NANSHA HYDRO POWER PROJECT IN YUNNAN PROVINCE CHINA

Document Prepared By LGAI Technological Center, S.A. (Applus+ Certification)

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Summary:

LGAI Technological Center, S.A. (hereafter referred to as "Applus+ Certification") has been commissioned by Goldchina Consultancy International Co., Ltd. to perform the verification of greenhouse gas emission reductions of the project activity "Nansha Hydro Power Project in Yunnan Province China" (VCS Ref. No. 884, hereafter referred to as "the project activity") reported in the monitoring report /1/ during monitoring period 01/09/2012 to 27/12/2017.

The project activity has been validated by TÜV SÜD based on the CDM PDD /3/ version 02 dated 25/07/2008 and reported in the validation report No. 1053560 /4/, version 5, completed on 07/08/2008. The project activity was registered as a CDM project activity on 12/01/2009 which is available at https://cdm.unfccc.int/Projects/DB/TUEV-SUED1218613554.96/view. A gap validation was performed by RINA during the VCS verification which is available at https://registry.verra.org/app/projectDetail/VCS/884. The VCS PD /3/ together with CDM PDD /3/ would be the basis for verification.

The project activity is a hydropower project located at Yuanyang County of Honghe Hani & Yi Autonomous State, Yunnan Province, P. R. China which is to use hydropower resource for electricity generation. The installed capacity of the project activity is 150 MW, involves the installation of 3 sets of hydro turbine generators with a unit capacity of 50 MW. The average annual power delivered to the grid by the project is expected to be 616,314 MWh. The project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in South China Power Grid (SCPG). It's estimated that the proposed project could achieve GHG emission reductions of 519,768 tCO_2e annually.

The purpose and scope of this verification is to ensure that reported emission reductions are complete and accurate in accordance with applicable VCS standards and relevant UNFCCC requirements in order to be certified. A desk review and a site visit have been conducted to verify the data submitted in the monitoring report /1/. Applus+ Certification confirms the following has been reviewed:

- Monitoring plan included in the registered CDM PDD /3/ version 02 dated 25/07/2008 and VCS PD /3/ version 01 dated 22/05/2012;
- Validation report No. 1053560 /4/ version 5, dated 07/08/2008;

- VCS Verification report No. 2012-SH-48-MD /4/ version 1.4, dated 15/08/2012;
- Approved methodology, ACM0002 /7/, version 6.0, dated 18/05/2006;
- VCS standards version 4.3 and guidance version 4.2, as well as relevant UNFCCC requirements;
- All information and references relevant to the project activity's resulting in emission reductions.

During this verification, no finding was identified related to the monitoring, implementation or operations of the project activity in relation to relevant VCS standards, guidance and UNFCCC requirements and relevant host party criteria and the applied baseline and monitoring methodology etc.

- *Applus+ Certification confirms that the project is implemented in accordance with the registered PD /3/. The monitoring plan complies with the applied methodology ACM0002 /7/ version 6.0 and the monitoring has been carried out in accordance with the registered PD. The monitoring system is in place and the emission reductions are calculated without material misstatements. The level of assurance of the verification is reasonable. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information reviewed and evaluated Applus+ Certification confirms that the implementation of the project has resulted in 2,745,232 tCO_2e emission reductions during period 01/09/2012 to 27/12/2017.*

CONTENTS

1 INTRODUCTION

1.1 Objective

- LGAI Technological Center, S.A. (Applus+ Certification) has been commissioned by Goldchina Consultancy International Co., Ltd. to perform the verification of greenhouse gas emission reductions of the project activity "Nansha Hydro Power Project in Yunnan Province China" (VCS Ref. No. 884) reported in the Monitoring Report /1/ during monitoring period 01/09/2012 to 27/12/2017.
- LGAI Technological Center, S.A. (Applus+ Certification) as the verification body of the project activity has been accredited as a DOE by UNFCCC and also meets the competence requirements as set out in ISO 14065:2020.
- The objective of verification is to have an independent review and ex post determination by a Validation and Verification Body (VVB) of the monitored reductions in GHG emissions that have occurred as a result of the registration of VCS project. Certification is the written assurance by the VVB that, during a specific time period, a proposed VCS project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified.
- The objective of this verification/certification is to verify and certify emission reductions, reported for the "Nansha Hydro Power Project in Yunnan Province China" in China for the period 01/09/2012 to 27/12/2017.

1.2 Scope and Criteria

- The verification scope is defined as an independent and objective review of the registered PD and PDD, the Project's baseline study and Monitoring Report (MR) and other relevant documents. The information in these documents is reviewed against VCS Version 4.3 requirements, UNFCCC rules and associated interpretations.
- The verification is not meant to provide any consulting towards the client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the Project monitoring towards reductions in the GHG emissions..

1.3 Level of Assurance

- The verification report is based on the CDM-PDD, the VCS Monitoring Report (MR), supporting evidences made available to the verifier and information collected through performing interviews and during the on-site assessment.
- The verification conclusion is assured a reasonable level of assurance.

1.4 Summary Description of the Project

Project title	Nansha Hydro Power Project in Yunnan Province China
VCS reference number	884
Project Participants	Honghe Guangyuan Hydro Power Development Co.Ltd (Project Owner, host country, P. R. China)
Location of the project	Yuanyang County of Honghe Hani & Yi Autonomous State, Yunnan Province, People's Republic of China Central Geographic coordinates: East longitude: 102°51'21" North latitude: 23°13'46"
Project start date	Construction start date: 18/07/2006 Operation start date: 28/12/2007
Version of CDM PDD and VCS PD	Version 02, dated 25/07/2008 (CDM PDD) Version 01, dated 22/05/2012 (VCS PD)
Monitoring period	01/09/2012 to 27/12/2017
First monitoring report	Version 01, dated 26/05/2022
Final monitoring report	Version 02.1, dated 01/09/2022
Applied Methodology/Version	ACM0002, version 6.0, dated 18/05/2006
Scope/Technical Area	1/1.2

The project activity is a hydropower project located at Yuanyang County of Honghe Hani & Yi Autonomous State, Yunnan Province, P. R. China which is to use hydropower resource for electricity generation. The installed capacity of the project activity is 150 MW, involves the installation of 3 sets of hydro turbine generators with a unit capacity of 50 MW. The average annual power delivered to the grid by the project is expected to be 616,314 MWh. The project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in South China Power Grid (SCPG). It's estimated that the proposed project could achieve GHG emission reductions of 519,768 tCO_2e annually.

The project activity has been validated by TÜV SÜD based on the CDM PDD /3/ version 02 dated 25/07/2008 and reported in the validation report No. 1053560 /4/, version 5, completed on 07/08/2008. The project activity was registered as a CDM project activity on 12/01/2009 which is available at https://cdm.unfccc.int/Projects/DB/TUEV-SUED1218613554.96/view. A gap validation was performed by RINA during the VCS verification which is available at https://registry.verra.org/app/projectDetail/VCS/884. The VCS PD /3/ together with CDM PDD /3/ would be the basis for verification.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification was conducted using Applus+ Certification's procedures in line with the requirements specified in the VCS Standard version 4.3, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant UNFCCC requirements and applying standard auditing techniques.

Applus+ Certification completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

- Activities associated with all the sources contributing to the project emissions and emission reductions, including leakage if relevant;
- Protocols used to estimate or measure GHG emissions from these sources;
- Collection and handling of data;
- Controls on the collection and handling of data;
- Means of verifying reported data; and
- Compilation of the monitoring report.

Applus+ Certification verified the implementation of the monitoring plan and the data presented in the Monitoring Report /1/ for the period in question. This involved a site visit and a desk review of the Monitoring Report. This Verification Report describes the findings of this assessment.

The information of the assessment team is included in below:

Assessment team

According to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in Applus+ Certification. The composition of assessment team has to be approved by the Applus+ Certification ensuring that the required skills are covered by the team. The four qualification levels for team members that are assigned by formal appointment rules as below:

- Leader Auditor (LA)
- Auditor (A)/ Auditor Trainee (AiT)

- Technical Reviewer (TR)
- Technical Experts (TE)

Name	Qualification	Coverage of scope	Coverage of Technical Area	Host country experience
Doris Dai	LA/TE	Y (1.2)	Y	Y
Simon Shen	TR	Y (1.2)	Y	Y

- **Doris Dai** (Master's Degree in Environmental Sciences, Bachelor's Degree in Environmental Technology) is an Auditor appointed by Applus+ LGAI for the GHG project assessment and auditing. She has more than 6 years of work experience in CDM/VCS project assessment. Before she joined Applus+ LGAI, she has been working for CTI Certification as senior GHG Auditor for 3.5 years.
- **Simon Shen** (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ Certification for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ Certification, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years.

2.2 Document Review

- The VCS monitoring report /1/ version 01 dated 26/05/2022, version 02.1 dated 01/09/2022 and the emission reduction calculations spreadsheet /2/, were assessed as part of the verification. In addition, the CDM PDD /3/ version 02 dated 25/07/2008 in particular the baseline estimations and the monitoring plan, the CDM Validation Report /4/ dated 07/08/2008, as well as relevant documents, were reviewed. A detailed document reviewed are listed in Appendix 1 of the report.

2.3 Interviews

The key personnel interviewed are summarized in the table below:

Interviewed personnel	Role	Organization	Subject
Mr. Wang Taiyuan	Chief Engineer	Honghe Guangyuan Hydro Power Development Co.Ltd	Operation of the project activity; Implementation of the monitor plan of the project activity; Data collection and data achievement; Calibration of meters and equipment maintenance.
Mr. Zhang Guangshou	Chief for Operation Department	Honghe Guangyuan Hydro Power Development Co.Ltd	
Mr. Liu Yu	Shift engineer	Honghe Guangyuan Hydro Power Development Co.Ltd	
Dr. Zheng Zhaoning	Technical Director	Goldchina Consultancy International Co., Ltd.	Data collection and ER calculation.

2.4 Site Inspections

- The assessment team performed the on-site verification (Yuanyang County of Honghe Hani & Yi Autonomous State, Yunnan Province, P. R. China) on 11/07/2022. The interviewed personnel and objective are listed in above table.

2.5 Resolution of Findings

- As an outcome of the verification process, the team can raise different types of findings.
- Where a non-conformance arises the assessment team shall raise a Corrective Action Request (CAR). A CAR is issued, where:
- a) Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;

- b) Modifications to the implementation, operation and monitoring of the project activity has not been sufficiently documented by the project participants;
- c) Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.
- The assessment team shall raise a Clarification Request (CL) if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.
- All CARs and CLs raised during verification shall be resolved prior to submitting a request for issuance.
- There is no CARs and CLs raised for this monitoring period for the project.

2.5.1 Forward Action Requests

- None FAR was raised during the verification process. Also there are no remaining from former validation.

2.6 Eligibility for Validation Activities

- Not applicable as LGAI Technological Center, S.A. holds the accreditation for the validation and verification for projects under scope 1.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

- Through reviewing the registered PDD /3/ and validation report /4/, it was validated that the project has been registered as a CDM project with reference No. 2133 first which is available at https://cdm.unfccc.int/Projects/DB/TUEV-SUED1218613554.96/view. Then the project has been registered as VCS project which is available at https://registry.verra.org/app/projectDetail/VCS/884. The project does not participate in the other emissions trading program by checking public information on Internet, interviewing with project owner and statement issued by project owner.
- By checking online information and interview with the project owner, it is confirmed that the project was only registered under VCS and CDM and won't apply for any carbon credits or environmental credits under any other scheme. During this monitoring period, only credits under VCS would be issued.
- The project has not received or sought any other form of environmental credit or has become eligible to do so since validation or previous verification.
- The GHG emission reductions or removals generated by the project have not become included in an emissions trading program or any other mechanism that includes GHG allowance trading.
- During the period from 28/12/2007 to 27/12/2017 as the first VCS crediting period, the project would claim only for VCUs or CERs. But VCUs and CERs will not be claimed in the same period. Also, for period 12/01/2009 to 31/08/2012, the project has applied for the issuance of CERs.
- The project is also registered as a CDM project with a seven year twice renewable project crediting period, which is from 12/01/2009 to 11/01/2030. Therefore, the total length of VCS crediting period should be no more than 21 years which is from 28/12/2007 to 27/12/2028.
- Therefore, Applus+ Certification consider the project is eligible to participate under the VCS Program as there is no double counting for the emission reduction during any period.

3.2 Methodology Deviations

- Not applicable as no deviation for methodology.

3.3 Project Description Deviations

- The project is registered under VCS scheme in 2012, then the first crediting period should be from 28/12/2007 to 27/12/2017 other than from 28/12/2007 to 11/01/2009. The assessment team confirm this is in line with the requirement of VCS and it has no impacts on the applicability, additionality or baseline of the project.

3.4 Grouped Project

- Not applicable as not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

- By means of on-site visit, the assessment team confirms that all physical features of the proposed CDM project activity proposed in the registered CDM PDD /3/ are in place and the PP has operated the project as per registered CDM PDD /3/. The installed capacity of the project is 150 MW, involves the installation of 3 sets of hydro turbine generators with a unit capacity of 50 MW. The electricity generated is transmitted to the local Power Grid via a newly built transformer station, which was then exported to the SCPG. The project activity was expected to supply 616,314 MWh of electricity to the grid. The construction of the project started on 18/07/2006, the project has been put into operation on 28/12/2007 verified by checking information on the UNFCCC website and site visit. There are no changes on the key equipment and technology since the validation of the project. No special event which would affect the monitoring of the project has been observed during the monitoring period.
- The project would contribute to sustainable development in as below:
- (1) The project will supply enough clean electricity for industry development in Honghe Hani & Yi Autonomous State.
- (2) To displace part of the electricity from coal-fired power plants, and thus will avoid environmental pollution caused by coal burning.
- (3) To make good use of the local water resource to solve the difficulties of lack of power and unstable voltages.
- (4) To create new job opportunities for the local people: temporary job opportunities will be available during the construction period and 98 permanent jobs during the operation time.
- (5) After the operation of the project, the local people can make good use of electricity instead of biomass, especially firewood, which can reduce the breakage to local vegetation and environment protection.
- Moreover by checking public information, staff roaster of project /16/ and site visit, following information has been confirmed:

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime

1)	7	Ensure access to affordable, reliable, sustainable and modern energy for all	Implemented activities to increase	Provide 3,255,154.43 MWh clean electricity in this monitoring period	With 150 MW installed capacity and 616,314 MWh clean electricity supply, the project ensure access to affordable, reliable, sustainable and modern energy for all. Especially supply enough clean electricity for industry development in Honghe Hani & Yi Autonomous State. To displace part of the electricity from coal-fired power plants, and thus will avoid environmental pollution caused by coal burning.
2)	8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Implemented activities to increase	No further changes this monitoring period	Create 49 permanent jobs during the operation time.
3)	13	Tonnes of greenhouse gas emissions avoided or removed	Implemented activities to increase	By displacing fuel fired electricity, reduce 2,745,232 tonnes of CO_2 emission.	Reduce 519,986 tCO_2e annually over the project lifetime.

- The technical parameters have been verified with the nameplates /9 / as below:

Hydro turbine	Model:	HL-LJ-420
	Number:	3
	Rated water head:	44.5m
	Rated flow:	129.92 m^3/s

	Rated capacity:	51.546 MW
Generator	Model:	SF50-52/9200
	Number:	3
	Rated capacity per unit:	50 MW
	Rated voltage:	10,500 V
	Rated capacity factor:	0.85
	Rated rotating speed:	115.4 r/min
Main transformer	Model:	SF10-6300kVA/110kV
	Number:	3

- By comparing the actual ER claimed in this monitoring period with the estimate in the registered PDD, the actual emission reductions (2,745,232 tCO_2e) are lower than what is stated in the registered PDD (i.e. 2,768,299 tCO_2e, equals to annual emission reductions, 519,768 tCO_2e multiplied by the actual operational days (1,944 days) then divided by 365 days). The assessment team consider this variation is in the normal range due to the reasonable fluctuation of the water flow.
- Therefore, the assessment team confirmed the ER in this monitoring period is not overestimated.
- The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period.
- All required equipments and procedures are available and implemented in an appropriate manner.
- All necessary monitoring instruments are installed. All required instruments including standby and operating procedures for the same have been implemented in an appropriate manner.
- The project is completely operational and the same has been confirmed on-site. Neither mistakes nor malfunction on main meters have been observed during this monitoring period.

4.2 Safeguards

4.2.1 No Net Harm

- By checking the EIA summary and conclusion provided in the registered PDD, it is confirmed that hydro power is green power and the impact caused by hydro power on the surrounding ecosystem and residents, water, and atmosphere etc. is very little, there would be no net harm caused due to the project activity. Also, the EIA of the project are approved by the government.

- Also, 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 on-site.
- By checking Opinions on environmental protection acceptance of completion, it is confirmed that no fish passage was established by the project, but artificial net catch and release to the upstream of the dam. Breeding and release for local wild fish have been implemented, Artificial fish nest of 500 m^2 was installed, and about breed 99,350 fish annually.
- The wastewater and hazardous waste management practices has been included the Section 2.1 of the monitoring report and confirmed to be correct.

4.2.2 Local Stakeholder Consultation

- There are three phases for inviting the comments of the stakeholders, during all three phased, survey was carried out through the information publication, distributing and collecting responses to questionnaires targeting on local residents, builders and members of the local authorities. The project owner introduced the proposed project, and then a survey was arranged through a questionnaire for all three phases, which was designed to be easily filled in. The opinions expressed by the stakeholders were recorded and are available on request.
- The stakeholder meeting and the survey showed that the proposed project receives strong support from the local community. They all believe the proposed project will promote local economic development and agree with the project development and construction. And main concern for the project has been eliminated by mitigating measurement carried out by the project owner and local government.
- Communications with Local stakeholders was being carried out at periodic intervals. There are no negative comments received for the project.
- During the site visit, the VVB has checked the original copy of public comments collection and feedback book during this monitoring period and confirmed that there are no negative comments raised from the stakeholder.
- Moreover, by interview with the project owner and checking on-line information, no negative comments or administrative penalty are raised from local supervision institute.
- Therefore, VVB is able to confirm no negative grievances have been raised in the monitoring period.
- All such conclusion has been verified through site visit and check registered PDD.

4.3 AFOLU-Specific Safeguards

- Not applicable as non-AFOLU project.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

- The monitoring has been carried out in accordance with the monitoring plan contained in the CDM PDD /3/. All parameters were monitored and determined as per the monitoring plan which is listed in below table:

Data / Parameter:	$EG_{PJ\ to\ SCPG,y}$
Data unit:	MWh
Description:	Annual Grid-connected power generation of the proposed project to South China Power Grid
Purpose of the data:	Calculation of baseline emissions
Parameter value:	3,337,705.36
Source of data used:	Annual Grid-connected power generation of the proposed project to South China Power Grid ($EG_{PJ\ to\ SCPG,y}$) are all sourced from Meter Reading Record (MRRs) /10/ issued by the project owner, Electricity Transaction Notes (ETNs) /11/ issued by power grid company and Statement issued by power grid company /15/ covering monitoring period.
Information flow:	2 sets of electricity meters (M1, M2 as main and M3, M4 as backup) installed at the 151 Switch on the Nanguang Circuit (M1 and M3) and at the 152 Switch on the Xiguang Circuit (M2 and M4) respectively were measured continuously, recorded monthly and archived electronically. At 24:00 hr of last day of each month, the staff from project owner will record 2 main electricity meters' readings and form Meter Reading Records (MRRs). The staff from power grid company will record the meter readings of meters (M1 and M2) then transcribes the data into Electricity Transaction Notes (ETNs). For the data for 27/12/2017 are determined by MRRs and Statement issued by power grid company. The data for MRRs, ETNs and Statement issued by power grid company have been sent to the CDM consulting company for reporting of GHG emission reduction. The conservative one would be used for ER calculation. Another 3 electricity meters (M5, M6 and M7) has been installed at the outlets of the three generators as a backup system, in this monitoring period, data from 3 electricity meters are not used for ER calculation.
Monitoring method, frequency and equipments:	The parameter was measured continuously and recorded monthly by 7 electricity meters (M1, M2, M3, M4, M5, M6 and M7) installed at the 151 Switch on the Nanguang Circuit (M1 and M3) and at the 152 Switch on the Xiguang Circuit (M2 and M4) and the outlets of the three generators (M5, M6 and M7) respectively during the monitoring period verified by site visit.

<table>
<tr><td></td><td>See below for the information of 7 electricity meters verified by site visit and checking calibration certificates /12/:
<table>
<tr><th>Meter*</th><th>Type</th><th>Serial Number</th><th>Accuracy</th></tr>
<tr><td>M1 (Old)</td><td>Mk6E</td><td>206659001</td><td>0.2s</td></tr>
<tr><td>M1 (New)</td><td>Mk6E</td><td>214127481</td><td>0.2s</td></tr>
<tr><td>M2 (Old)</td><td>Mk6E</td><td>206659630</td><td>0.2s</td></tr>
<tr><td>M2 (New)</td><td>Mk6E</td><td>214597130</td><td>0.2s</td></tr>
<tr><td>M3 (Old)</td><td>Mk6E</td><td>206659280</td><td>0.2s</td></tr>
<tr><td>M3 (New)</td><td>Mk6E</td><td>214127489</td><td>0.2s</td></tr>
<tr><td>M4 (Old)</td><td>Mk6E</td><td>206659002</td><td>0.2s</td></tr>
<tr><td>M4 (New)</td><td>Mk6E</td><td>214127467</td><td>0.2s</td></tr>
<tr><td>M5</td><td>DTSD341</td><td>20070940010005</td><td>0.5s</td></tr>
<tr><td>M6</td><td>DTSD341</td><td>20070940010006</td><td>0.5s</td></tr>
<tr><td>M7</td><td>DTSD341</td><td>20070940010007</td><td>0,5s</td></tr>
</table>
*On 31/12/2015, Electricity meter M1, M2, M3 and M4 were replaced with new one confirm by checking with Meter Change Record /18/.

The type, serial number and accuracy have been confirmed by site visit.</td></tr>
<tr><td>Calibration:</td><td>The calibration information is shown as below /12/:
<table>
<tr><th>Meter</th><th>Calibration date</th><th>Valid until</th></tr>
<tr><td>M1 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td></td><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M1 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td>M2 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td></td><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M2 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td>M3 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td></td><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M3 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td>M4 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td></td><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M4 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td>M5</td><td>30/09/2007</td><td>29/09/2012</td></tr>
<tr><td></td><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td></td><td>28/09/2017</td><td>27/09/2022</td></tr>
</table></td></tr>
</table>

	<table><tr><td rowspan="3">M6</td><td>30/09/2007</td><td>29/09/2012</td></tr><tr><td>29/09/2012</td><td>28/09/2017</td></tr><tr><td>28/09/2017</td><td>27/09/2022</td></tr><tr><td rowspan="3">M7</td><td>30/09/2007</td><td>29/09/2012</td></tr><tr><td>29/09/2012</td><td>28/09/2017</td></tr><tr><td>28/09/2017</td><td>27/09/2022</td></tr></table> The calibration was conducted by accredited third parties which is Electric Power Research Institute of Yunnan Electric Power Test & Research Institute (Group) Co., Ltd. was accredited by CNAS /13/.
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Data of the parameter was verified by checking MRRs, ETNs and Statement issued by power grid company. All data is in line with MRRs, ETNs and Statement issued by power grid company; Information flow was verified by checking MRRs and ETNs, and all information are consistent; Monitoring method was verified by site visit, checking calibration certificates, all monitoring method meets the description in the PDD; Calibration was verified by checking calibration certificate and Accreditation certificate, all calibration of monitoring equipment meets the requirement indicated in the PDD.

Data / Parameter:	$EG_{SCPG\ to\ PJ,y}$
Data unit:	MWh
Description:	The annual amount of power supplied by the South China Power Grid Corporation to the proposed project
Purpose of the data:	Calculation of baseline emissions
Parameter value:	82,550.93
Source of data used:	The annual amount of power supplied by the South China Power Grid Corporation to the proposed project ($EG_{SCPG\ to\ PJ,y}$) are all sourced from Meter Reading Record (MRRs) /10/ issued by the project owner, Electricity Transaction Notes (ETNs) /11/ issued by power grid company and Statement issued by power grid company /15/ covering monitoring period.
Information flow:	2 sets of electricity meters (M1, M2 as main and M3, M4 as backup) installed at the 151 Switch on the Nanguang Circuit (M1 and M3) and at the 152 Switch on the Xiguang Circuit (M2 and M4) respectively were measured continuously, recorded monthly and archived electronically. At 24:00 hr of

<table>
<tr><td></td><td>last day of each month, the staff from project owner will record 2 main electricity meters' readings and form Meter Reading Records (MRRs). The staff from power grid company will record the meter readings of meters (M1 and M2) then transcribes the data into Electricity Transaction Notes (ETNs). For the data for 27/12/2017 are determined by MRRs and Statement issued by power grid company.

The data for MRRs, ETNs and Statement issued by power grid company have been sent to the CDM consulting company for reporting of GHG emission reduction. The conservative one would be used for ER calculation.

Another 3 electricity meters (M5, M6 and M7) has been installed at the outlets of the three generators as a backup system, in this monitoring period, data from 3 electricity meters are not used for ER calculation.</td></tr>
<tr><td>Monitoring method, frequency and equipments:</td><td>The parameter was measured continuously and recorded monthly by 7 electricity meters (M1, M2, M3, M4, M5, M6 and M7) installed at the 151 Switch on the Nanguang Circuit (M1 and M3) and at the 152 Switch on the Xiguang Circuit (M2 and M4) and the outlets of the three generators (M5, M6 and M7) respectively during the monitoring period verified by site visit.

See below for the information of 7 electricity meters verified by site visit and checking calibration certificates /12/:

<table>
<tr><th>Meter*</th><th>Type</th><th>Serial Number</th><th>Accuracy</th></tr>
<tr><td>M1 (Old)</td><td>Mk6E</td><td>206659001</td><td>0.2s</td></tr>
<tr><td>M1 (New)</td><td>Mk6E</td><td>214127481</td><td>0.2s</td></tr>
<tr><td>M2 (Old)</td><td>Mk6E</td><td>206659630</td><td>0.2s</td></tr>
<tr><td>M2 (New)</td><td>Mk6E</td><td>214597130</td><td>0.2s</td></tr>
<tr><td>M3 (Old)</td><td>Mk6E</td><td>206659280</td><td>0.2s</td></tr>
<tr><td>M3 (New)</td><td>Mk6E</td><td>214127489</td><td>0.2s</td></tr>
<tr><td>M4 (Old)</td><td>Mk6E</td><td>206659002</td><td>0.2s</td></tr>
<tr><td>M4 (New)</td><td>Mk6E</td><td>214127467</td><td>0.2s</td></tr>
<tr><td>M5</td><td>DTSD341</td><td>20070940010005</td><td>0.5s</td></tr>
<tr><td>M6</td><td>DTSD341</td><td>20070940010006</td><td>0.5s</td></tr>
<tr><td>M7</td><td>DTSD341</td><td>20070940010007</td><td>0,5s</td></tr>
</table>
*On 31/12/2015, Electricity meter M1, M2, M3 and M4 were replaced with new one confirm by checking with Meter Change Record //.

The type, serial number and accuracy have been confirmed by site visit.</td></tr>
</table>

<table>
<tr><td>Calibration:</td><td>The calibration information is shown as below /12/:
<table>
<tr><th>Meter</th><th>Calibration date</th><th>Valid until</th></tr>
<tr><td rowspan="2">M1 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M1 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td rowspan="2">M2 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M2 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td rowspan="2">M3 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M3 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td rowspan="2">M4 (Old)</td><td>19/10/2007</td><td>18/10/2012</td></tr>
<tr><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>M4 (New)</td><td>31/12/2015</td><td>30/12/2020</td></tr>
<tr><td rowspan="3">M5</td><td>30/09/2007</td><td>29/09/2012</td></tr>
<tr><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>28/09/2017</td><td>27/09/2022</td></tr>
<tr><td rowspan="3">M6</td><td>30/09/2007</td><td>29/09/2012</td></tr>
<tr><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>28/09/2017</td><td>27/09/2022</td></tr>
<tr><td rowspan="3">M7</td><td>30/09/2007</td><td>29/09/2012</td></tr>
<tr><td>29/09/2012</td><td>28/09/2017</td></tr>
<tr><td>28/09/2017</td><td>27/09/2022</td></tr>
</table>
The calibration was conducted by accredited third parties which is Electric Power Research Institute of Yunnan Electric Power Test & Research Institute (Group) Co., Ltd. was accredited by CNAS /13/.</td></tr>
<tr><td>QA/QC procedure:</td><td>Data record will be archived for a period of 2 years after the crediting period to which the records pertain.</td></tr>
<tr><td>Means of verification:</td><td>Data of the parameter was verified by checking MRRs, ETNs and Statement issued by power grid company. All data is in line with MRRs, ETNs and Statement issued by power grid company;
Information flow was verified by checking MRRs and ETNs, and all information are consistent;
Monitoring method was verified by site visit, checking calibration certificates, all monitoring method meets the description in the PDD;
Calibration was verified by checking calibration certificate and Accreditation certificate, all calibration of monitoring equipment meets the requirement indicated in the PDD.</td></tr>
</table>

Data / Parameter:	A_{PJ}
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full
Purpose of the data:	Calculation of project emissions
Parameter value:	8,930,000
Source of data used:	Survey report issued by Zhujiang Water Resource Protection Science Institute which is a qualified design institute /17/
Information flow:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{PJ}) was determined by Survey report issued by Zhujiang Water Resource Protection Science Institute which is a qualified design institute /17/
Monitoring method, frequency and equipments:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (A_{PJ}) was determined by Survey report issued by Zhujiang Water Resource Protection Science Institute which is a qualified design institute /17/
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

- By checking the original record, crosscheck with the supporting evidence issued from other party than project owner, checking calibration related documents and interview with project owner through the site visit, the VVB is able to confirm there are no transposition errors between data sets. All data are consistent in all data sets.
- The procedures used for handling any internal auditing performed and identified non-conformities identified were integrated with other parts of the monitoring plan and confirmed to be correctly conducted by site visit interview.
- Parameters available at validation stage:
- Below data has been verified against the data sources and the PDD.

Parameter title	Description	Data	Source
$EF_{CM,y}$*	CM emission factor of South China Power Grid	0.84335	Notification on 2007 baseline emission factors for regional power grids in China, issued by China /14/.

- * $EF_{CM,y}$ is not directly available in the registered PDD but calculated based on the ex-ante data fixed in the registered PDD.
- In conclusion, the assessment team confirmed GHG emission reductions and removals have been quantified correctly in accordance with the project description and applied methodology.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

- The monitoring has been carried out in accordance with CDM PDD /3/ dated 25/07/2008.
- As a result of verification of the ER calculation process, the assessment team confirmed that all the parameters required for the determination of the emission reductions have been included in the MR Report and ER Calculation Spreadsheet /2/ and are consistent with the applied methodology ACM0002 version 6.0 and the monitoring plan. The parameters are complete in this monitoring period.
- After verifying the reported figures with the raw data sources, it's confirmed that the values of the parameters from the raw data sources are consistent with those quoted in the ER Calculation Spreadsheet and the MR Report. The verification process for the same has been clearly described above in section 4.4 of the report.

4.6 Non-Permanence Risk Analysis

- Not applicable as a renewable project.

5 VERIFICATION CONCLUSION

- Applus+ Certification has been commissioned by Goldchina Consultancy International Co., Ltd. to perform the verification of greenhouse gas emission reductions of the project activity "Nansha Hydro Power Project in Yunnan Province China" (VCS Ref. No. 884).
- The management of Honghe Guangyuan Hydro Power Development Co.Ltd is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project's Monitoring Plan in the CDM PDD /3/ dated 25/07/2008.
- Our verification approach was based on the requirements as defined under the applicable VCS standards and relevant UNFCCC requirements. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:
- the project is implemented and operated as per the registered PDD and PD;
- the monitoring plan in the registered PDD is as per the applied methodology;
- the monitoring complies with the registered PDD and PD;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS and CDM requirements;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.
- In our opinion, the GHG emission reductions for "Nansha Hydro Power Project in Yunnan Province China" during the monitoring period 01/09/2012 to 27/12/2017 as reported in Monitoring Report, prepared on the basis of the project's Monitoring Plan are fairly stated. Based on the information we have seen and evaluated, we confirm the following statement:
- Verification period: From 01/09/2012 to 27/12/2017 (divided into 6 vintage periods). Verified GHG emission reductions or removals in the above reporting period:

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2012	*103,175*	*0*	*0*	*103,175*
2013	*282,792*	*0*	*0*	*282,792*
2014	*677,444*	*0*	*0*	*677,444*
2015	*540,055*	*0*	*0*	*540,055*
2016	*509,205*	*0*	*0*	*509,205*
2017	*632,561*	*0*	*0*	*632,561*
Total	*2,745,232*	*0*	*0*	*2,745,232*

APPENDIX 1: REFERENCE LIST

1. Monitoring report, Version 01, dated 26/05/2022; version 02.1, dated 01/09/2022

2. ER calculation spreadsheet

3. Registered CDM PDD, version 02, dated 25/07/2008

   Registered VCS PD, version 01, dated 22/05/2012

4. Validation report, No. 1053560, version 5, completed by TÜV SÜD;

   VCS Verification report, completed on 15/08/2012 by RINA

5. VCS standard version 4.3, dated on 22/06/2022

6. Statement issued by project owner

7 Approved methodology ACM0002, version 6.0, dated 18/05/2006

8 CDM Monitoring procedure

9 Nameplate of the equipment

10 Meter Reading Record (MRRs) for Meters

11 Electricity Transaction Notes covering the monitoring period

12 Calibration certificates of meters (M1, M2, M3, M4, M5, M6 and M7) covering the whole monitoring period issued by Electric Power Research Institute of Yunnan Electric Power Test & Research Institute (Group) Co., Ltd.

13 Accreditation certificates for Electric Power Research Institute of Yunnan Electric Power Test & Research Institute (Group) Co., Ltd. issued by CNAS

14 Notification on 2007 baseline emission factors for regional power grids in China issued by China DNA

15 Statement issued by power grid company

16 Staff roaster of project

17 Survey report issued by Zhujiang Water Resource Protection Science Institute is a qualified design institute

18 Meter Change Record

19 Opinions on environmental protection acceptance of completion