment was conducted to provide a reasonable level of assurance of compliance against the defined audit criteria and materiality threshold within the audit scope. Based on the audit findings the verification statement reasonably assures that the GHG assertion is materially correct and is a fair representation of the GHG data and information.

1.4 Summary Description of the Project

The project is implemented by Yunnan Baoshan Binglang River Hydropower Development Co., Ltd. The main purpose of the project activity is to generate clean form of electricity through renewable water source. The project is a single project with one dam, one reservoir and one set of power plant which has been defined during the validation process^{VAL}. The total installed capacity of the project activity is 48 MW(3×16MW). The utilization of water sources from Binglang River is for generation of power, the annual

power delivered to the grid by the project is expected to be 235,000 MWh. The Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in CSPG. It's estimated that the project activity could achieve average GHG emission reductions of 178,615 tCO₂e annually. The project activity is located in Tengchong County, Baoshan City, Yunnan Province, People's Republic of China.

The project activity generates GHG emission reductions by generate clean form of electricity through renewable water source, in the 2nd monitoring period from 01-December-2011 to 31-March-2016, the total verified carbon units (VCUs) achieved in the monitoring period are 596,949 tCO₂e, which has been verified by on-site inspection, and checking the related documentations, interview with the project implementer.

The project activity generates GHG emission reductions by replacing the electricity generated by fossil fuel fired power plants CSPG. Thus the project generates GHG emission reductions and produces financial, social and environmental benefits. The project has resulted in the local sustainable development as described in Section 1 of the Monitoring Report. The project was registered as a VCS project activity with the Ref. No. 192/^{VCS}/ and the 596,949 tCO₂e of emission reductions have been certified as claimed verified carbon units (VCUs) for this monitoring period.

2 VERIFICATION PROCESS

2.1 Method and Criteria

A project specific Verification and monitoring plan was developed to guide the verification auditing process to ensure efficiency and effectiveness. The purpose of the verification is to present a risk assessment for determining the nature and extent of validation procedures necessary to ensure the risk of auditing error is reduced to a reasonable level. According to the ISO14064-3, the criteria are the policy, procedure or requirement used as reference against which evidence is compared. Therefore, verification of the monitoring plan and the reported project results were measured for compliance against the following criteria:

VCS Standard, v4.4/^{VCSS/}

VCS Program Guide, v4.3/^{VCSPG/}

VCS Program Definitions, v4.3/^{VCSPD/}

The verification process derived from all items in the verification criteria stated above. Field techniques based on the project parameters, scope and best professional judgement of the verification team in order to meet a reasonable level of assurance. The verification consisted of the following three phase:

Document review

On-site assessment

The resolution of outstanding issues and the issuance of the final verification report and certification.

The verification process derived from all items in the verification criteria stated above. Field sampling and techniques based on the project parameters, scope and best professional judgement of the verification team in order to meet a reasonable level of assurance.

2.2 Document Review

The VCS MR/^{MR/} and supporting background documents related to the project implementation were reviewed. Document's review was conducted to ensure consistency with and identify any deviation from VCS program requirements. Desk review included an examination of the project details, data and parameters, and quantification of GHG emission reductions.

Furthermore, the verification team used additional documentation by third parties like host party legislation, technical reports referring to the monitoring or to the basic conditions and technical data.

The references used in the course of this verification are summarized in Appendix 2.

The verification was performed basing on the documents check and site inspection/measurements, refer to the section 4 of this report for the verification process detail and corresponding documents review.

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the verification process. Onsite interviews and information discussions were conducted with project implementer/^{11/}, local officer/^{12/}, local stakeholders/^{13/} and Project VCS development consultant/^{14/}. The interviews were performed by the verification team on-site (within the project area, in Tengchong County, Baoshan City, Yunnan Province, China) and the following is a list of the main interviewees and subject.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Zhou ^{/11/}	Hong	Yunnan Baoshan Binglang River Hydropower Development Co., Ltd./ Vice Plant Chief	30-June-2022	- General aspects of the project - Changes since validation / previous verifications - Quality management 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	Zhao Xuejiao
2.	Sun ^{/11/}	Haiqing	Yunnan Baoshan Binglang River Hydropower Development Co., Ltd./ Duty Chief	30-June-2022		
3.	Yang ^{/11/}	Jinrui	Yunnan Baoshan Binglang River Hydropower Development Co., Ltd./ Operation staff	30-June-2022		
4.	Chen ^{/11/}	Xi	Yunnan Baoshan Binglang River Hydropower Development Co., Ltd./ Operation staff	30-June-2022		
5.	Yin ^{/3/}	Ketan	Local Village	30-June-2022	- Local stakeholder communication - Stakeholder comments	Zhao Xuejiao
6.	Yu ^{/3/}	Yanneng				
7	Lei ^{/3/}	Zhicong	Local officer from Ecological Environment Bureau	30-June-2022	- Environment impacts	Zhao Xuejiao
8.	Yang ^{/14/}	Dongqi	Consultant	30-June-2022	- Financial aspects - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation	Zhao Xuejiao
9.	Srinivasan ^{/14/}	Krishnan				
10.	Tan ^{/14/}	Yiling				

					- Monitoring measurements - Editorial issues of the VCS MR	
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2.4 Site Visits

The verification site inspection was conducted from 30-June-2022. A ground inspection of the project was conducted during the site visit and the verification team interviewed representatives from project implementer, operation staffs, local officers, residents and Project VCS development consultant. During the site inspection, the project location, main equipment, monitoring equipment and project implementation were inspected and document evidence were checked, details as following table,

Duration of on-site inspection: 30-June-2022				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening meeting	Project Owner's Office in Tengchong County, Baoshan City, Yunnan Province, P. R. China	30-June-2022	Zhao Xuejiao
2	On-site inspection Interview with PP Representatives and local stakeholders	Project power plant in Tengchong County, Baoshan City, Yunnan Province, P. R. China	30-June-2022	Zhao Xuejiao
3	Documents check (refer to Appendix 3 for details)	Project Owner's Office in Tengchong County, Baoshan City, Yunnan Province, P. R. China	30-June-2022	Zhao Xuejiao
4	Finding Summary	Project Owner's Office in Tengchong County, Baoshan City, Yunnan Province, P. R. China	30-June-2022	Zhao Xuejiao
5	Close Meeting	Project Owner's Office in Tengchong County, Baoshan City, Yunnan Province, P. R. China	30-June-2022	Zhao Xuejiao

2.5 Resolution of Findings

Material discrepancies identified in the course of the validation are addressed either as CARs, CLs or FARs.

A Corrective Action Request (CAR) is established where:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The VCS Standard Version 4.4 requirements have not been met;
- There is a risk that the GHG emission reductions cannot be monitored or calculated.

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

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

A detailed list of the CARs CLs and FAR raised and discussed in the course of this validation is included in Appendix 3 of this report.

In the course of the validation 11 Corrective Action Requests (CARs), 5 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

2.5.1 Forward Action Requests

This is the 2nd verification, and there is no FAR raised in the 1st periodical verification process/^{VER}/.

2.6 Eligibility for Validation Activities

The VVB TÜV NORD CERT GmbH hold accreditation for both validation and verification for the relevant sectoral scope 1. The validation was not conducted by TÜV NORD CERT GmbH.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The project only sought the registration with the VCS Program and validation was conducted by VVB and has been successfully registered in VCS Program with the Ref. No. 192 on 24-November-2009/VCS/.

The project has neither been registered nor seeking registration under any other GHG programs which has been confirmed via checking the UNFCCC/unfccc/, GS/gs/, VCS/vcs/ and other GHG schemes' website.

The VVB verified that the project is only participated in VCS program/VCS/.

The project activity is not part of any emission trading program which has been confirmed via checking the UNFCCC/unfccc/, GS/gs/, VCS/vcs/ and other GHG schemes' website. The net GHG emission reductions during this monitoring period from the project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions. The project activity has not participated under any other GHG programs which has been confirmed via checking the UNFCCC/unfccc/, GS/gs/, VCS/vcs/ and other GHG schemes' website.

Furthermore, based on verification team's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO₂e/year which has been verified in the public website/cets/, and it is confirmed that the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner by checking the enforced company list in public information/eci/. Hence, it is confirmed that the emission reductions will not be double counted.

Via on-site interview with the project implementer and checking the project dedicated VCS website <https://registry.verra.org/app/projectDetail/VCS/192>, in addition, by checking the Declaration of not involved in other carbon schemes and no double counting for the project/DND/, it is verified that the implementation of the project is consistent with the description in the Project Design Document (PD) and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 01-December-2011 to 31-March-2016.

3.2 Methodology Deviations

During the monitoring period, there are no methodology deviations.

3.3 Project Description Deviations

Deviations to project description were applied during this verification period as below details,

There is one deviation in the monitoring plan from the registered PD/PD/.

The deviation is that the applied national standard for electric meter calibration has changed from "Chinese Verification Regulation of Verification Equipment for AC Electrical Energy Meters, JJG597-2005" in the registered PD to "Chinese Verification Regulation of Electrical Energy Meters with Electronics, JJG596-1999". The PD author explained that it was a miss application of standard and the Yunnan Provincial Bureau of Quality and Technical Supervision, which made calibration works in the project, has advised the project proponent of its change. The detail of this change can be referred to the section 3.3 of the monitoring report.

And via checking the 1st periodical verification report/VER/, it is confirmed that this deviation has been found and assessed since the 1st periodical verification which is not only occurred for this monitoring period, and based on the detail assessment of the 1st periodical verification report/VER/, it is verified that this deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology.

3.4 Grouped Project

Via checking the PD/^{PD}/ and validation report/^{VAL}/, it is confirmed that the project is not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

Via onsite visit, interviewing the project developer and reviewing the project operation, it was confirmed that the project was implemented to generate clean form of electricity through renewable water source. The project is a single project with one dam, one reservoir and one set of power plant which has been defined during the validation process/^{VAL/}. The total installed capacity of the project activity is 48 MW(3×16MW). The utilization of water sources from Binglang River is for generation of power, the annual power delivered to the grid by the project is expected to be 235,000 MWh. The Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in CSPG/^{PPA/}. It's estimated that the project activity could achieve GHG emission reductions of 178,615 tCO₂e annually. Via checking the MR/^{MR/} and by site inspection, it is verified that there are no changes on the key equipment and technology since the last verification of the project.

Through site visit and the review project monitoring report and/^{MR/} other supporting docs as listed in Appendix 3, it can be confirmed that w.r.t. the realized technology, as well as the monitoring and metering equipment, the project has been implemented and operated as applied methodology/^{METH/} and monitoring plan described in the registered PD/^{PD/} except deviation assessed in the section 3.3 of this report.

This verification covers the period from 01-December-2011 to 31-March-2016 (including both days). The project activity generates GHG emission reductions by generate clean form of electricity through renewable water source, in the 2nd monitoring period, the total verified carbon units (VCUs) achieved in the monitoring period are 596,949 tCO₂e, which has been verified by on-site inspection, and checking the related documentations, interview with the project implementer.

The construction of project started on 28-July-2003, the 1st generator of the project commissioning started time was 23-September-2005, 2nd generator of the project commissioning started time was 14-October-2005 and 3rd generator of the project commissioning started time was 22-December-2005, which are verified by site visit checking the Grid-connected generation handover record/^{GHR/} and 1st verification report/^{VER/}.

Via checking the PD/^{PD/} and validation report/^{VAL/}, it is confirmed that the project is not a grouped project.

The net GHG emission reductions during this monitoring period from the project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions. Via on-site interview with the project implementer and checking the project dedicated VCS website <https://registry.verra.org/app/projectDetail/VCS/192>, it is verified that the implementation of the project is consistent with the description in the PD and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for the period from 01-December-2011 to 31-March-2016/^{DND/}.

The project was registered as a VCS project activity with the VCS Ref. No. 192/^{VCS/}, the crediting period for the project is selected the renewable crediting period of 10 years which is renewed at most two times, the maximum of 30 years with 1st 10 years crediting period started from 01-April-2006 to 31-March-2016 under VCS Program.

This monitoring period (01-December-2011 to 31-March-2016) is the 2nd monitoring period belongs to 1st 10 years crediting period under VCS scheme.

Details of the project location are given in table 4-1 below:

Table 4-1: Project Location

No.	Project Location
Host Country	China
Region:	Yunnan Province
Project location address:	Tengchong County, Baoshan City

Latitude:	25° 22'14"N
Longitude:	98° 11'32"E

The location of the project site is verified with on-site investigation by GPS device and the coordinates are verified as consistent in the MR.

Details of the project equipment technical parameters are given in table 4-2 below:

Table 4-2 Project equipment technical parameters

Parameter	Unit	Amount
Turbine		
Quantity	-	3
Model	m	HLA696-LJ-130
Rated Output	MW	16.6
Rated Revolution	r/min	600
Rated Head	m	115
Rated Flow	m ³ /s	15.82
Generator		
Quantity	-	3
Model	m	SF16-10/2860
Rated Capacity	MW	16
Rated Revolution	r/min	600
Rated Voltage	kV	10.5
Power Factor	m ³ /s	0.8

Via site inspection of the main equipment and checking the nameplate of the equipment/^{PHT/}, it is verified that the technical parameters listed in above table are correct and actual and consistent with PD.

The approved consolidated methodology applied in the project activity is ACM0002 “Consolidated baseline methodology for grid connected electricity generation from renewable sources” (version 10.0)/^{METH/}.

Applied tools applied in the project activity are

Tool for the demonstration and assessment of additionality (ver.05.2)/^{TDA/}

Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (ver.02)/^{TPL/}

Tool to calculate the emission factor for an electricity system (ver.01.1)/^{TEF/}

The project does not involve Supply Chain (Scope 3) Emissions as the produced biogas is consumed by the project facility at the project site.

Via on-site inspection, checking the evidence provided as below and interview with the project implementer, it is verified that the project contributes the sustainable development through the following aspects:

1. *The project reduces the CO₂ emission per ton of coal produced (Goal 7 of UN SDG) – verified by checking the meter reading records/^{MRR/} and power sales invoice/^{PSI/} and Emission Reduction Calculation sheet/^{XLS/}, it is confirmed that 694,429.156 MWh of electricity supplied to the grid during the Monitoring Period compared with the baseline scenario during this monitoring period, and total of 1,777,368.811 MWh of electricity supplied to the grid since the project started, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;*

2. *The project activity creates new job opportunities and contributing to local economic prosperity (Goal 8 of UN SDG) – verified by interview with staffs and checking the Labor Contracts/^{LC/} and monthly payroll/^{PAY/}, it is confirmed that 25 job opportunities (5 females) have been provided during this monitoring period, and total of 25 job opportunities (5 females) have been provided since the project started, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable;*
3. *Sequester greenhouse gas and mitigate climate changes (Goal 13 of UN SDG) – verified by checking the Emission Reduction Calculation sheet/^{XLS/}, it is confirmed that 596,949 tCO_{2e} Emission reductions have been achieved during the monitoring period, and total of 1,540,403 tCO_{2e} Emission reductions have been achieved since the project started, hence the contribution to this SDG has been confirmed and the provisions for monitoring and reporting this goal is verified as reasonable.*

Via checking the validation report/^{VAL/} and previous verification report/^{VER/}, it is verified that there were no any previously validated methodology deviations.

In conclusion, Verification Team was able to confirm that the project implementation is in accordance with the project description contained in the registered PD/^{PD/} except deviations assessed in the section 3.3 of this report.

CAR 01, CAR 02, CAR 03, CAR 04, CAR 05 and CAR 06 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.2 Safeguards

4.2.1 No Net Harm

The analysis of the potential environmental and socio-economic impacts of the project activity is described in MR/^{MR/}. The assessment is as below,

The project activity promotes environmental and socio-economic well-being as it results in zero GHG emissions due to installation and operation of clean, renewable energy technology for electricity generation.

By checking Environmental Impact Assessment (EIA) Reports/^{EIA/} for the project activity, the verification team confirm all environmental impacts has been analyzed, and via site inspection, it is confirmed that related mitigation measures have been conducted by PP as per the EIA and no net harm was detected. Besides, no potential environment or social economic matter was found during the site visit. The project is renewable energy project and thus no net harm observed in air or water quality and forest vegetation and protected plants on-site thus no negative environmental and socio-economic impacts during this verification period.

Furthermore, via site inspection, it is confirmed that the project using clean renewable water energy to reduce greenhouse gas emissions and the environmental pollution. Meanwhile, the implementation of the project improved local socio-economic development through development of the project and provides green energy which has been confirmed by site interview with local officer and resident.

4.2.2 Local Stakeholder Consultation

A stakeholder questionnaire survey was carried out by the project developer during the project preparation stage which was prior to the start date of the construction has been verified by checking the PD/^{PD/} and validation report/^{VAL/}.

During the implementation stage of this monitoring period, via checking the local stakeholder communication survey questionnaires/^{LSCR/} and interview with the local officer and local residents during

site visit, it is confirmed that the project developer carried out a stakeholder meeting with questionnaire survey for the local stakeholders including representatives from local residents of Shop owner, Contractors, Farmer and Local community to collect the relevant comments and suggestions on 31-January-2016 to collect any comments or inputs to the project implementation.

Via checking the filled 26 questionnaires/^{LSCR}/, interview with the local officer and local residents during site visit, it is verified that all of them satisfied with the environment maintenance method for the project and there were no negative comments and issues from the local stakeholders during the implementation period which are assessed as below,

Furthermore, via site inspection of the project site, it is confirmed that a grievance register has been put in project site so that the stakeholders can put down queries and feedbacks anytime. via interview with the local officer, it is confirmed that the local authority has conducted spot checks on the implementation of the project from time to time as per the request from the local governments' regulations and it is found that there were no negative comments received for the project for this monitoring period.

Hence there is no need to change the project design based on the stakeholder inputs and it is confirmed that all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals and the mechanism for ongoing communication with local stakeholders has been established which in compliance with the VCS requirements.

CL 01, CL 02 and CL 03 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.3 AFOLU-Specific Safeguards

N.A.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

4.4.1 Assessment of Data and parameters Available at Validation

By means of comparison of the MR and the ER calculation with the registered PD, the verification team has checked whether all parameters fixed ex-ante have been applied correctly.

The parameters that are fixed ex ante are following:

Parameters	Source of data	Values applied	Demonstration by Verification team
EF _y - Emission factor of the Grid	Registered PD	0.8712 tCO ₂ e/MWh	This is an ex-ante fixed value as listed in the PD/ ^{PD} / which has been verified during the validation process/ ^{VAL} /, and it is determined ex-ante and is fixed during the first 10 years' crediting period.

It is confirmed that the parameter listed above are fixed ex-ante and used for GHG emission reductions calculation in accordance with the applied methodology and methodological tools.

4.4.2 Assessment of Data and parameters Monitored

During the verification all relevant monitoring parameters have been verified with regard to the

- (i) appropriateness of the applied measurement / determination method,
- (ii) the correctness of the values applied for ER calculation,

- (iii) the accuracy, and applied QA/QC measures.

The results as well as the verification procedure are described parameter-wise in the project specific verification checklist (Appendix 5).

CAR 07, CAR 08 and CAR 09 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.3 Assessment of in Compliance with monitoring plan

By means of comparison of the MR with the applied CDM methodology and all VCS standards' requirements.

The verification team has checked whether the monitoring implementation during this monitoring period is in compliance with the latest approved monitoring plan/^{PD/} and related requirements of the applied methodology/tools.

The verification team has checked the monitoring system in MR against the applied methodology and latest approved monitoring plan/^{PD/}.

The monitoring system has been operated as per the latest approved monitoring plan/^{PD/} as in compliance with the latest applicable version of the methodology (ACM0002 version 10.0).

Data and parameters to be monitored as above tables are confirmed in line with the latest approved monitoring plan/^{PD/} and applied methodology, also corresponding to the formula used for ER calculation.

Monitoring structure

The PD contains a diagram illustrating the Management structure of VCS monitoring to be implemented by the PP in order to implement the project activity. Via the monitoring manual/^{MM/} and PD, according to the needs of the positions and responsibilities of the monitoring team, the daily operation and the recording activity at the power station are carried out by the Recording team and the Operating team. The data recorded is checked and compiled as the monthly and yearly data by the Administration and Power sales team, and then the compiled data is passed to the Power station manager, who reports the data to the VCS section manager. After that, the amount of the emission reduction is calculated by the manager then the result is reported to the accounting team at last. The organizational structure is considered sufficient to fulfil the monitoring requirements of the methodology and to ensure that emission reductions can be verified.

Monitoring process

Data and parameters to be monitored as above tables in section 4.4.2 are confirmed in line with the methodology and tool, also corresponding to the formula used for ER calculation.

For the monitoring system and points of electricity, via on-site investigation, it is confirmed that the electricity monitoring system is installed to directly and continuously measure the electricity by the project activity, all the listed parameters are measured on-time by the meters installed respectively/^{MM/}. The electricity generated is supplied to the grid under the Grid Connection Approval/^{GCA/} and Power Purchase Agreement/^{PPA/}.

All monitoring devices were calibrated/^{CAL/} every five years by grid company/^{CMA/} in line with the regulations of the grid company and "Chinese Verification Regulation of Electrical Energy Meters with Electronics, JJG596-2012"/^{JJG/}.

QA/QC

The QA/QC manager is in charge of calibration and maintenance of the instruments to ensure their accuracy and reliability. The accuracy of all the monitoring devices is in line with the related requirements as confirmed in the calibration report/^{CAL}/. Calibration of equipment has been implemented periodically by grid company/^{CMA}/ in line with the regulations of the grid company as stated in PD. All the records have been documented by the PP.

The monitoring team was trained for basic conception and management of the project activity by checking the training records/^{TTR}/ and specific operator get the qualification certificate/^{COS}/, specific staff collected the electricity data regularly and complete the corresponding records, keeping all the data collected as part of monitoring archived electronically.

Internal audit/^{IAR}/ was conducted by QA/QC manager for cross check all the data as described in above tables in section 4.4.2.

Emergency procedure

QA/QC unit manager will take actions to initiate and supervise the implementation of corrective actions, metering equipment installed shall be inspected by an accredited inspection agency after the repair of all or part of meter caused by the failure of one or more parts to operate in accordance with the specifications, and if metering equipment (M3, M5, M7) fail, no emission reductions shall be counted which is verified as conservative.

By site interview with monitoring staff and experts and checking the related evidence for data/^{MRR}./LOG/, it is verified that no emergency situations have been occurred. Thus no emergency procedure was used for this monitoring period.

Based on above assessment, it is verified that the monitoring system complies with the applied methodology and the monitoring plan and all applied procedures are completely in compliance to the methodology ACM0002 (version 10.0) and latest approved monitoring plan/^{PD}/.

4.4.4 Compliance with the calibration frequency requirements for measuring instruments

During the verification the relevant monitoring equipment has been checked whether the calibration requirements have been met; especially if the calibration frequency is in line with the requirements of the registered PD/^{PD}/ and the regulations of the grid company.

The information of monitoring equipment used for monitoring in this monitoring period is listed in PD and the calibration information has been assessed in above section 4.4.2 in each monitoring parameter table.

Furthermore, via checking the certificate of grid company who conducted the calibration/^{CMA}/, it is confirmed that the grid company get the related qualification.

In conclusion, the equipment used for monitoring is controlled and calibrated in accordance with the latest approved monitoring plan/^{PD}/. Based on that, it is confirmed that all installed monitoring equipment has been duly calibrated for this entire monitoring period/^{CAL}/.

4.4.5 Assessment of data and calculation of emission reductions or net removals

4.4.5.1 Calculation of baseline GHG emissions or removals

According to the methodology and registered PD, BE_y is calculated as below

$$BE_y = EG_y \times EF_{grid,CM,y} = (EG_{ex,y} - EG_{im,y}) \times EF_y \quad (1)$$

Where:

BE_y	=	Baseline emissions in year y tCO ₂ /yr)
EG_y	=	Net electricity supplied by the project activity to the grid (MWh)
EG_{ex}	=	Electricity supplied by the project activity to the grid (MWh)
EG_{im}	=	Electricity supplied by the grid to project activity (MWh)
$EF_{grid,CM,y}$	=	Combined margin CO ₂ emission factor for grid connected power generation in year y calculated using the latest version of "TOOL 07: Tool to calculate the emission factor for an electricity system" (t CO ₂ /MWh)

During this monitoring period, based on the above assessment in section 4.4.1 and 4.4.2, CTI verified that the BE_y for this monitoring period is calculated as below table,

Table 4-1 BE_y calculation during this monitoring period

Year	EG_y (MWh)	$EF_{grid,CM,y}$ (tCO ₂ e/MWh)	BE_y (tCO ₂ e)
01-December-2011~31-December-2011	6,979.836	0.8712	6,081
01-January-2012~31-December-2012	186,149	0.8712	162,166
01-January-2013~31-December-2013	172,071	0.8712	149,903
01-January-2014~31-December-2014	150,767	0.8712	131,342
01-January-2015~31-December-2015	152,237	0.8712	132,625
01-January-2016~31-March-2016	17,027	0.8712	14,832
Total	685,230.2	0.8712	596,949

Hence, the total baseline emission for this monitoring period is calculated as 596,949 tCO₂e.

In conclusion, the calculations of baseline GHG emissions have been carried out in accordance with the formulae and methods described in the registered monitoring plan, the applied methodology and, where applicable, the applied standardized baseline. Any assumptions used in baseline GHG emissions have been justified. Appropriate emission factor values have been correctly applied. No errors, miscalculations, omissions, misstatements or incomplete information has been identified. It can be confirmed that the baseline emission calculation is overall correct.

CAR 10 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.5.2 Calculation of project GHG emissions or actual net GHG removals by sinks

In accordance with ACM0002 ver. 10.0, registered PD/PD/ and validation report^{VAL/}, the project emission for this monitoring period is determined as below,

According to registered PD, project emissions from the reservoir have to be considered if the power density (PD) of the power plant is greater than 4 W/m² and less than or equal to 10 W/m². The power density of the project activity is calculated as follows:

$$PD = \frac{Cap_{PJ}}{A_{PJ}} \quad (2)$$

Where:

- PD = Power density of the project activity, in W/m²
- Cap_{PJ} = Installed capacity of the hydro power plant after the implementation of the project activity(W)
- A_{PJ} = Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m²)

For the project, during this monitoring period, the Cap_{PJ} and A_{PJ} were monitored during this verification and yearly, thus,

For year 2012, Cap_{PJ} = 48MW, and A_{PJ} = 0.17 km², therefore PD=282.4 W/m², which is greater than 10W/m².

For year 2013, Cap_{PJ} = 48MW, and A_{PJ} = 0.17 km², therefore PD=282.4 W/m², which is greater than 10W/m².

For year 2014, Cap_{PJ} = 48MW, and A_{PJ} = 0.17 km², therefore PD=282.4 W/m², which is greater than 10W/m².

For year 2015, Cap_{PJ} = 48MW, and A_{PJ} = 0.17 km², therefore PD=282.4 W/m², which is greater than 10W/m².

For year 2016, Cap_{PJ} = 48MW, and A_{PJ} = 0.17 km², therefore PD=282.4 W/m², which is greater than 10W/m².

Therefore, it is confirmed that the power density values for all the years during this MP are all higher than 10W/m², according to ACM0002, PE_y=0.

CAR 11 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.5.3 Calculation of leakage GHG emissions

According to the PD and methodology, the leakage emissions is 0, hence LE_y=0.

4.4.5.4 Summary of calculation of GHG emission reductions or net anthropogenic GHG removals by sinks

The verification team has checked the MR includes a summary table of the emission reductions calculation.

Summary of emission reductions during the monitoring period,

$$ER_y = BE_y - PE_y - LE_y \quad (3)$$

Hence, the emission reductions during this monitoring period are summarized in the table below

Table 4-2 Emission Reductions Calculation during this monitoring period

Parameters Period	Baseline Emissions BE_y (tCO ₂ e)	Project Emissions PE_y (tCO ₂ e)	Leakage Emissions LE_y (tCO ₂ e)	Net GHG emission reductions or removals ER (tCO ₂ e)
01-December-2011~31-December-2011	6,081	0	0	6,081
01-January-2012~31-December-2012	162,166	0	0	162,166
01-January-2013~31-December-2013	149,903	0	0	149,903
01-January-2014~31-December-2014	131,342	0	0	131,342
01-January-2015~31-December-2015	132,625	0	0	132,625
01-January-2016~31-March-2016	14,832	0	0	14,832
Total	596,949	0	0	596,949

All the figures as per the monitoring report were cross-checked by the verification team against basic monitored data. Refer to section 4.4.1 and 4.4.2 of this report for assessment details.

Via checking the values in MR/MR/ against the ER calculation sheet^{/XLS/}, it is confirmed that the emission reductions calculation is overall correct.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

Refer to section 4.4 above for the detail assessment of each monitoring parameters and Appendix 3 for the supporting evidence used to determine the GHG emission reductions.

For each reported data, the evidence is provided and verified as sufficient and quality is appropriate. Also, the cross-checks have been performed on the reported data with different source of evidence. The information flow from data generation and aggregation, to recording, calculation and final transposition

into the monitoring report has been assessed by verification team in section 4.4 for each parameter and also the calibration have been conducted accordingly.

Therefore, it is concluded that the evidence provided are verified as sufficient and quality is appropriate and thus the evidence can be used to determine the GHG emission reductions for this monitoring period.

4.6 Non-Permanence Risk Analysis

N/A.

5 VERIFICATION CONCLUSION

Yunnan Baoshan Binglang River Hydropower Development Co., Ltd. has commissioned the TÜV NORD JI/CDM Certification Program to carry out the Verified Carbon Standard (VCS) 2nd periodic verification of the project activity “48 MW Houqiao Hydropower Project, Yunnan, China”, VCS Ref. No. 192, for the period 01-December-2011 to 31-March-2016, with regard to the relevant requirements for VCS Standard Version 4.4.

Based on the documented evidence and corroborated by an on-site assessment, TÜV NORD can confirm that:

- the project has been implemented and operated as per the validated PD;
- there is a project description deviation identified during last verification, and the project implementation in compliance with the PD except this deviation.
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS requirement;
- the monitoring is in place as per the applied baseline and monitoring methodology;
- the monitoring complies with the monitoring plan in the validated PD;
- the monitoring plan in the validated PD is as per the applied baseline and monitoring methodology.

The GHG emission reductions were calculated correctly on the basis of the approved monitoring methodology ACM0002 Consolidated methodology for grid-connected electricity generation from renewable sources, version 10.0 and the monitoring plan in the validated PD. Hence it is certified that the GHG emission reductions from the project during the monitoring period amount as follows:

Monitoring period: From 01-December-2011 to 31-March-2016

Verified GHG emission reductions and removals in the above verification period:

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)
01-December-2011~31-December-2011	6,081	0	0	6,081
01-January-2012~31-December-2012	162,166	0	0	162,166
01-January-2013~31-December-2013	149,903	0	0	149,903
01-January-2014~31-December-2014	131,342	0	0	131,342
01-January-2015~31-December-2015	132,625	0	0	132,625
01-January-2016~31-March-2016	14,832	0	0	14,832
Total	596,949	0	0	596,949

The estimated ex-ante GHG emission reductions and removals, the achieved emission reductions and removals for this monitoring period, percentage difference and justification of the difference have been given in below table

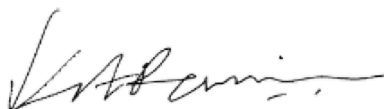
Year	Ex-ante emissions reductions/removals	Achieved emissions reductions/removals	Percent difference	Justification for the difference
01-December-2011~31-December-2011	15,618	6,081	-61.06%	The actual ER value achieved during this monitoring period is lower than the ex-ante estimated value in PD. The difference is due to lower natural water source supply than expected which leads to less power generation than estimated in PD. The estimated power generation value is derived from the FSR which is estimated depending on average historical multi-year water source data, but the actual water source for this monitoring period is lower than average historical multi-year value which has been confirmed during site visit by interview with PP and checking the data from electricity invoice comparing with PD.
01-January-2012~31-December-2012	183,893	162,166	-11.82%	
01-January-2013~31-December-2013	183,893	149,903	-18.48%	
01-January-2014~31-December-2014	183,893	131,342	-28.58%	
01-January-2015~31-December-2015	183,893	132,625	-27.88%	
01-January-2016~31-March-2016	45,847	14,832	-67.65%	
Total	797,038	596,949	-25.10%	

Beijing, 27-June-2023



Zhao Xuejiao
TÜV NORD JI/CDM Certification Program
Verification Team Leader

Essen, 27-June-2023



Kunal Rami
TÜV NORD JI/CDM Certification Program
Final Approval

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
AFOLU	Agriculture, Forestry and Other Land Use
BAU	Business as usual
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Certification Program // Crediting Period
CSPG	China Southern Power Grid
DNA	Designated National Authority
EB	CDM Executive Board
ER	Emission Reductions
ETS	Emission Trading Scheme
FAR	Forward Action Request
GHG	Greenhouse gas(es)
GS	Gold Standard
IPCC	Intergovernmental Panel on Climate Change
JNR	Jurisdictional and Nested REDD+
MP	Monitoring plan
MR	Monitoring Report
NDRC	National Development and Reform Commission
NPRA	Non-Permanence Risk Analysis
PD	Project Description
PP	Project Participant
QC/QA	Quality control/Quality assurance
UNFCCC	United Nations Framework Convention on Climate Change
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VVB	Validation/Verification Body

APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS



Statement of Competence

Appointment and authorization according to the procedures of the TUV NORD JI/CDM Certification Program

Ms. Xue Jiao Fancy Zhao

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification)	2023-04-30
VCS / ISO 14064-2	Senior Assessor	2023-04-30

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.1	Thermal energy generation
1.2	Renewables
3.1	Energy Demand
8.1	Mining and mineral production
13.1	Solid waste and wastewater
13.2	Manure

230- Rev. 12, Date: 2022-11-01



Statement of Competence

Appointment and authorization according to the procedures of the TUV NORD JI/CDM Certification Program

Mr. Kunal Rami

SCHEME	STATUS	VALID UNTIL
CDM	Senior Assessor (Validation, Verification) Technical Reviewer	2023-03-26
VCS / ISO 14064-2	Senior Assessor Technical Reviewer	2023-03-26

Authorization status for technical areas within sectoral scopes:

CODE	TECHNICAL AREA
1.2	Renewables
2.1	Energy distribution
3.1	Energy demand
6.1	Construction
7.1	Transport
13.1	Solid waste and wastewater

224 - Rev. 9, Date: 2020-12-03

APPENDIX 3: DOCUMENTS REVIEWED OR REFERENCED

No	Author	Reference	Title	References to the document	Provider
1.	Local Administration for Industry and Commerce	/BL/	Business License	Business License of Forestry Yunnan Baoshan Binglang River Hydropower Development Co., Ltd.	PP
2.	Yunnan Provincial Bureau of Quality and Technical Supervision & Yunnan Baoshan Electric Power Co., Ltd.	/CAL/	Calibration report	Calibration report for all electricity meters M3, M5 and M7 with validity covering this monitoring period	PP
3.	Yunnan Provincial Baoshan City Government	/CMA/	Certificate of Electrical Management Authorization	Certificate of Electrical Management Authorization of Yunnan Baoshan Electric Power Co., Ltd., valid permanent	PP
4.	China Electricity Council	/COS/	Certificates of operation staffs	Certificates of operation staffs	PP
5.	PP	/DND/	Declaration	Declaration of not involved in other carbon schemes and no double counting for the project issued on 10-June-2022	PP
6.	Kunming Survey and Design Institute of State Elec	/EIA/	Environmental Impact Assessment (EIA) Report	Dated in July 2004	PP
7.	Yunnan Baoshan Electric Power Co., Ltd. and PP	/GCA/	Grid Connection Approval	Issued on 25-July-2005	PP
8.	PP	/GHR/	Grid-connected generation handover record	Grid-connected generation handover record for each generator units of project	PP
9.	PP	/IAR/	Internal audit report	Internal audit report	PP
10.	National standard	/JJG/	JJG596-2012	“Chinese Verification Regulation of Electrical Energy Meters with Electronics” - old version JJG596-1999	Public website

11.	PP	/LOG/	Operation logs	Operation log covering this monitoring period	PP
12.	Representative s of local stakeholders	/LSCR/	Local stakeholder consultation records	26 valid questionnaires of local stakeholder consultation during this monitoring period	PP
13.	UNFCCC	/METH/	Methodology	ACM0002 “Consolidated baseline methodology for grid connected electricity generation from renewable sources” version 10.0	UNFCCC website
14.	Dali Xidian Industrial Co., Ltd. Power Generation Branch	/MM/	Monitoring Manual	Monitoring Manual created in December 2005	PP
15.	Nanjitan	/MR/	Monitoring report	2 nd periodic Monitoring report of the project Draft Version No. 1, dated 08- December-2021 Final Version No. 45 dated 15- February-2023	Nanjitan
16.	PP	/MRR/	Meter Reading Records	Meter Reading Records covering this monitoring period	PP
17.	VCSA	/MRT/	Monitoring Report Template	VCS-Monitoring-Report- Template-v4.2	VCS website
18.	Consultant	/PD/	Project Description	Approved Project Description of “48 MW Houqiao Hydropower Project, Yunnan, China” (Version No. 1.3, dated 14- October-2009)	VCS website
19.	TUV NORD	/PHT/	On-site photo taken by verification team	On-site photo taken by verification team including main equipment, nameplates, reservoir, dam, electricity meters, project plant, control room etc.	TUV NORD
20.	PP and Yunnan Baoshan Electric Power Co., Ltd.	/PPA/	Power Purchase Agreements	Power Purchase Agreements signed in 2012, 2013, 2014, 2015 and 2016 valid for this monitoring period	PP
21.	PP and Yunnan Baoshan Electric Power Co., Ltd.	/PPI/	Power purchases invoice	Power purchases invoice covering this monitoring period	PP
22.	China Hydropower Consulting Group Kunming Survey and	/PRSA/	Proof of Area of the reservoir	Proof of Area of the reservoir for year 2012, 2013, 2014, 2015 and 2016	PP

	Design Institute				
23.	PP and Yunnan Power Grid Company	/PSI/	Power sales invoice	Power sales invoice covering this monitoring period	PP
24.	UNFCCC	/TDAA/	Methodological tool	Tool for the demonstration and assessment of additionality (ver.05.2)	UNFCCC website
25.	UNFCCC	/TEF/	Methodological tool	Tool to calculate the emission factor for an electricity system (ver.01.1)	UNFCCC website
26.	UNFCCC	/TPL/	Methodological tool	Tool to calculate project or leakage CO ₂ emissions from fossil fuel combustion (ver.02)	UNFCCC website
27.	Project Owner	/TTR/	Technical Training Records	Technical Training Records dated in 2012, 2013, 2014, 2015 and 2016	PP
28.	JCI	/VAL/	Validation report	Approved Validation report of “48 MW Houqiao Hydropower Project, Yunnan, China” dated 15-October-2019	VCS website
29.	VCSA	/VCSPD/	VCS Program Definitions, Version 4.3	https://verra.org/project/vcs-program/rules-and-requirements/	VCS website
30.	VCSA	/VCSPG/	VCS Program Guide, Version 4.3	https://verra.org/project/vcs-program/rules-and-requirements/	VCS website
31.	VCSA	/VCSS/	VCS Standard, Version 4.4	https://verra.org/project/vcs-program/rules-and-requirements/	VCS website
32.	VVB	/VER/	1 st periodical verification report	https://registry.verra.org/app/projectDetail/VCS/192	VCS website
33.	VCSA	/VRT/	Verification Report Template	VCS-Verification-Report-Template-v4.2	VCS website
34.	Nanjitan	/XLS/	Net anthropogenic GHG emission reductions calculation spreadsheets	Net anthropogenic GHG emission reductions calculation spreadsheets of “48 MW Houqiao Hydropower Project, Yunnan, China” for this monitoring period Draft Version No. 1, dated 08-December-2021 Final Version No. 5, dated 08-February-2023	Nanjitan
35.	China Certified Emission Reduction Exchange Info-platform	/ccer/	China Certified Emission Reduction	http://cdm.ccchina.org.cn/ccer.aspx	Website
36.	Gold Standard Organization	/gs/	Gold Standard	http://www.goldstandard.org/	Website

37.	IPCC	/ipcc/	IPCC publications	www.ipcc-nggip.iges.or.jp	Website
38.	Ministry of Ecology and Environment of China	/cets/	China national emissions trading scheme	http://www.mee.gov.cn/xxgk02/202101/t20210105_816131.html	Public Website
39.	Ministry of Ecology and Environment of China	/ecl/	Enforced company list	http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf	Public Website
40.	UNFCCC	/unfccc/	UNFCCC	http://cdm.unfccc.int	Website
41.	VCS	/vcs/	VCS	http://www.v-c-s.org/	Website
42.	UNFCCC	/VVS/	Standard of CDM validation and verification standard for project activities	Version 03.0	Website

APPENDIX 4: CLARIFICATION REQUESTS, CORRECTIVE ACTION REQUESTS AND FORWARD ACTION REQUESTS

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

FAR ID	<i>n.a</i>	Section no.		Date:	
Description of FAR					
Project participant response (1st round)					Date:
Documentation provided by project participant (1st round)					
☐	Changes in MR	Section(s):		New version No.:	
☐	Changes in XLS	Worksheet(s):		New version No.:	
☐	Other:				
VVB assessment (1st round)					Date:
Conclusion <i>Tick the appropriate checkbox</i>		☐ Additional action should be taken (finding remains open) ☐ The finding is closed			

Table 2. CL from this verification

CL ID	01	Section no.	2.2	Date:	05/07/2022
Description of CL					
The descriptions provided in section 2.2 are not in line with the requirement of MR template.					
Project participant response (1st round)					
The description provided in section 2.2 are changed in line with requirement of MR template.					
Documentation provided by project participant (1st round)					Date:
					15/08/2022
☒	Changes in the MR	Section(s): 2.2		New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):		New version No.:	
☒	Other:				
VVB assessment (1st round)					Date:
					11/09/2022
The revised MR is checked, it is verified that the descriptions have been clarified in the MR which is verified as in line with the requirement of MR template. Refer to section 4.2.2 of this report for detail assessment.					
Conclusion <i>Tick the appropriate checkbox</i>		☐ Additional action should be taken (finding remains open) ☒ The finding is closed			

CL ID	02	Section no.	2.2	Date:	05/07/2022
Description of CL					
The actual information of stakeholder questionnaire survey is not clarified including survey time, who and how distribute questionnaires, quantity of questionnaire distributed and collected, the category of the participated stakeholders, etc..					
Project participant response (1st round)					
The actual information of stakeholder questionnaire survey is clarified including survey time, who and how distribute questionnaires, quantity of questionnaire distributed and collected, the category of the participated stakeholders. Refer to updated section 2.2 for details.					
Documentation provided by project participant (1st round)					Date:
					15/08/2022

☒ Changes in the MR	Section(s): 2.2	New version No.: 2.0
☐ Changes in XLS	Worksheet(s):	New version No.:
☒ Other:	/LSCR/	
VVB assessment (1st round)		Date: 11/09/2022
The revised MR is checked, it is verified that the actual information of stakeholder questionnaire survey is clarified which is verified as consistent with the filled questionnaires/LSCR/. Refer to section 4.2.2 of this report for detail assessment.		
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CL ID	03	Section no.	2.2	Date: 05/07/2022
Description of CL				
The actual negative comments gathered during the stakeholder questionnaire survey are not assessed and the related mitigate measurements to the impacts are not clarified.				
Project participant response (1st round)				
There are no negative comments in the updated stakeholder consultation and proof have been submitted for VVB review.				
Documentation provided by project participant (1st round)				Date: 15/08/2022
☒ Changes in the MR	Section(s): 2.2		New version No.: 2.0	
☐ Changes in XLS	Worksheet(s):		New version No.:	
☒ Other:	/LSCR/			
VVB assessment (1st round)				Date: 11/09/2022
The revised MR is checked, it is verified that no negative comments gathered during the stakeholder questionnaire survey is clarified which is verified as consistent with the filled questionnaires/LSCR/. Refer to section 4.2.2 of this report for detail assessment.				
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CL ID	04	Section no.	whole	Date: 08/02/2023
Description of CL				
The last date of the previous monitoring period was 30-November-2011. Please clarify the gap in data reporting 30-November-2011-31-December-2011.				
Project participant response (1st round)				
The whole MR is updated with adding the gap period and all the related values have been updated accordingly.				
Documentation provided by project participant (1st round)				Date: 14/02/2023
☒ Changes in the MR	Section(s): 2.2		New version No.: 5	
☒ Changes in XLS	Worksheet(s): all		New version No.: 5	
☒ Other:				
VVB assessment (1st round)				Date: 15/02/2022
The revised MR is checked, it is verified that the gap period has been supplemented which is confirmed as reasonable. And the recalculation of ER is verified as correct in both MR and ER sheet.				
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CL ID	05	Section no.	3.2.2	Date: 08/02/2023
Description of CL				
In section 3.2.2, for the deviation description,				

What is the main difference between these calibration standards, what does it mean in terms of QA/QC procedure for the related monitoring parameter(s). Clarification is requested.			
Project participant response (1st round)			
JJG596 and JJG597 are verification regulations that verify two different aspects, 596 is for measuring electrical energy, and 597 is for verifying electrical equipment, the number “1999” and “2005” are time when the documents issued.			
This deviation has been raised in the 1 st monitoring period, but not new one in this monitoring period and the deviation has been approved with the approval of the 1 st verification.			
Documentation provided by project participant (1st round)			Date: 14/02/2023
☒	Changes in the MR	Section(s): 2.2	New version No.: 5
☐	Changes in XLS	Worksheet(s):	New version No.:
☒	Other:		
VVB assessment (1st round)			Date: 15/02/2022
The revised MR is checked, it is verified that the clarification has been added.			
The deviation is that the applied national standard for electric meter calibration has changed from “Chinese Verification Regulation of Verification Equipment for AC Electrical Energy Meters, JJG597-2005” in the registered PD to “Chinese Verification Regulation of Electrical Energy Meters with Electronics, JJG596-1999”(the latest available version is “Chinese Verification Regulation of Electrical Energy Meters with Electronics, JJG596-2012)/JJG/. The PD author explained that it was a miss application of standard and the Yunnan Provincial Bureau of Quality and Technical Supervision, which made calibration works in the project, has advised the project proponent of its change. The detail of this change can be referred to the section 3.3 of the monitoring report.			
And via checking the 1 st periodical verification report/ ^{VER} /, it is confirmed that this deviation has been found and assessed since the 1 st periodical verification which is not only occurred for this monitoring period, and based on the detail assessment of the 1 st periodical verification report/ ^{VER} /, it is verified that this deviation does not impact the applicability of the methodology, additionality or the appropriateness of the baseline scenario, and the project remains in compliance with the applied methodology.			
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed	

Table 3. CAR from this verification

CAR ID	01	Section no.	All	Date: 05/07/2022
Description of CAR				
The MR template used by PP is not the latest version, revision is requested.				
Project participant response (1st round)				
The MR template used by PP is changed to the latest version 4.2, as requested.				
Documentation provided by project participant (1st round)				Date: 08/02/2023
☒	Changes in MR	Section(s): all	New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☐	Other:			
VVB assessment (1st round)				Date: 15/02/2023
The revised MR is checked, it is verified the MR template version has been updated to the latest version which is verified as appropriate/ ^{MRT} /.				
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	02	Section no.	1.1	Date: 05/07/2022
Description of CAR				

The description in section 1.1 is not completely in line with the MR template request, the relevant implementation dates (e.g., dates of construction, commissioning, and continued operation periods) are missing.			
Project participant response (1st round)			
The description in section 1.1 is in line with the MR template request, the relevant implementation dates (e.g., dates of construction, commissioning, and continued operation periods) are added. Refer to table in section 1.1 for detail information.			
Documentation provided by project participant (1st round)			Date: 15/08/2022
☒	Changes in MR	Section(s): 1.1	New version No.: 2.0
☐	Changes in XLS	Worksheet(s):	New version No.:
☒	Other:	/GHR/	
VVB assessment (1st round)			Date: 11/09/2022
The revised MR is checked, it is verified the relevant implementation dates have been added. The construction of project started on 28-July-2003, the 1 st generator of the project commissioning started time was 23-September-2005, 2 nd generator of the project commissioning started time was 14-October-2005 and 3 rd generator of the project commissioning started time was 22-December-2005, which are verified by site visit checking the Grid-connected generation handover record/ ^{GHR} / and 1 st verification report/ ^{VER} /.			
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed	

CAR ID	03	Section no.	1.7	Date: 05/07/2022
Description of CAR				
The figure of project location is not clearly show the actual location, revision is requested.				
Project participant response (1st round)				
The figure is updated accordingly.				
Documentation provided by project participant (1st round)				Date: 15/08/2022
☒	Changes in MR	Section(s): 1.7	New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☒	Other:			
VVB assessment (1st round)				Date: 11/09/2022
The updated figure is checked, VVB confirmed that the location of the project site is verified with on-site investigation by GPS device and the coordinates are verified as consistent in the MR.				
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	04	Section no.	1.8	Date: 05/07/2022
Description of CAR				
The name, version of meth and tools applied are not provided in line with PD.				
Project participant response (1st round)				
The name, version of meth and tools applied changed in line with PD.				
Documentation provided by project participant (1st round)				Date: 15/08/2022
☒	Changes in MR	Section(s): 1.8	New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☐	Other:			
VVB assessment (1st round)				Date: 11/09/2022
The revised MR is checked, it is verified that the name, version of meth and tools applied have been updated which is verified in line with the registered PD.				

The approved consolidated methodology applied in the project activity is ACM0002 “Consolidated baseline methodology for grid connected electricity generation from renewable sources” (version 10.0)/METH/. Applied tools applied in the project activity are Tool for the demonstration and assessment of additionality (ver.05.2)/TDAA/ Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion (ver.02)/TPL/ Tool to calculate the emission factor for an electricity system (ver.01.1)/TEF/	
Conclusion Tick the appropriate checkbox	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	05	Section no.	1.11	Date:	05/07/2022
Description of CAR					
For section 1.11, - The sustainable development contributions achieved by the project during this monitoring period are not provided in line with the requirement of MR template. - As per the MR template, the evidence of the project's SD contributions shall be provided as appendices to this report, however, evidence not provided in appendices of MR.					
Project participant response (1st round)					
- The sustainable development contributions achieved by the project during this monitoring period are provided in line with the requirement of MR template. - As per the MR template, the evidence of the project's SD contributions are provided in appendices of this report.					
Documentation provided by project participant (1st round)					Date:
☒	Changes in MR	Section(s): 1.11		New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):		New version No.:	
☐	Other:				
VVB assessment (1st round)					Date:
- The revised MR is checked, it is verified that the sustainable development contributions achieved by the project during this monitoring period have been demonstrated which is confirmed in line with the requirement of MR template. - The revised MR is checked, it is verified that evidence of the project's SD contributions have been provided as appendices to MR. Refer to section 4.1 of this report for detail assessment of the sustainable development contributions.					
Conclusion					
Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed			

CAR ID	06	Section no.	3.1	Date:	05/07/2022
Description of CAR					
It is observed that in section 3.1, - Description of main equipment and technology of the project is missing. - Table of technical parameters of turbines and generators is missing.					
Project participant response (1st round)					
- Main equipment and technology of the project was added. - Table of technical parameters of turbine and generators is added.					
Documentation provided by project participant (1st round)					Date:
☒	Changes in MR	Section(s): 3.1		New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):		New version No.:	
☐	Other:				
VVB assessment (1st round)					Date:

1. The revised MR is checked, it is confirmed that the description of main equipment and technology of the project is added and confirmed as correct by checking the PD/ ^{PD} / and validation report/ ^{VAL} /. 2. The revised MR is checked, it is confirmed that the table of technical parameters of turbine and generators is added and confirmed as correct by checking the PD/ ^{PD} / and validation report/ ^{VAL} /.	
Conclusion Tick the appropriate checkbox	☐ Additional action should be taken (finding remains open) ☒ The finding is closed

CAR ID	07	Section no.	4.2	Date: 05/07/2022
Description of CAR				
For parameter EG _{ex} ,				
1. The exact standard and regulation referred should be provided, including both installation and calibration.				
2. Frequency of monitoring missing.				
3. Validity for each calibration is missing.				
4. The calibration validity did not cover the monitoring period.				
5. The Serial No. of the meters M3, M5 and M7 provided in the MR are not same to the last verification report.				
6. All the related meters for measuring this parameter should be listed.				
7. The calculation method is missing.				
Project participant response (1 st round)				
1. The exact standard and regulation is provided, including both installation and calibration.				
2. Frequency of monitoring is added				
3. Validity for each calibration is added.				
4. The calibration validity covering the monitoring period is added.				
5. There were a typo mistake in the last verification report, the Serial No. of the meters M3, M5 and M7 provided in the MR is correct and actual according to the calibration reports in 2010.				
6. All the related meters are listed.				
7. The calculation method is added.				
Documentation provided by project participant (1 st round)				Date: 15/08/2022
☒	Changes in MR	Section(s): 4.2	New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☒	Other:	/CAL/		
VVB assessment (1 st round)				Date: 11/09/2022
1. The revised MR is checked, it is confirmed that the exact standard and regulation referred have been provided accordingly which is verified as reasonable based on local expertise of VVB.				
2. The revised MR is checked, it is confirmed that the frequency of monitoring is added which is verified as actual by site inspection of the electricity meters.				
3. The revised MR is checked, it is confirmed that the validity for each calibration is added which is verified as correct by checking the calibration certificate/CAL/.				
4. The revised MR is checked, it is confirmed that the calibration validity has covered the monitoring period.				
5. The calibration reports/CAL/ in 2010 have been checked, it is confirmed that the Serial No. of the meters M3, M5 and M7 provided in the MR is correct and actual which is also verified by site inspection.				
6. The revised MR is checked, it is confirmed that all the meters used for measuring this parameter are listed accordingly.				
7. The revised MR is checked, it is confirmed that the calculation method is added which is confirmed as correct.				
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	08	Section no.	4.2	Date: 05/07/2022
Description of CAR				
For parameter EG _{im} ,				
1. The exact standard and regulation referred should be provided, including both installation and calibration. 2. Frequency of monitoring missing. 3. Validity for each calibration is missing. 4. The calibration validity did not cover the monitoring period. 5. All the related meters for measuring this parameter should be listed. 6. The calculation method is missing.				
Project participant response (1st round)				
1. The exact standard and regulation is provided, including both installation and calibration. 2. Frequency of monitoring is added 3. Validity for each calibration is added. 4. The calibration validity covering the monitoring period is added. 5. The related meter has been listed. 6. The calculation method is added.				
Documentation provided by project participant (1st round)				Date: 15/08/2022
☒	Changes in MR	Section(s): 4.2	New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☒	Other:	/CAL/		
VVB assessment (1st round)				Date: 11/09/2022
1. The revised MR is checked, it is confirmed that the exact standard and regulation referred have been provided accordingly which is verified as reasonable based on local expertise of VVB. 2. The revised MR is checked, it is confirmed that the frequency of monitoring is added which is verified as actual by site inspection of the electricity meters. 3. The revised MR is checked, it is confirmed that the validity for each calibration is added which is verified as correct by checking the calibration certificate/^{CAL}. 4. The revised MR is checked, it is confirmed that the calibration validity has covered the monitoring period. 5. The revised MR is checked, it is confirmed that all the meters used for measuring this parameter are listed accordingly. 6. The revised MR is checked, it is confirmed that the calculation method is added which is confirmed as correct.				
Conclusion Tick the appropriate checkbox		☐ Additional action should be taken (finding remains open) ☒ The finding is closed		

CAR ID	09	Section no.	4.2	Date : 05/07/2022
Description of CAR				
For parameter AP _J , the monitoring frequency is yearly, however, the monitored values for this monitoring period are not provided yearly.				
Project participant response (1st round)				
For parameter AP _J , the monitoring frequency is yearly, and the monitored values for this monitoring period are provided yearly.				
Documentation provided by project participant (1st round)				Date: 15/08/2022
☒	Changes in MR	Section(s): 4.2	New version No.: 2.0	
☐	Changes in XLS	Worksheet(s):	New version No.:	
☒	Other:	/PRSA/		
VVB assessment (1st round)				Date: 11/09/2022
The revised MR is checked, it is confirmed that the monitored values for this monitoring period are provided yearly which are verified as correct by checking the Proof of Area of the reservoir/ ^{PRSA} .				

Conclusion Tick the appropriate checkbox	☐ Additional action should be taken (finding remains open) ☒ The finding is closed
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CAR ID	10	Section no.	5.1	Date :	05/07/2022
Description of CAR					
The formular for BE calculation is missing in section 5.1.					
Project participant response (1st round)					
The formula for BE calculation is added in 5.1					
Documentation provided by project participant (1st round)					Date:
☒ Changes in MR		Section(s): 5.1		New version No.: 2.0	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☐ Other:					
VVB assessment (1st round)					Date:
The revised MR is checked, it is confirmed that formular for BE calculation is added accordingly which is confirmed in line with the registered PD and applied methodology.					
Conclusion Tick the appropriate checkbox	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

CAR ID	11	Section no.	5.2	Date :	05/07/2022
Description of CAR					
For determination of PE during this monitoring period in section 5.2, the power density value is not calculated as per the PD and methodology, revision is requested.					
Project participant response (1st round)					
The power density is calculated as per PD and methodology and is revised as requested.					
Documentation provided by project participant (1st round)					Date:
☒ Changes in MR		Section(s): 5.2		New version No.: 2.0	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☐ Other:					
VVB assessment (1st round)					Date:
The revised MR is checked, it is confirmed that the section 5.2 has been updated accordingly. Refer to section 4.4.5.2 for detail assessment of power density calculation and PE determination.					
Conclusion Tick the appropriate checkbox	☐ Additional action should be taken (finding remains open) ☒ The finding is closed				

Table 4. FAR from this verification

FAR ID	xx	Section No.		Date:	DD/MM/YYYY
Description of FAR					
Project participant response					Date:
					DD/MM/YYYY
Documentation provided by project participant					
☐ Changes in MR		Section(s):		New version No.:	
☐ Changes in XLS		Worksheet(s):		New version No.:	
☐ Other:					
VVB assessment					Date:
					DD/MM/YYYY
Conclusion Tick the appropriate checkbox	☐ To be checked during the next periodic verification				

APPENDIX 5 MONITORED PARAMETERS

Table A-1: Periodic Verification Checklist – Monitored Parameters

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
A. EG_{ex}		Electricity supplied by the project activity to the grid		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level but also describe the applied data aggregation trails (from ODL to data aggregation level zero).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i> <i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the Joint-PD-MR,D and the applied methodology.</i>	/I1/ /PSI/ /LOG/ /MR/ /MRR/ /MM/ /PPA/ /METH/	<i>Description:</i> In this monitoring period, the electricity supplied by the project activity to the grid which has been confirmed by checking the meter reading records^{/MRR/} and power sales invoice^{/PSI/}. The electricity supplied by the project activity to the grid EG_{ex} is measured continuously by electricity meters M3 installed at the outlet of project 110kV line and M5 and M7 installed at the outlet of project 35kV line used as revenue meters with accuracy of 0.2s and measured continuously and recorded monthly. Then EG_{ex} of this project is equal to the M3+M5+M7. The meters monitor the electricity supplied to the CSPG. The meter readings are recorded by the monitoring team monthly. Meanwhile, the automatic monitoring system will collect the data from the meters every month and deliver them to the PP. The meter readings are recorded by the PP, based on that, related monthly power sales invoice^{/PSI/} have been issued. Neither failure nor exchange of electricity meters were detected during the monitoring period. The data aggregation procedure applied by the PP is shown as follow: EG_{ex} is measured continuously by electricity meters M3, M5 and M7, the operators read the value from the electricity meters per month. Based on the sum of the three meter values, the electricity supplied to the grid for that month is determined. Accordingly the operator issues the monthly reports. - Based on the monthly reports, the final monthly value was reported in the monitoring report. <i>Verifier's action:</i>	CAR-07	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		This was verified by on-site interview, by observations and by cross checking with calibration records, meter reading records and power sales invoices, Joint-PD-MR and applied methodology against the ER calculation spreadsheet. Furthermore, the following actions have been taken by the verification team to check the correctness of the data aggregation. The reported value in the MR has been recalculated by the verification team based on the values from the monthly reports. Based on monthly reports and the underlying original data, the verification team calculated the data aggregation completely independent from the calculation provided by the PP. 100% of the monthly reports have been verified. The meter reading record values have been cross-checked with monthly power sales invoices. <i>Conclusion:</i> The actual Measurement / Determination method for this monitoring period is not clearly specified. CAR 07 was raised.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/I1/ /CAL/ /CMA/ /PSI/ /LOG/ /MR/ /MRR/ /MM/ /PPA/ /TTR/ /METH/ /PHT/	<i>Description:</i> EG_{ex} is measured continuously by electricity meters with accuracy of 0.2s and recorded monthly. The calibration of all the meters were performed every five years by grid company/^{CMA}/ according to regulations of the grid company and records maintained/^{CAL}/. QA/QC procedure for meter calibration maintenance and recording; procedure for monitoring staff training and competence were established and implemented. The data flow and protection process was observed during the on-site verification. In case the meters is out of order, the data on the invoice will be used for calculate the emission reduction. The calibration is valid for the entire monitoring period. The monitored data will be kept accordingly. <i>Verifier's action:</i> The above mentioned was verified by cross checking the monthly power sales invoices, the meter readings and calibration records	CAR 07	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
		against the MR, internal audit records and ER sheet against the MR. Further, an on-site interview has been conducted and the procedures for meter calibration maintenance and recording as well as for monitoring staff training and competence have been cross checked. <i>Conclusion:</i> The accuracy of equipment used for monitoring is checked as controlled and calibrated in accordance with the monitoring plan. However, CAR 07 was raised.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/PSI/ /LOG/ /MR/ /MRR/ /TTR/ /XLS/ /METH/ /IAR/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The electricity of EG_{ex} during period 01-January-2021 to 31-March-2016 is reported in the MR based on the meters readings and cross check with power sales invoices. <i>Verifier's action:</i> By means of checking the ER-spreadsheet against the monthly power sales invoices and meter reading records, the internal audit record and daily log. <i>Conclusion:</i> The value is verified as correct.	OK	OK
B. EG_{im}		Electricity supplied by the grid to project activity		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level but also describe the applied data aggregation trails (from ODL to data aggregation level zero).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used.</i>	/I1/ /PPI/ /LOG/ /MR/ /MRR/ /MM/ /PPA/ /METH/	<i>Description:</i> In this monitoring period, the electricity delivered by the grid to project activity which has been confirmed by checking the meter reading records/^{MRR/} and power purchases invoice/^{PPI/}. The electricity delivered by the grid to project activity EG_{im} is measured continuously by bi-directional electricity meter M3 installed at the outlet of project 110kV line used as revenue meter with accuracy of 0.2s and measured continuously and recorded monthly. Then EG_{im} of this project is equal to the M3. The meter monitor the electricity delivered by the CSPG to project activity. The meter readings are recorded by the monitoring team monthly. Meanwhile, the automatic monitoring system will collect	CAR-08	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
Furthermore, verify the frequency of measurements as per the requirements. Assess whether the measurement / determination method is in line with the registered monitoring plan of the Joint-PD-MR,D and the applied methodology.		the data from the meter every month and deliver them to the PP. The meter readings are recorded by the PP, based on that, related monthly power purchases invoice/^{PPI}/ have been issued. Neither failure nor exchange of electricity meter were detected during the monitoring period. The data aggregation procedure applied by the PP is shown as follow: 1. EG_{im} is measured continuously by electricity meter M3, the operators read the value from the electricity meter per month. Based on the meter values, the electricity supplied by the grid to the project for that month is determined. Accordingly the operator issues the monthly reports. 2. Based on the monthly reports, the final monthly value was reported in the monitoring report. <i>Verifier's action:</i> This was verified by on-site interview, by observations and by cross checking with calibration records, meter reading records and power purchases invoices, Joint-PD-MR and applied methodology against the ER calculation spreadsheet. Furthermore, the following actions have been taken by the verification team to check the correctness of the data aggregation. The reported value in the MR has been recalculated by the verification team based on the values from the monthly reports. Based on monthly reports and the underlying original data, the verification team calculated the data aggregation completely independent from the calculation provided by the PP. 100% of the monthly reports have been verified. The meter reading record values have been cross-checked with monthly power purchases invoices. <i>Conclusion:</i> The actual Measurement / Determination method for this monitoring period is not clearly specified. CAR 08 was raised.		
b) Accuracy and QA/QC Procedure	/11/	Description:	CAR-08	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
(VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/CAL/ /CMA/ /PPI/ /LOG/ /MR/ /MRR/ /MM/ /PPA/ /TTR/ /METH/ /PHT/	EG_{im} is measured continuously by electricity meter with accuracy of 0.2s and recorded monthly. The calibration of all the meter were performed every five years by grid company^{/CMA/} according to regulations of the grid company and records maintained^{/CAL/}. QA/QC procedure for meter calibration maintenance and recording; procedure for monitoring staff training and competence were established and implemented. The data flow and protection process was observed during the on-site verification. In case the meter is out of order, the data on the invoice will be used for calculate the emission reduction. The calibration is valid for the entire monitoring period. The monitored data will be kept accordingly. Verifier's action: The above mentioned was verified by cross checking the monthly power purchases invoices, the meter readings and calibration records against the MR, internal audit records and ER sheet against the MR. Further, an on-site interview has been conducted and the procedures for meter calibration maintenance and recording as well as for monitoring staff training and competence have been cross checked. Conclusion: The accuracy of equipment used for monitoring is checked as controlled and calibrated in accordance with the monitoring plan. However, CAR 08 was raised.		
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i>	/PPI/ /LOG/ /MR/ /MRR/ /QA/ /TTR/ /XLS/ /METH/	☒ Correct ☐ Not correct (initial assessment) Description: The electricity of EG_{im} during period 01-January-2021 to 31-March-2016 is reported in the MR based on the meter readings and cross check with power purchases invoices. Verifier's action: By means of checking the ER-spreadsheet against the monthly power purchases invoices and meter reading records, the internal audit record and daily log.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/IAR/	<i>Conclusion:</i> The value is verified as correct.		
C. Cap_{PD}		Installed capacity of the hydro power plant after the implementation of the project activity		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level but also describe the applied data aggregation trails (from ODL to data aggregation level zero).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used. Furthermore, verify the frequency of measurements as per the requirements.</i> <i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the Joint-PD-MR,D and the applied methodology.</i>	/I1/ /PHT/ /PD/ /MR/ /METH/ /LOG/	<i>Description:</i> 3 sets of turbine generators with rated unit capacity of 16 MW are installed which is in line with registered PD. The nameplates and the central control system of turbine generators are read during site inspection. <i>Verifier's action:</i> It was verified by means of on-site inspection and observation and cross checking with equipment nameplates. <i>Conclusion:</i> The capacity is as per registered PD and monitored as per applied methodology ACM0002.	OK	OK
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i>	/I1/ /PHT/ /PD/ /MR/ /METH/ /LOG/	<i>Description:</i> The accuracy of the value can be verified from nameplates of turbine generators and the technical information/parameters in PD. The value is verified once during verification. <i>Verifier's action:</i> This was verified by means of on-site interview and observation and cross-checked nameplates and PD. <i>Conclusion:</i> QA/QC procedures are met. No inaccuracies occurred.	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Describe whether all applicable QA/QC procedures are met. Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>				
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i> <i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>	/I1/ /PHT/ /PD/ /MR/ /METH/ /LOG/	☒ Correct ☐ Not correct (initial assessment) <i>Description:</i> The value has been checked with the capacity indicated on the nameplates (3*16 MW) of turbine generators and the technical information/parameters of the key equipment. <i>Verifier's action:</i> This was verified by means of on-site interview and observation and cross checking the registered PD. <i>Conclusion:</i> The installed capacity 48MW given in the monitoring report is correct. The project is installed as per registered PD.	OK	OK
D. APJ		Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full		
a) Measurement / Determination method (VVS, §§ 389-393) <i>Describe how the monitoring parameter was measured / determined. Focus primarily on the original data level but also describe the applied data aggregation trails (from ODL to data aggregation level zero).</i> <i>Check if relevant equipment has been exchanged and if in cases of failures / downtimes of standard equipment other measurement / determination methods have been used.</i>	/I1/ /PRSA/ /PD/ /MR/ /METH/	<i>Description:</i> Area of the reservoir is measured yearly by professional design institute. The area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full was determined as 0.17 km ² . <i>Verifier's action:</i> It was verified by on-site interview and cross checking with Report of the reservoir area of this hydropower project and MR, registered PD and applied methodology. <i>Conclusion:</i>	OK	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>Furthermore, verify the frequency of measurements as per the requirements.</i> <i>Assess whether the measurement / determination method is in line with the registered monitoring plan of the Joint-PD-MR,D and the applied methodology.</i>		The measurement is as per registered PD and applied methodology ACM0002.		
b) Accuracy and QA/QC Procedure (VVS, §§ 394-400) <i>In case of measured (or estimated) values, check whether the accuracy of equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan or if significant inaccuracies occur; in this case, make sure that the most conservative assumptions theoretically possible have been made for calculating ERs.</i> <i>Describe whether all applicable QA/QC procedures are met.</i> <i>Assess further if the calibration of the monitoring equipment has been carried out in line with the latest EB guidance.</i> <i>Include calibration dates and information in validity of the installed monitoring equipment in the table in Annex 2.</i>	/PRSA/ /PD/ /MR/ /METH/	<i>Description:</i> Area of the reservoir is measured yearly by professional design institute. <i>Verifier´s action:</i> It was verified by cross checking the Report of the reservoir area against the PD and MR. <i>Conclusion:</i> Accuracy is confirmed.	OK	OK
c) Correctness (VVS, §§ 389-393) <i>Determine whether the value given in the monitoring report is correct or determined in a conservative manner.</i> <i>In case of conservative approaches used in lieu of the monitoring as per registered MP detailed assessment of the conservativeness of the approach used should be given.</i>	/PRSA/ /PD/ /MR/ /METH/	☐ Correct ☒ Not correct (initial assessment) <i>Description:</i> The values are not listed as yearly basis. <i>Verifier´s action:</i> It was verified by cross checking the Report of the reservoir area against the PD and MR. <i>Conclusion:</i> The value given in MR is not correct. CAR 09 was raised.	CAR 09	OK

Checklist Item (incl. guidance for the verification team)	Reference	Verification Team Comments (Means and results of assessment)	Draft Concl.	Final Concl.
<i>In case of mistakes / deviations pl. provide details and descriptions of the CARs raised.</i>				

APPENDIX 6: CALIBRATION DATES AND VALIDITY OF INSTALLED MONITORING EQUIPMENT

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Previous calibration (last calibration before start of this MP)	Calibration date(s) during this monitoring period	Validity of calibration(s)	Delay in calibration: yes/no	Period of delayed calibration
Electricity meter M3	EG_{ex} EG_{im}	0502A023-01	ION8300	0.2s	11-Aug-2010	11-Aug-2015	11-Aug-2010 to 10-Aug-2020	☒ No ☐ Yes	N/A
Electricity meter M5	EG_{ex}	0502A025-01	ION8300	0.2s	11-Aug-2010	11-Aug-2015	11-Aug-2010 to 10-Aug-2020	☒ No ☐ Yes	N/A
Electricity meter M7	EG_{ex}	0502A024-01	ION8300	0.2s	11-Aug-2010	11-Aug-2015	11-Aug-2010 to 10-Aug-2020	☒ No ☐ Yes	N/A