

VCS VERIFICATION REPORT FOR LUOFAN 24MW HYDROPOWER PROJECT IN GUIZHOU PROVINCE CHINA



Document Prepared By China Classification Society Certification Company

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Summary:

China Classification Society Certification Company(CCSC), commissioned by Guizhou Honor Carbon Asset Management Co., Ltd, has performed a Verification of the *Luofan 24MW Hydropower Project in Guizhou Province China* (hereafter referred to as “the project”), on the basis of requirements of Verified Carbon Standard (VCS) Version 3.4.

The project is developed and operated by Guizhou Zhongshui Eenergy Co., Ltd., which is located in Yanjia Town, Ceheng County, Guizhou Province, P.R. China. The project is a dam type hydropower plant with total installed capacity of 24MW (2×10MW+1×4MW). The electricity generated by the project can displace part of the power from the fossil fuel-fired power plants of CSPG.

The purpose and scope of this verification is to ensure that reported emission reductions are complete and accurate in accordance with applicable VCS requirements in order to be certified.

CCSC appointed a qualified verification team in accordance with internal procedures to perform the verification.

The verification process includes three phases:

- 1) Desk review of documents;
- 2) On-site visit and follow-up interviews;
- 3) Resolution of outstanding issues and the issuance of the final verification report and opinion.

The findings from the desk review of the original project activity documents and the findings from interviews during the follow up visit are summarized. The verification of the Project resulted in **1 Corrective Action Request and 2 clarifications Requests** and have been successfully closed. The verification is based on the draft monitoring report, revised monitoring report, the monitoring plan as set out in the validated PD, the validation report, emission reduction calculation spreadsheet and supporting documents made available to CCSC by the project participant.

The verification team confirms that the project is implemented as planned and described in the VCS

PD. Installed equipment being essential for generating emission reduction run reliably and are calibrated appropriately. The monitoring system is in place and the project is ready to generate GHG emission reductions.

In conclusion, it is CCSC's opinion that the project activity "Luofan 24MW Hydropower Project in Guizhou Province China", as described in the Monitoring Report version 02 of 19/11/2013, meets all relevant requirements for VCS and all relevant host Party criteria. Hence, CCSC is able to certify that the emission reductions from the project during the monitoring period 05/12/2011 to 25/08/2013 amount to 95,624 tCO₂e.

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1 INTRODUCTION

1.1 Objective

Verification is the periodic independent formal review by the accredited verification body and ex-post determination of the monitored GHG emission reductions during a defined verification period.

A verification statement is the written assurance by a verified body that, during a specific period of time, a project activity achieved the emission reductions as verified.

The objective of this verification is to verify and provide a verification statement of emission reductions of the project “Luofan 24MW Hydropower Project in Guizhou Province China” during the monitoring period from 05/12/2011 to 25/08/2013.

1.2 Scope and Criteria

The verification scope encompasses an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the CCSC. The verification scope covers the relevant documents (e.g. the VCS-PD, the monitoring plan, the VCS monitoring report (VCS-MR), the emission reduction calculation spreadsheet, supporting documents available to the verifiers and information collected through performing interviews and during the on-site assessment, VCAS’s requirements publicly available, relevant rules, including the host country legislation, etc.) to be independently reviewed, the project geographical locations to be visited on-site, the related project local stakeholders to be interviewed with, and processes that are necessary to acquire objective evidence for the evaluation of the project compliance to the VCS requirements, CDM approved methodology ACM0002 (Version 14.0.0)/10/ and associated interpretations.

The criteria of the verification are:

- VCS Standard version 3.4 and other relevant requirements defined by VCSA;
- Approved consolidated baseline and monitoring methodology ACM0002 (Version 14.0.0)/10/

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

CCSC has undertaken a reasonable assurance engagement in accordance with VCS Standard (Version 3.4) /5/. It requires a reasonable level of assurance in verification that GHG assertions are free of material errors, omissions and misrepresentations. The verification conclusion is based on the VCS-PD, VCS-MR, supporting evidences made available to the verifiers and information collected through performing interviews and during the on-site inspection.

1.4 Summary Description of the Project

Luofan 24MW Hydropower Project is a dam type hydropower plant located in Yanjia Town, Ceheng County, Guizhou Province, China with a net electricity of 85,988 MWh supplied to the China Southern Power Grid (CSPG) annually. The project will achieve CO₂ emission reduction by replacing electricity supplied by fossil fuel fired power plant connected into CSPG.

The project involves installation and operation of two sets of turbines and generators with 10MW unit each as well as a set of turbine and generator with 4 MW, corresponding to total capacity of 24 MW. The key technical data of turbine generator units are shown as follows:

Parameter	Unit	Value	
Hydro Turbines			
Model	----	HLA550-LJ-131	HLA708B-LJ-103
Quantity	unit	2	1
Rated power	MW	10	4
Rated water head	m	144.0	144.0
Rated flow rate	m³/s	7.85	3.99
Generators			
Model	----	SF10-10/2860	SF4000-8/2500
Quantity	unit	2	1
Rated Power	MW	10	4
Power factor	----	0.8	0.8
Rated Voltage	kV	10.5	10.5

The construction of the project started on 13/10/2009. The first water turbine and generator units were started on 05/12/2011. The second and third water turbines and generators units were started on 15/12/2011.

During the monitoring period from 05/12/2011 to 25/08/2013, the total net electricity supplied by the grid by the project is 147206.540MWh, thus the VCUs generated by the project are determined as 95,624 tCO₂e.

2 VERIFICATION PROCESS

2.1 Method and Criteria

The overall verification, from Contract Review to Verification Report & Opinion, was conducted using CCSC internal procedures.

CCSC verified the project against the requirements set in VCS /5/ /6/ /9/, and other relevant VCS requirements.

The following sections outline each step in more detail.

2.2 Document Review

A desk review of the VCS-PD, monitoring plan, the validation report, the applied monitoring methodology, VCS monitoring report (VCS-MR) and supporting documents was conducted by the verification team. The aim of the desk review of the documentation was to verify the completeness of the data and the information presented, to carry out the compliance check of the VCS-MR with respect to the monitoring plan and the applied methodology. Particular attention was given to the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures. The evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions was also conducted.

To address the CCSC's corrective action and clarification requests, the VCS-MR was revised and resubmitted by PP. The final verification conclusion presented in this report is based on the revised VCS-MR/1/ (version02, dated on19/11/2013).

Section 6 of this report contains a complete list of all documents and proofs reviewed by the verification team.

2.3 Interviews

From 10/10/2013 to 11/10/2013, CCSC performed an on-site assessment at the physical site of the project located in Yanjia Town, Ceheng County, Guizhou Province, P. R. China.

The verification team verified that the actual implementation of the project was as described in the VCS-PD/04/ and VCS-MR/01/. This included the review of the project operation based on the evidence of on-site observation and presented documents.

During the on-site assessment, the verification team has interviewed with key personnel from the project owner (the project participant) and the consultancy.

The assessment content and topics/the persons interviewed at the on-site assessment were provided in the below table.

Date: 10/10/2013 to 11/10/2013	
Interview topics	Interviewed Organizations and persons
--The status of VCS project implementation. -- Any changes of the VCS project. -- The project on-site inspection—The evidences of construction, status and operation of key equipment, parameters monitoring and data processing activities, monitor equipment and calibration. -- Monitoring data. -- Quality Management; organizational structure, responsibilities and competencies. Internal QA/QC Management procedures and document control (QA/QC). -- Environmental Impacts. -- Compliance with National Laws and Regulations.	Guizhou Zhongshui Eenergy Co., Ltd. (the project owner): 1. Lei Mingjiang , Director of Production and Technology Department; 2. Yang Mingzhi, General Manager 3. Fang Quanqi, Project Manager. 4. Vice Manager: Cai Shangyong Villager of Luofan Village: Cen Fumei Ceheng Development and Reform Commission: Office Secretary: Chen Xue Ceheng Environmental Protection Bureau: Office Secretary: Zhou Cheng
-- Preparation of Monitoring Report. -- Compliance of the monitoring plan with the monitoring methodology -- Compliance of monitoring with the monitoring plan -- Assessment of data and calculation of GHG emission reductions	Guizhou Hengyuan Carbon Asset Administration Co.,Ltd. (Consulting Company): 1. Wang Xinmin, Project Manager 2. Zhang Jiaqi, Project Assistant

2.4 Site Inspections

The on-site assessment involved following activities,

- 1) An assessment of the implementation and operation of the project activity as per the VCS-PD;
- 2) A review of information flows for generating, aggregating and reporting the monitoring parameters;
- 3) Interviews with relevant personnel to confirm that the operational and data collection procedures are implemented in accordance with the approved monitoring plan;

- 4) A cross-check between information provided in the monitoring report and data from other sources such as operational records or similar data sources;
- 5) A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the VCS-PD and the selected methodology;
- 6) A review of calculations and assumptions made in determining the GHG data and emission reductions;
- 7) An identification of quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

2.5 Resolution of Findings

During the verification of a project activity, to identify issues that need to be further elaborated upon, researched or added to in order to confirm that the project activity meets the VCSA requirements and can achieve credible emission reductions, the verification team will issue a Corrective Action Request (CAR), a Clarification Request (CL) or a Forward Action Request (FAR) depending on different situations.

The objective of this phase of the verification is to resolve issues related to the monitoring, implementation and operations of the registered project activity that could impair the capacity of the registered project activity to achieve emission reductions or influence the monitoring and reporting of emission reductions prior to CCSC's positive conclusion on the GHG emission reduction calculation.

Findings established during the verification can either be seen as a non-fulfilment of criteria ensuring the proper implementation of a project or where a risk to deliver high quality emission reductions is identified.

A Corrective Action Request (CAR) will be raised if one of the following occurs:

- (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 registered 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.

A Clarification Request (CL) will be raised if information is insufficient or not clear enough to determine whether the applicable VCS requirements have been met.

A Forward Action Request (FAR) will be raised, for actions if the monitoring and reporting require attention and/or adjustment for the next verification period.

To guarantee the transparency of the verification process, the concerns raised are documented in more detail in Appendix A.

2.5.1 Forward Action Requests

There was no FAR to be addressed during the verification.

2.6 Eligibility for Validation Activities

CCSC, who has undertaken validation activities as part of the verification, holds accreditation for validation for the relevant sectoral scope of VCSA.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

CCSC can confirm that the net GHG emission reductions generated from the reporting period from 05/12/2011 to 25/08/2013 has not been involved in other GHG programs.

3.2 Methodology Deviations

No methodology deviation has been applied to the Project.

3.3 Project Description Deviations

No project description deviation has been identified during the validation.

3.4 Grouped Project

Not Applicable since the project is a non-grouped project

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

4.1.1 Project Implementation in accordance with the VCS PD

The verification team has performed an on-site visit to verify the real implementation of the project against the description in the VCS PD.

The project was verified to be located in Yanjia Town, Ceheng County, Guizhou Province, P.R. China, and the geographical coordinates of the project is Longitude: 105°51'E, Latitude: 25°07'N which has been verified during onsite visit.

The verification team has performed a site visit to verify the actual implementation of the project against the description in the *VCS PD /04/* and found that: 2 sets of 10MW hydro turbine generators and 1 set of 4MW hydro turbine generator are in place as described in the *VCS PD /04/*, and the total installed capacity of the project activity is 24MW, which has been confirmed through the observation of the nameplates of the turbines and generators during the onsite visit. The first generator started operation on 05/12/2011. Likewise, the second and third generators started operation on 15/12/2011 as confirmed by the "operation log" /11/. Other facilities and equipments such as the main transformer, the bus line, etc as mentioned in the *VCS PD /04/* are also in place and operated. All the generators and other equipments were in normal operation at the time of the onsite visit.

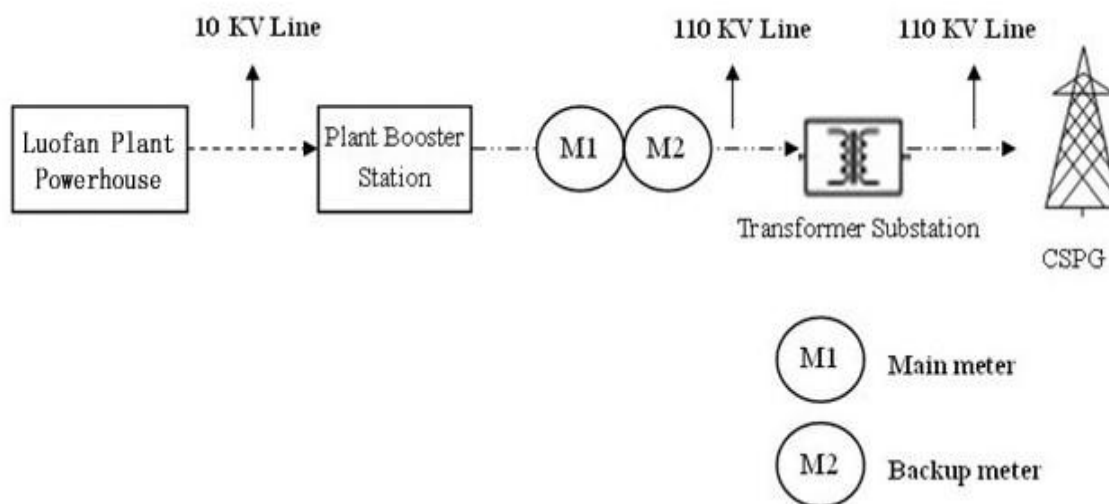
According to the information collected during on-site visit and the relevant evidence provided by project owner, CCSC can confirm that no project design change occurred during the monitoring period and the project was implemented in accordance with the *VCS-PD /04/*.

4.1.2 Compliance of monitoring with the monitoring plan

Through document review and on site visit, the verification team was able to confirm that the monitoring, including the actual monitoring system, data management has been carried out in accordance with the monitoring plan in the *VCS-PD*.

Monitoring system

The location of the metering system of the project is outlined as the following figure



The monitoring system (including a main meter M1 and a back-up meter M2) owned by the power grid company is installed at the connection point from the booster station of Luofan Plant to 110KV Transformer Substation, which monitors the power exported to the grid and the power imported from the grid.

Data and parameters

1) Data and parameters fixed ex-ante

DATA/PARAMETER Unit	Source of data	Reported value for the project period	Assessment/Observation
$EF_{grid,CM,y}$	VCS-PD	0.64960 tCO ₂ e/MWh	The value of this parameter is derived from the VCS-PD /04/ the value of this parameter is fixed during this period.

2) Data and parameters monitored ex-post

Data/Parameter	$EG_{facility, y}$
Data Unit	MWh
Description	Quantity of net electricity generation supplied by the project during the period.
Source of data to be used	Meter (Main Meter M1) records
Value of monitored parameter for the monitoring period	147,206.540
Monitoring equipment	The measurement equipment are electricity meters. Detailed

	information of the electricity meters are summarized in the following table: <table><tr><td>Meter</td><td>M1</td><td>M2</td></tr><tr><td>Type</td><td>2000-0420</td><td>2000-0420</td></tr><tr><td>SN</td><td>2603141</td><td>2603142</td></tr><tr><td>Accuracy</td><td>0.2s</td><td>0.2s</td></tr></table> The monitoring system （including a main meter M1 and a back-up meter M2）owned by the power grid company is installed at the connection point from the booster station of Luofan Plant to 110KV Transformer Substation, which monitors the power exported to the grid and the power imported from the grid.	Meter	M1	M2	Type	2000-0420	2000-0420	SN	2603141	2603142	Accuracy	0.2s	0.2s
Meter	M1	M2											
Type	2000-0420	2000-0420											
SN	2603141	2603142											
Accuracy	0.2s	0.2s											
Accuracy of the monitoring equipment	The accuracy of meter M1 and M2 is 0.2S, which is in compliance with the VCS-PD /04/ and the national standard JJG596-1999 /22/.												
Measuring/Reading/Recording frequency	The parameter is continuously measured and monthly record, which is in line with the monitoring plan /04/.												

Data/Parameter	Cap _{PJ}
Data Unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data to be used	Project site.
Value of monitored parameter for the monitoring period	24,000,000
Monitoring equipment	/

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.

Source of data to be used	Measured annually by a qualified third party.
Value of monitored parameter for the monitoring period	298,700
Frequency of monitoring/recording:	Yearly
Monitoring equipment	/

Therefore, CCSC can confirm that the revised Monitoring Report (version02, dated on 19/11/2013)/01/ is complete, transparent and in accordance with the monitoring plan /04/ and other relevant requirements.

4.2 Accuracy of GHG Emission Reduction or Removal Calculations

The emission reduction calculations provided in the spreadsheet /02/ have been verified to be correct and in line with the VCS-PD /04/.

A complete set of data of monitoring parameter $EG_{\text{facility},y}$ 05/12/2011 to 25/08/2013 are available for verification.

The critical parameter used for the determination of the Emission Reductions is the net electricity supplied to the grid by the project. The data pertaining to the above parameter are maintained in the identified records. All the data are in compliance with that stated in the VCS-MR (Version 02)/01/.

As per the methodology ACM0002 (version14.0.0)/10/, the emission reductions for the project are calculated as the baseline emissions minus the project emissions and leakage. Hence the emission reduction is determined by the following formula:

$$ER_y = BE_y - PE_y$$

Where,

ER_y : Emission reductions

BE_y : Baseline emissions

PE_y : Project emissions

Baseline Emission

$$BE_y = EG_y \cdot EF_{\text{grid},CM,y}$$

Where:

BE_y : Baseline emission in year y (tCO_2/yr)

EG_y : Net electricity supplied to the grid (MWh)

$EF_{grid,CM,y}$: The combined baseline emission factor (tCO_2e/MWh). It has been determined to be 0.6496 tCO_2e/MWh according to the *Chinese DNA: 2013 Baseline Emission Factors for Regional Power Grids in China* /24/.

While the EG_y is calculated as:

$$EG_{facility,y} = EG_{out,y} - EG_{in,y}$$

Where:

$EG_{out,y}$, The quantity of electricity supplied by the project to the grid; and

$EG_{in,y}$, The quantity of electricity delivered to the project from the grid

In order to ensure the accuracy of measurement, the net electricity supplied to the grid ($EG_{facility,y}$) has been cross-checked with the Electricity Transaction Notes (ETNs) /14/, and the conservative values were used. The verified values during the reporting period from 05/12/2011-25/08/2013 are shown in the following tables:

Period	$EG_{out,y}$ (MWh)	Electricity Transaction Note (ETN) (MWh)	Verified $EG_{out,y}$ (MWh)	$EG_{in,y}$ (MWh)	Electricity Transaction Note (ETN) (MWh)	Verified $EG_{in,y}$ (MWh)	$EG_{facility,y}$ (MWh)
	A	B	C=MIN(A,B)	D	E	F=MAX(D,E)	G=C-F
05/12/2011-- 25/12/2011	3,797.332	3,800.000	3,797.332	23.496	23.496	23.496	3,773.836
Subtotal- 2011			3,797.332			23.496	3,773.836
26/12/2011-- 25/01/2012	3,652.880	3,650.000	3,650.000	25.344	25.344	25.344	3,624.656
26/01/2012-- 25/02/2012	4,321.504	4,320.000	4,320.000	22.352	22.352	22.352	4,297.648
26/02/2012-- 25/03/2012	4,254.712	4,250.000	4,250.000	16.984	16.984	16.984	4,233.016
26/03/2012-- 25/04/2012	6,344.756	6,340.000	6,340.000	13.157	13.157	13.157	6,326.843

26/04/2012-- 25/05/2012	7,405.595	7,400.000	7,400.000	13.508	13.508	13.508	7,386.492
26/05/2012-- 25/06/2012	13,965.688	13,970.000	13,965.688	12.936	12.936	12.936	13,952.752
26/06/2012-- 25/07/2012	15,029.168	15,030.000	15,029.168	9.417	9.417	9.417	15,019.751
26/07/2012-- 25/08/2012	15,533.540	15,530.000	15,530.000	9.724	9.724	9.724	15,520.276
26/08/2012-- 25/09/2012	11,903.408	11,900.000	11,900.000	14.168	14.168	14.168	11,885.832
26/09/2012-- 25/10/2012	6,785.724	6,780.000	6,780.000	17.336	17.336	17.336	6,762.664
26/10/2012-- 25/11/2012	3,923.260	3,920.000	3,920.000	23.056	23.056	23.056	3,896.944
26/11/2012-- 25/12/2012	4,055.963	4,060.000	4,055.963	21.912	21.912	21.912	4,034.051
Subtotal- 2012			97,140.82			199.894	96,940.925
26/12/2012-- 25/01/2013	4,015.880	4,020.000	4,015.880	25.344	25.344	25.344	3,990.536
26/01/2013-- 25/02/2013	4,370.167	4,370.000	4,370.000	21.032	21.032	21.032	4,348.968
26/02/2013-- 25/03/2013	3,920.884	3,920.000	3,920.000	24.288	24.288	24.288	3,895.712
26/03/2013-- 25/04/2013	6,273.783	6,270.000	6,080.000	18.832	18.832	18.832	6,061.168
26/04/2013-- 25/05/2013	6,829.416	6,830.000	6,829.416	17.116	17.116	17.116	6,812.300
26/05/2013-- 25/06/2013	8,578.900	8,580.000	8,578.900	13.772	13.772	13.772	8,565.128
26/06/2013-- 25/07/2013	8,019.308	8,020.000	8,019.308	11.088	11.088	11.088	8,008.220

26/07/2013-- 25/08/2013	4,821.211	4,820.000	4,820.000	10.253	10.253	10.253	4,809.747
Subtotal- 2013			46,633.50			141.725	46,491.779
Total	147,803.08	147,780.00	147,571.66	365.12	365.12	365.12	147,206.54

Therefore, the baseline emissions (BE_y) are conservatively calculated as following:

$$\begin{aligned}
 BE_y &= EG_{\text{facility}, y} \times EF_{\text{grid, CM}, y} \\
 &= 147,206.54 \text{ MWh} \times 0.6496 \text{ tCO}_2\text{e/MWh} \\
 &= 95,624 \text{ tCO}_2\text{e}
 \end{aligned}$$

Project Emission

PE_y is the project emissions which is 0 since the power density of the project activity is 80.348 W/m^2 ($24,000,000/298,700=80.348 \text{ W/m}^2$) which is larger than 10 W/m^2 as per the applicable methodology ACM0002 (Version 14.0.0) /10/.

The power density is calculated as the result of dividing the installed capacity of the hydropower plant after the implementation of the project activity (Cap_{PJ}) by the 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}). The value of the reservoir area is confirmed to be $298,700 \text{ m}^2$ according to the measure report of the reservoir /23/ and the installed capacity (24MW) is checked by the nameplates of the turbines and generators during the onsite visit.

The power density of the proposed project is calculated as the following formula:

$$PD = 24,000,000 / 298,700 = 80.348 \text{ W/m}^2$$

According to the methodology ACM0002 (version 14.0.0), the project emissions may not be considered during this monitoring period. Thus, $PE_y = 0$

Leakage Emissions

According to the applied methodology ACM0002 (version 14.0.0), no leakage emissions are considered.

Emission reduction

The emission reductions of the project are calculated as follows:

Reporting period	$ER_y(\text{tCO}_2\text{e})$	$PE_y(\text{tCO}_2\text{e})$	$ER_y = BE_y - PE_y(\text{tCO}_2\text{e})$
------------------	------------------------------	------------------------------	--

05/12/2011-25/08/2013	95,624	0	95,624
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Based on the above assessment, the emission reduction during the monitoring period from 05/12/2011 to 25/08/2013 is verified as 95,624 tCO₂e. Compared with the estimated emission reductions under the same days of 630 from 05/12/2011 to 25/08/2013 in the VCS-PD/04/, (96,410 = 55,857 * 630 / 365) tCO₂e, the verified emission reduction is 0.81% less than the estimated value. CCSC considers the value of verified emission reduction is reasonable.

4.3 Quality of Evidence to Determine GHG Emission Reductions or Removals

The evidences used to determine the GHG emission reductions are assessed as follows:

Assessment of the Evidence Quality																	
Parameters monitored	(i) EG _{out,y} , The quantity of electricity supplied by the project to the grid; and (ii) EG _{in,y} ,The quantity of electricity delivered to the project from the grid																
Monitoring method	The meter M1 (main meter, bi-direction, accuracy 0.2S) measures the electricity exported to the grid and electricity imported to the project from the grid. The meter M2 (backup meter, bi-direction, accuracy 0.2S) is used as the backup meter for M1. When the main meter is in trouble, the project owner employs the data monitored by the backup meter.																
Measuring/Reading/Recording frequency	The parameters are continuously measured and monthly recorded																
Calibration frequency/interval	The electricity meters are maintained and calibrated every year, which is in compliance with the national standard, JJG596-1999 /22/. <table><tr><td></td><td>M1</td><td>M2</td></tr><tr><td>On-sit</td><td>10/11/2011</td><td>10/11/2011</td></tr><tr><td>Calibration data</td><td>09/11/2012</td><td>09/11/2012</td></tr><tr><td>Validity until</td><td>08/11/2013</td><td>08/11/2013</td></tr><tr><td>Calibration Entity</td><td colspan="2">GUIZHOU ELECTRIC POWER TEST AND RESEARCH INSTITUTE</td></tr></table> The calibration interval is one year, and also in compliance with the national industrial standard JJG596-1999 /22/.			M1	M2	On-sit	10/11/2011	10/11/2011	Calibration data	09/11/2012	09/11/2012	Validity until	08/11/2013	08/11/2013	Calibration Entity	GUIZHOU ELECTRIC POWER TEST AND RESEARCH INSTITUTE	
	M1	M2															
On-sit	10/11/2011	10/11/2011															
Calibration data	09/11/2012	09/11/2012															
Validity until	08/11/2013	08/11/2013															
Calibration Entity	GUIZHOU ELECTRIC POWER TEST AND RESEARCH INSTITUTE																

Calibration cover the monitoring period	It has been confirmed that the validity period of all conducted calibrations covers this monitoring period from 05/12/2011 to 25/08/2013.
Data reported	Through a cross check with the ETNs, the most conservative values have been applied to calculate the electricity exported to and imported from the grid by the project.

In summary, all necessary documentation is collected, referenced and is easily accessible in hard-copy or electronic format. The data pertaining to the monitored parameters are maintained in the identified internal records and consistent with the values stated in the Monitoring Report (version 02)/01/. Key data have been cross-checked via external sources, such as ETNs.

4.4 Non-Permanence Risk Analysis

During on-site visit, the verification team observed that a VCS Project Monitoring Manuals/20/ had been prepared in 10/2011 and confirmed that the structure of monitoring management team and the responsibilities of team have been defined and followed well in accordance with the VCS-PDD/04/ and the approved monitoring plan. The monitoring personnel are well trained and have got relevant national operation qualifications, which demonstrates that they have sufficient competence to carry out the relevant monitoring tasks.

The routine requirements and log of the internal training for operating and maintaining the equipment were provided by the project owner. During the on-site visit, it has been observed that the maintenance staffs have performed the routine equipment maintenance in accordance with the internal requirements for equipment tour inspection of the company.

CCSC can confirm that the personnel training and the equipment maintenance have been implemented properly by checking the training and maintenance records, and by interviewing with site personnel.

All monitored data will be archived in electronic form and be kept for at least 2 years after the end of the last crediting period or till the last issuance of VERs for the project activity whichever occurs later.

The QA/QC measures were further verified reliable by checking the daily operation & maintenance logs.

5 VERIFICATION CONCLUSION

CCSC has carried out the verification of the project “Luofan 24MW Hydropower Project in Guizhou Province China”. The verification was performed based on the requirements set by Voluntary Carbon Standard (VCS) Version 3.4 /5/, as well as criteria given to provide for consistent project operations, monitoring and reporting. This verification covers the period from 05/12/2011 to 25/08/2013 inclusive.

In the course of the verification 1 Corrective Action Request (CAR) and 2 Clarification Requests (CLs) were raised and successfully closed. The verification is based on the VCS-MR (version01)/01/, the revised VCS-MR (version02)/01/, the VCS-PD /4/, ER calculation spread sheet/2/ and supporting documents available to CCSC.

As the result of the verification, CCSC confirms that:

- The project activity has been implemented and operated as per the registered CDM-PDD, VCS-PD and that all physical features (technology, project equipment, and monitoring and metering equipment) of the project are in place;
- The VCS-MR and other supporting documents provided are complete in accordance with the latest applicable version of the VCS Program Definitions /9/ and in accordance with the additional requirements stated by the VCS Association (VCSA);
- The actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology i.e. ACM0002 (version 14.0.0)/10/;
- The GHG emission reductions are calculated without material misstatements and in a conservative and appropriate manner.

Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CCSC confirms the following statement:

Reporting period: From 05/12/2011 to 25/08/2013

Verified GHG emission reductions or removals in the above reporting 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)
2011 (05/12/2011- -25/12/2011)	2,451	0	0	2,451
2012 (26/12/2011-	62,972	0	0	62,972

-25/12/2012)				
2013 (26/12/2012- -25/08/2013)	30,201	0	0	30,201
Total	95,624			95,624

REFERENCE

Documents provided by the Project Participant and relevant background documents have been reviewed or referenced for the periodic verification conclusions.

/1/	VCS Monitoring report of Luofan 24MW Hydropower Project in Guizhou Province China Version 01 dated 24/09/2013 Version 02 dated 19/11/2013 The monitoring period is 05/12/2011 to 25/08/2013.
/2/	ER calculation spreadsheet for the period 05/12/2011 to 25/08/2013
/3/	Tool to calculate the emission factor for an electricity system" (version 04.0.0)
/4/	VCS Project Description (VCS-PD) of Luofan 24MW Hydropower Project in Guizhou Province China Version 03 dated 19/11/2013
/5/	VCS Standard, version 3.4, dated 08/10/2013
/6/	VCS Registration & Issuance Process, version 3.5, dated 08/10/2013
/7/	PDR approval letter issued by Qian Xinan Development & Reform Commission, dated on 27/05/2009
/8/	EIA approval letter issued by Environmental Protection Bureau of Qian Xinan, dated on 23/04/2009
/9/	VCS Program Definitions, version 3.5, dated 08/10/2013
/10/	Approved consolidated baseline and monitoring methodology ACM0002 "Grid-connected electricity generation from renewable sources", version 14.0.0
/11/	Daily operation log
/12/	The Grid Connection Agreement signed between Guizhou Electric Power Company and Guizhou Zhongshui Eenergy Co., Ltd. dated on 11/2011.
/13/	Guizhou Zhongshui Eenergy Co., Ltd.: Monthly meter readings during the monitoring period from 05/12/2011 to 25/08/2013
/14/	Electricity Transaction Notes(ETNs) during the monitoring period from 05/12/2011 to 25/08/2013
/15/	Qualification certificate of Guizhou Electric Power Test & Research institute issued by Quality and Technical Supervision Bureau of Guizhou Province.
/16/	Guizhou Electric Power Test & Research institute: calibration certificates for meter M1 (SN 2603141) and meter M2 (SN 2603142) dated 10/11/2011 and 09/11/2012.
/17/	Equipment purchase Agreement, dated on 20/11/2009
/18/	2006 IPCC Guidelines on National GHG Inventories
/19/	Clean Development Mechanism Validation and Verification Standard (Version 5.0), issued by CDM Executive Board
/20/	Luofan hydropower station VCS monitoring manual
/21/	China National Technical Committee for Electric Energy Metering Standardization: DL/T448-2000 Technical Administration Code of Electric Energy Metering, dated 01/01/2001
/22/	State Bureau of Quality and Technical Supervision: JJG596-1999, "Verification Regulation of Electrical Energy Meters with Electronics", dated 21/10/1999
/23/	Guizhou Survey & Design research Institute for Water Resources and Hydropower: The measure report for the reservoir area of Luofan 24MW Hydropower Project.
/24/	2013 Baseline Emission Factors for Regional Power Grids in China issued by the DNA of China

APPENDIX A: RESOLUTION OF CORRECTIVE ACTION REQUESTS AND CLARIFICATION REQUESTS

No.	CAR/CL/FAR	Response by Project Participants/ CCSC's conclusion of assessment
CL1	The type of both M1 and M2 is 2000-0420 as per the calibration certificate while it is 2000-0460 in the MR version 01. Please clarify.	<u>Response by Project Participants:</u> This was a slip of the pen. The correction had been done. <u>CCSC's conclusion of assessment:</u> The verification team verified the updated MR (version02)/1/ and found that the type of M1 and M2 has been revised to be in line with the calibration report issued by Guizhou Electric Power Test & Research institute /16/. Moreover, it has been confirmed by the on-site visit. Therefore, CL1 was closed.
CL2	The section1.5 of MR version 01 stated that the project start date was 05/11/2011 which is not in line with the statement of section 2.1. Clarification is required.	<u>Response by Project Participants:</u> This was a slip of pen. The correction had been done. <u>CCSC's conclusion of assessment:</u> It is confirmed that the project start date has been updated in the MR (version02)/1/. Therefore, CL2 was closed.
CAR 1	The calibration entity and the certificate of the entity were missed. Thus, a corrective action is required.	<u>Response by Project Participants:</u> The correction had been done. <u>CCSC's conclusion of assessment:</u> It is confirmed that the calibration entity has been updated in the MR (version02)/01/. Furthermore, the calibration certificate for meters /16/ and the qualification certificate of the calibration entity/15/ have been provided.

No.	CAR/CL/FAR	Response by Project Participants/ CCSC's conclusion of assessment
		Therefore, CAR1 was closed.

APPENDIX B: CERTIFICATES OF COMPETENCE



Approved by:

CERTIFICATE OF COMPETENCE

Date of Qualification: 10/03/2011

Mr. Rui Qiguang

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions (CDMI0301)* as

- ☒ CDM validator for Technical Area(s): TA2.2/TA3.1
- ☒ CDM verifier for Technical Area(s): TA2.2/TA3.1
- ☒ Technical expert for Technical Area(s): TA2.2/TA3.1
- ☒ Technical reviewer
- ☒ Financial expert
- ☒ Team leader
- ☐ CDM validation/verification trainee

Huang ShiYuan
CCSC General Manager



Appendix IX

CERTIFICATE OF COMPETENCE

Date of Qualification: 12/08/2013

Mr. Liu Dongsen

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- ☒ CDM validator for Technical Area(s): TA1.2
- ☒ CDM verifier for Technical Area(s): TA1.2
- ☐ Technical expert for Technical Area(s): _____
- ☒ Technical reviewer
- ☐ Financial expert
- ☒ Team leader
- ☐ CDM validation/verification trainee

Huang ShiYuan
CCSC General Manager



Appendix IX

CERTIFICATE OF COMPETENCE

Date of Qualification: 22/07/2013

Ms. Liang Miaomiao

Has been qualified in accordance with *GHG Personnel Competence Requirements and Professional Competence Evaluation Instructions* (GHGI0302) as

☒ GHG validator for Technical Area(s): CDM TA1.2 / GHG TA 1.2

☒ GHG verifier for Technical Area(s): _____

☐ Technical expert for Technical Area(s): _____

☒ Technical reviewer

☐ Financial expert

☒ Team leader

☐ GHG validation/verification trainee

Huang ShiYuan
CCSC General Manager



Appendix III

CERTIFICATE OF COMPETENCE

Date of Qualification: 12/03/2013

Mr. Shi Weiwei

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions (CDMI0301)* as

- ☐ CDM validator for Technical Area(s): _____
- ☐ CDM verifier for Technical Area(s): _____
- ☒ Technical expert for Technical Area(s): TA1.2
- ☐ Technical reviewer
- ☒ Financial expert
- ☐ Team leader
- ☒ CDM validation/verification trainee

Huang ShiYuan
CCSC General Manager



Appendix D

CERTIFICATE OF COMPETENCE

Date of Qualification: 13/05/2013

Mr. Guo Kai

Has been qualified in accordance with *CDM Personnel Competence Requirements and Professional Competence Evaluation Instructions* (CDMI0301) as

- ☐ CDM validator for Technical Area(s): _____
- ☐ CDM verifier for Technical Area(s): _____
- ☒ Technical expert for Technical Area(s): TA1.2
- ☐ Technical reviewer
- ☒ Financial expert
- ☐ Team leader
- ☒ CDM validation/verification trainee

Huang ShiYuan
CCSC General Manager