# 65MW DAGUSHAN HYDROPOWER PROJECT IN 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 Climate Bridge (Shanghai) Ltd. to perform the verification of greenhouse gas emission reductions of the project activity "65MW Dagushan Hydropower Project in China" (VCS Ref. No. 653, hereafter referred to as "the project activity") reported in the monitoring report /1/ during monitoring period 29/04/2012 to 31/03/2018.

The project activity has been validated by TÜV NORD CERT GmbH based on the CDM PDD /3/ version 05 dated 04/02/2010 and reported in the validation report No. QT-EC0417-08 - 08/233 /4/, version 1.2, completed on 08/03/2010. The project activity was registered as a CDM project activity on 09/05/2010 and successfully renewed on 04/05/2017 which is available at https://cdm.unfccc.int/Projects/DB/RWTUV1256040897.46/view. A monitoring plan revision was made and approved by UNFCCC on 03/03/2011. A gap validation was performed by GLC which is available at https://registry.verra.org/app/projectDetail/VCS/653.

The project activity is a hydropower project located in the middle of the upper steam of the Heihe River, within the territory of Su'nan Yugu Autonomous County of Gansu Province, P. R. China which is to use hydropower resource for electricity generation. The installed capacity of the project activity is 65 MW, consisting of 2 sets of hydropower turbine generators with unit capacity of 26 MW and another set of hydropower turbine generator with unit capacity of 13 MW. The average annual power delivered to the grid by the project is expected to be 195,150 MWh. The project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in Northwest Power Grid (NWPG). It's estimated that the proposed project could achieve GHG emission reductions of 170,015 $tCO_2e$ 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 05 dated 04/02/2010;
- Revised monitoring plan approved by UNFCCC on 03/03/2011 /3/;

- Validation report No. QT-EC0417-08 - 08/233 /4/, version 1.2, completed on 08/03/2010 by TÜV NORD CERT GmbH;
- VCS Validation Report /4/, completed on 10/06/2011 by GLC;
- Approved methodology, ACM0002 /7/, version 10.0, dated 11/06/2009;
- VCS standards and guidance version 4.0, 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 PDD and revised monitoring plan /3/. The monitoring plan complies with the applied methodology ACM0002 /7/ version 10.0 and the monitoring has been carried out in accordance with the revised monitoring plan. 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 1,338,564 $tCO_2e$ emission reductions during period 29/04/2012 to 31/03/2018.

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# 1 INTRODUCTION

## 1.1 Objective

LGAI Technological Center, S.A. (Applus+ Certification) has been commissioned by Climate Bridge (Shanghai) Ltd. to perform the verification of greenhouse gas emission reductions of the project activity "65MW Dagushan Hydropower Project in China" (VCS Ref. No. 653) reported in the Monitoring Report /1/ during monitoring period 29/04/2012 to 31/03/2018.

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 14065:2007.

The objective of verification is to have an independent review and ex post determination by a Designated Operational Entity (DOE) 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 DOE 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 "65MW Dagushan Hydropower Project in China" in China for the period 29/04/2012 to 31/03/2018.

## 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 4.0 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 and revised monitoring plan, 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 | 65MW Dagushan Hydropower Project in China |
| VCS reference number | 653 |
| Project Participants | Gansu Zhangye Dagushan Hydropower Co. Ltd. (Project Owner, host country, P. R. China) |
| Location of the project | In the middle of the upper steam of the Heihe River, within the territory of Su'nan Yugu Autonomous County of Gansu Province, P. R. China<br><br>Geographic coordinates:<br><br>East longitude: 100°01′29″<br><br>North latitude: 38°37′21″ |
| Project start date | Construction start date: 16/11/2007<br><br>Operation start date: 22/07/2009 |
| Version of VCS PD or CDM PDD | Version 05, dated 04/02/2010 (CDM PDD)<br><br>Revised Monitoring plan, approved on 03/03/2011 |
| Monitoring period | 29/04/2012 to 31/03/2018 |
| First monitoring report | Version 01, dated 17/09/2020 |
| Final monitoring report | Version 03, dated 13/11/2020 |
| Applied Methodology/Version | ACM0002, version 10.0, dated 11/06/2009 |
| Scope/Technical Area | 1/1.2 |

The project activity is a hydropower project located in the middle of the upper steam of the Heihe River, within the territory of Su'nan Yugu Autonomous County of Gansu Province, P. R. China which is to use hydropower resource for electricity generation. The installed capacity of the project activity is 65 MW, consisting of 2 sets of hydropower turbine generators with unit capacity of 26 MW and another set of hydropower turbine generator with unit capacity of 13 MW. The average annual power delivered to the grid by the project is expected to be 195,150 MWh. The project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants in Northwest Power Grid (NWPG). It's estimated that the proposed project could achieve GHG emission reductions of 170,015 $tCO_2e$ annually.

The project activity has been validated by TÜV NORD CERT GmbH based on the CDM PDD /3/ version 05 dated 04/02/2010 and reported in the validation report No. QT-EC0417-08 - 08/233 /4/, version 1.2, completed on 08/03/2010. The project activity was registered as a CDM project activity on 09/05/2010 and successfully renewed on 04/05/2017 which is available at https://cdm.unfccc.int/Projects/DB/RWTUV1256040897.46/view. A monitoring plan revision was made and approved by UNFCCC on 03/03/2011. A gap validation was performed by GLC which is available at https://registry.verra.org/app/projectDetail/VCS/653.

# 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 4.0, 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 project's 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 |
|---|---|---|---|---|
| *Denny Xue* | *LA/TE* | *Y (1.2)* | *Y* | *Y* |
| *Simon Shen* | *TR* | *Y (1.2)* | *Y* | *Y* |

**Denny Xue** (Master Degree in Environmental Engineering, Bachelor Degree in Thermal Engineering) is a lead auditor appointed by Applus+ Certification for the GHG project assessment. He is based on Shanghai. He has 1.5 years of work experiences in CDM project development. Before he joined Applus+ Certification, he has been worked for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

**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 17/09/2020, version 03 dated 13/11/2020 and the emission reduction calculations spreadsheet /2/, were assessed as part of the verification. In addition, the registered PDD /3/ version 05 dated 04/02/2010 and revised monitoring plan /3/ in particular the baseline estimations and the monitoring plan, the CDM validation report /4/ version 1.2 dated 08/03/2010 and the VCS Validation Report /4/ dated 10/06/2011, as well as relevant documents, were reviewed. A detailed documents 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. Li Jianmin | Chief | Gansu Zhangye Dagushan Hydropower Co. Ltd. | Operation of the project activity;<br>Implementation of the monitor plan of the project activity;<br>Data collection and data achievement;<br>Calibration of meters and equipment maintenance. |
| Mr. Qin Xiaojun | Operation Director | Gansu Zhangye Dagushan Hydropower Co. Ltd. | |
| Mr. Che Tianmin | Operator | Gansu Zhangye Dagushan Hydropower Co. Ltd. | |
| Mr. Li Hong | Operator | Gansu Zhangye Dagushan Hydropower Co. Ltd. | |
| Mr. Chen Sihang | Project Manager | Climate Bridge (Shanghai) Ltd. | Data collection and ER calculation. |

## 2.4 Site Inspections

The assessment team performed the on-site verification (In the middle of the upper steam of the Heihe River, within the territory of Su'nan Yugu Autonomous County of Gansu Province, P. R. China) on 09/10/2020. 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 verification and 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. 3045 first which is available at https://cdm.unfccc.int/Projects/DB/RWTUV1256040897.46/view and then renewed on 04/05/2017. Then the project has been registered as VCS project which is available at https://registry.verra.org/app/projectDetail/VCS/653. 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.

During the period from 22/07/2009 to 21/07/2019 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. By checking information on the UNFCCC website (https://cdm.unfccc.int/Projects/DB/RWTUV1256040897.46/view), during the period from 09/05/2010 to 28/04/2012, the emission reductions generated have been successfully applied for CERs. Therefore, the start date of the monitoring period for this verification has been set as 29/04/2012.

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 not deviation for methodology.

## 3.3 Project Description Deviations

The project was registered under CDM scheme on 09/05/2010 with reference number of 3045. According to CDM standard, the crediting period is 09/05/2010-08/05/2017, which could be renewed twice. And a renewal has been done, the second crediting period is 09/05/2017-08/05/2024.

Then the project was registered under VCS scheme in 2011. In the monitoring report, the project commission date is 22/07/2009 and start date of crediting period is chosen as 22/07/2009 as well. However, in the monitoring report, the crediting period was set as from 22/07/2009 to 08/05/2010. While according to VCS 2007.1, the project crediting period is allowable for 10 years and could be renewed twice. Therefore, the first crediting period of project has been determined as 22/07/2009 to 21/07/2019.

The deviation has no impact for the applicability of the methodology, additionality or the appropriateness of the baseline scenario and meet all appropriate rules and requirements of VCS standard.

## 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 65 MW, consisting of 2 sets of hydropower turbine generators with unit capacity of 26 MW and another set of hydropower turbine generator with unit capacity of 13 MW. The electricity generated is transmitted to the local Gansu Power Grid via a newly built transformer station, which was then exported to the NWPG. The project activity was expected to supply 195,150 MWh of electricity to the grid. The construction of the project started on 16/11/2007, the project started operation on 22/07/2009 verified by checking information on the UNFCCC website. 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:

- To act as a direct supplement to power grid capacity, and alleviate regional shortage of electricity in a sense;

- Compared with fossil fuel fired plants, the project does not release pollutants into the air, such as sulphur dioxide, nitrogen oxide and particulates, nor does it emit residuals that can give harmful impacts on soil, water etc.;

- Create new job opportunities for the local people during the project construction and operation.

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

| Equipment | Parameter | Unit | Amount |
|---|---|---|---|
| Turbine | Units(large/small) | - | 3 (2*large/1*small) |
| | Model(large/small) | - | HL(257)-LJ-225<br>HL(257)-LJ-160 |
| | Rated Head | m | 73 |

| | | | |
|---|---|---|---|
| | Rated Flow (large/small) | $m^3/s$ | 40/21 |
| | Rated Rotation Speed (large/small) | r/min | 300/428.6 |
| | Rated Power (large/small) | MW | 27.3/13.6 |
| | Annual operation time | h | 3,094 |
| Generator | Model (large/small) | - | SF-J26-20/4800<br>SF-J13-14/3400 |
| | Rated Power | MW | 26/13 |
| | Rated Voltage | kV | 10.5 |
| | Rated Rotation Speed | r/min | 300/428.6 |
| Manufacturer | Hangzhou Resource Power Equipment Co., Ltd. | | |

By comparing the actual ER claimed in this monitoring period with the estimate in the registered PD, the actual emission reductions (1,338,564 $tCO_2e$) are 32.86% higher than what is stated in the registered PDD (i.e. 1,007,514 $tCO_2e$, equals to annual emission reductions, 170,015 $tCO_2e$ multiplied by the actual operational days (2,163 days) then divided by 365 days) which will not lead to the overestimation of VERs due to the reason as below:

(1) The increased water flow to the Heihe River lead to more power generation;

(2) The project owner has high quality of management, which eliminates most of the uncontrollable factors and guarantees its operation;

(3) When considering this variation in the IRR calculation, the IRR is still lower than the benchmark.

Based on above reasons, the assessment team consider the variation of electricity generation of the project in this monitoring period is acceptable.

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 hydropower is green power and the impact caused by hydropower 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.

### 4.2.2 Local Stakeholder Consultation

A survey was carried out on from October 2006 to December 2006 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 one-page questionnaire, 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.

Communications with Local stakeholders was being carried out at periodic intervals. There are no negative comments received for the project.

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 registered PDD /3/ and revised monitoring plan /3/. All parameters were monitored and determined as per the monitoring plan which is listed in below table:

| **Data / Parameter:** | $EG_{facility,y}$ |
|---|---|
| Data unit: | MWh |
| Description: | Quantity of net electricity generation supplied by the project plant/unit to the grid in year y |
| Purpose of the data: | Calculation of baseline emissions |
| Parameter value: | 1,536,460.700 |
| Source of data used: | Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ($EG_{facility,y}$) are all sourced from Meter Reading Record (MRRs) /10/ issued by the project owner, Electricity Transaction Notes (ETNs) /11/ issued by power grid company covering monitoring period. And based on the data in the Meter Reading Record (MRRs) /10/, following formula is used to calculate $EG_{facility,y}$:<br>$EG_{facility,y} = (EG_{M1} + EG_{M2}) * (EG_{M7} + EG_{M9}) / (EG_{M5} + EG_{M7} + EG_{M9})$ |

<table>
<tr><td>Information flow:</td><td>As Quantity of net electricity generation supplied by the project plant/unit to the grid in year y ($EG_{facility,y}$) is calculated as below:<br>$EG_{facility,y} = (EG_{M1} + EG_{M2}) * (EG_{M7} + EG_{M9}) / (EG_{M5} + EG_{M7} + EG_{M9})$<br>For $EG_{M1}$, $EG_{M2}$, $EG_{M5}$, $EG_{M7}$, $EG_{M9}$, electricity meter M1, M2, M5, M7 and M9 (M1 and M2 installed at Heihe 330 kV Substation, for the rest installed at project site) were measured continuously, recorded monthly and archived electronically separately. At 24:00 hr of last day of each month, the staff from project owner will record electricity meter's readings and form Meter Reading Records (MRRs). The staff from power grid company will record the meter readings of meter then transcribes the data into Electricity Transaction Notes (ETNs), then after the confirmation of the project owner for the ETNs, the project owner would issue the invoice.<br>Also, another 5 electricity meters (M3, M4, M6, M8 and M10 installed at the project site) are working as the backup meters in case the main meters (M1, M2, M5, M7 and M9 correspondingly) are out of function. The monitoring and record procedure are as the same as 5 main meters.<br>The data for MRRs and ETNs have been sent to the CDM consulting company for reporting of GHG emission reduction. The conservative one would be used for ER calculation.</td></tr>
<tr><td>Monitoring method, frequency and equipments:</td><td>The parameter was measured continuously and recorded monthly by 5 sets of electricity meter (M1, M2, M5, M7, M9 as main meters and M3, M4, M6, M8 and M10 as backup meters) installed at Heihe 330 kV Substation (M1 and M2) and project site (rest of meters). See below for the information of 5 sets of electricity meter 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</td><td>SL7000</td><td>36061122</td><td>0.2s</td></tr>
<tr><td>M2</td><td>SL7000</td><td>36085837</td><td>0.2s</td></tr>
<tr><td>M3</td><td>DTSD341</td><td>20080850060011</td><td>0,2s</td></tr>
<tr><td>M4</td><td>DTSD341</td><td>20080850060012</td><td>0.2s</td></tr>
<tr><td>M5 (Old Meter)</td><td>SL7000</td><td>53033805</td><td>0.2s</td></tr>
<tr><td>M5 (New Meter)</td><td>MK6E</td><td>215294945</td><td>0.2s</td></tr>
<tr><td>M6</td><td>DTSD50</td><td>06022100934603</td><td>0.2s</td></tr>
<tr><td>M7 (Old Meter)</td><td>SL7000</td><td>53033804</td><td>0,2s</td></tr>
<tr><td>M7 (New Meter)</td><td>MK6E</td><td>215294941</td><td>0,2s</td></tr>
</table></td></tr>
</table>

| | | | | |
|---|---|---|---|---|
| | M8 (Old Meter) | SL7000 | 53033803 | 0,2s |
| | M8 (New Meter) | MK6E | 215294942 | 0,2s |
| | M9 (Old Meter) | SL7000 | 53033801 | 0,2s |
| | M9 (New Meter) | MK6E | 215294943 | 0,2s |
| | M10 (Old Meter) | SL7000 | 53033802 | 0,2s |
| | M10 (New Meter) | MK6E | 215294944 | 0,2s |

The type, serial number and accuracy have been confirmed by site visit.

Moreover, by checking Meter change record /15/, it is confirmed on 16/12/2016, old meters were replaced by new meters for M5, M7, M8, M9 and M10.

Calibration:

The calibration information is shown as below /12/:

| Meter | Calibration date | Valid until |
|---|---|---|
| M1 and M2 | 22/02/2012 | 21/05/2012 |
| | 21/05/2012 | 20/08/2012 |
| | 18/08/2012 | 17/11/2012 |
| | 16/11/2012 | 15/02/2013 |
| | 15/02/2013 | 14/05/2013 |
| | 14/05/2013 | 13/08/2013 |
| | 13/08/2013 | 12/11/2013 |
| | 12/11/2013 | 11/02/2014 |
| | 11/02/2014 | 10/05/2014 |
| | 10/05/2014 | 09/08/2014 |
| | 09/08/2014 | 08/11/2014 |
| | 08/11/2014 | 07/02/2015 |
| | 07/02/2015 | 06/05/2015 |
| | 06/05/2015 | 05/08/2015 |
| | 05/08/2015 | 04/11/2015 |
| | 04/11/2015 | 03/02/2016 |
| | 03/02/2016 | 02/05/2016 |
| | 02/05/2016 | 01/08/2016 |
| | 01/08/2016 | 31/10/2016 |
| | 31/10/2016 | 30/01/2017 |
| | 30/01/2017 | 29/04/2017 |
| | 29/04/2017 | 28/07/2017 |
| | 28/07/2017 | 27/10/2017 |
| | 27/10/2017 | 26/01/2018 |
| | 26/01/2018 | 25/04/2018 |
| M3 and M4 | 16/06/2011 | 16/06/2012 |
| | 21/05/2012 | 20/05/2013 |
| | 18/05/2013 | 17/05/2014 |
| | 17/05/2014 | 16/05/2015 |
| | 16/05/2015 | 15/05/2016 |
| | 15/05/2016 | 14/05/2017 |

| | | | |
|---|---|---|---|
| | | 14/05/2017 | 13/05/2018 |
| | M5 (Old Meter) | 16/06/2011 | 16/06/2012 |
| | | 10/03/2012 | 09/06/2012 |
| | | 21/05/2012 | 20/08/2012 |
| | | 17/08/2012 | 16/11/2012 |
| | | 16/11/2012 | 15/02/2013 |
| | | 15/02/2013 | 14/05/2013 |
| | | 14/05/2013 | 13/08/2013 |
| | | 13/08/2013 | 12/11/2013 |
| | | 12/11/2013 | 11/02/2014 |
| | | 11/02/2014 | 10/05/2014 |
| | | 10/05/2014 | 09/08/2014 |
| | | 09/08/2014 | 08/11/2014 |
| | | 08/11/2014 | 07/02/2015 |
| | | 07/02/2015 | 06/05/2015 |
| | | 06/05/2015 | 05/08/2015 |
| | | 05/08/2015 | 04/11/2015 |
| | | 04/11/2015 | 03/02/2016 |
| | | 03/02/2016 | 02/05/2016 |
| | | 02/05/2016 | 01/08/2016 |
| | | 01/08/2016 | 31/10/2016 |
| | | 31/10/2016 | 30/01/2017 |
| | M5 (New Meter) | 09/11/2016 | 08/02/2017 |
| | | 30/01/2017 | 29/01/2017 |
| | | 29/04/2017 | 28/07/2017 |
| | | 28/07/2017 | 27/10/2017 |
| | | 27/10/2017 | 26/01/2018 |
| | | 26/01/2018 | 25/04/2018 |
| | M6 | 13/06/2011 | 12/06/2012 |
| | | 21/05/2012 | 20/05/2013 |
| | | 18/05/2013 | 17/05/2014 |
| | | 17/05/2014 | 16/05/2015 |
| | | 16/05/2015 | 15/05/2016 |
| | | 15/05/2016 | 14/05/2017 |
| | | 14/05/2017 | 13/05/2018 |
| | M7 (Old Meter) | 10/03/2012 | 09/06/2012 |
| | | 21/05/2012 | 20/08/2012 |
| | | 17/08/2012 | 16/11/2012 |
| | | 16/11/2012 | 15/02/2013 |
| | | 15/02/2013 | 14/05/2013 |
| | | 14/05/2013 | 13/08/2013 |
| | | 13/08/2013 | 12/11/2013 |
| | | 12/11/2013 | 11/02/2014 |
| | | 11/02/2014 | 10/05/2014 |
| | | 10/05/2014 | 09/08/2014 |
| | | 09/08/2014 | 08/11/2014 |
| | | 08/11/2014 | 07/02/2015 |
| | | 07/02/2015 | 06/05/2015 |
| | | 06/05/2015 | 05/08/2015 |
| | | 05/08/2015 | 04/11/2015 |
| | | 04/11/2015 | 03/02/2016 |
| | | 03/02/2016 | 02/05/2016 |
| | | 02/05/2016 | 01/08/2016 |
| | | 01/08/2016 | 31/10/2016 |

| | | | |
|---|---|---|---|
| | | 31/10/2016 | 30/01/2017 |
| | M7 (New Meter) | 09/11/2016 | 08/02/2017 |
| | | 30/01/2017 | 29/01/2017 |
| | | 29/04/2017 | 28/07/2017 |
| | | 28/07/2017 | 27/10/2017 |
| | | 27/10/2017 | 26/01/2018 |
| | | 26/01/2018 | 25/04/2018 |
| | M8 (Old Meter) | 13/06/2011 | 12/06/2012 |
| | | 21/05/2012 | 20/05/2013 |
| | | 18/05/2013 | 17/05/2014 |
| | | 17/05/2014 | 16/05/2015 |
| | | 16/05/2015 | 15/05/2016 |
| | | 15/05/2016 | 14/05/2017 |
| | M8 (New Meter) | 09/11/2016 | 08/11/2017 |
| | | 27/10/2017 | 26/10/2018 |
| | M9 (Old Meter) | 10/03/2012 | 09/06/2012 |
| | | 21/05/2012 | 20/08/2012 |
| | | 17/08/2012 | 16/11/2012 |
| | | 16/11/2012 | 15/02/2013 |
| | | 15/02/2013 | 14/05/2013 |
| | | 14/05/2013 | 13/08/2013 |
| | | 13/08/2013 | 12/11/2013 |
| | | 12/11/2013 | 11/02/2014 |
| | | 11/02/2014 | 10/05/2014 |
| | | 10/05/2014 | 09/08/2014 |
| | | 09/08/2014 | 08/11/2014 |
| | | 08/11/2014 | 07/02/2015 |
| | | 07/02/2015 | 06/05/2015 |
| | | 06/05/2015 | 05/08/2015 |
| | | 05/08/2015 | 04/11/2015 |
| | | 04/11/2015 | 03/02/2016 |
| | | 03/02/2016 | 02/05/2016 |
| | | 02/05/2016 | 01/08/2016 |
| | | 01/08/2016 | 31/10/2016 |
| | | 31/10/2016 | 30/01/2017 |
| | M9 (New Meter) | 09/11/2016 | 08/02/2017 |
| | | 30/01/2017 | 29/01/2017 |
| | | 29/04/2017 | 28/07/2017 |
| | | 28/07/2017 | 27/10/2017 |
| | | 27/10/2017 | 26/01/2018 |
| | | 26/01/2018 | 25/04/2018 |
| | M10 (Old Meter) | 13/06/2011 | 12/06/2012 |
| | | 21/05/2012 | 20/05/2013 |
| | | 18/05/2013 | 17/05/2014 |
| | | 17/05/2014 | 16/05/2015 |
| | | 16/05/2015 | 15/05/2016 |
| | | 15/05/2016 | 14/05/2017 |
| | M10 (New Meter) | 09/11/2016 | 08/11/2017 |
| | | 27/10/2017 | 26/10/2018 |
| | The calibration from 2011 to 2016 was conducted by accredited third parties which is Gansu Power Company Electricity Measurement and | | |

| | |
|---|---|
| | Testing Center /13/ which was accredited by Quality and Technical Supervision Bureau of Gansu valid from 26/01/2011 to 25/01/2016.<br>The calibration from 2017 to 2018 was conducted by accredited third parties which is State Grid Gansu Power Company Electricity Science Research Institute Measurement and Testing Center /13/ which was accredited by Quality and Technical Supervision Bureau of Gansu valid from 29/09/2014 to 28/09/2018. |
| 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 and ETNs. All data is in line with MRRs and ETNs;<br>Information flow was verified by checking MRRs and ETNs, and all information are consistent;<br>Monitoring method was verified by site visit, checking calibration certificates, all monitoring method meets the description in the revised monitoring plan;<br>Calibration was verified by checking calibration certificate, all calibration of monitoring equipment meets the requirement indicated in the revised monitoring plan. |

| **Data / Parameter:** | $Cap_{PJ}$ |
|---|---|
| Data unit: | W |
| Description: | Installed capacity of the hydropower plant after the implementation of the project activity |
| Purpose of the data: | Calculation of project emissions |
| Parameter value: | 65,000,000 |
| Source of data used: | Nameplate of hydropower turbine generator |
| Information flow: | By checking Nameplate of hydropower turbine generator, it is confirmed the installed capacity of project activity is 65,000,000 W. |
| Monitoring method, frequency and equipments: | By checking Nameplate of hydropower turbine generator, it is confirmed the installed capacity of project activity is 65,000,000 W.<br>The installed capacity of the project activity would be checked annually. |
| 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: | Data of the parameter was verified by checking Nameplate of hydropower turbine generator. All data is in line with Nameplate of hydropower turbine generator;<br>Information flow was verified by checking Nameplate of hydropower turbine generator, and all information are consistent. |

| | |
|---|---|
| **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: | 138,047 |
| Source of data used: | Survey Report issued by Gansu water conservancy and hydropower survey and design institute /16/. |
| Information flow: | By checking Survey Report issued by Gansu water conservancy and hydropower survey and design institute, it is confirmed the area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full is 138,047 $m^2$ through the whole monitoring period. |
| Monitoring method, frequency and equipments: | By checking Survey Report issued by Gansu water conservancy and hydropower survey and design institute, it is confirmed the Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full is 138,047 $m^2$ through the whole monitoring period.<br>The area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full would be checked annually. |
| 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: | Data of the parameter was verified by checking Survey Report. All data is in line with Survey Report; |

| | |
|---|---|
| | Information flow was verified by checking Survey Report, and all information are consistent. |

Parameters available at validation stage:

Below data has been verified against the data sources and the PDD.

| Parameter title | Description | Data | Source |
|---|---|---|---|
| $EF_{y*}$ | The baseline grid emission factor | 0.8712 | Notification on 2008 baseline emission factors for regional power grids in China, issued by China on 18/07/2008 /14/. |
| $Cap_{BL}$ | Installed capacity of the hydro power plant before the implementation of the project activity. | 0 | Based on ACM0002 |
| $A_{BL}$ | Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full | 0 | Based on ACM0002 |

* $EF_y$ is not directly available in the registered PDD but calculated based on the ex-ante data fixed in the registered PDD.

## 4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The monitoring has been carried out in accordance with the revised monitoring plan /3/ approved by UNFCCC on 03/03/2011.

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 10.0 and the revised 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 Climate Bridge (Shanghai) Ltd. to perform the verification of greenhouse gas emission reductions of the project activity "65MW Dagushan Hydropower Project in China" (VCS Ref. No. 653).

The management of Gansu Zhangye Dagushan Hydropower 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 registered PDD /3/, version 05 dated 04/02/2010 and the revised monitoring plan approved on 03/03/2011.

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 registered PDD and revised monitoring plan is as per the applied methodology;

- the monitoring complies with the revised monitoring plan;

- 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 "65MW Dagushan Hydropower Project in China" during the monitoring period 29/04/2012 to 31/03/2018 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 29/04/2012 to 31/03/2018 (divided into 7 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 | 205,546 | 0 | 0 | 205,546 |
| 2013 | 229,867 | 0 | 0 | 229,867 |
| 2014 | 223,595 | 0 | 0 | 223,595 |
| 2015 | 215,501 | 0 | 0 | 215,501 |
| 2016 | 216,102 | 0 | 0 | 216,102 |
| 2017 | 225,469 | 0 | 0 | 225,469 |
| 2018 | 22,481 | 0 | 0 | 22,481 |
| Total | 1,338,564 | 0 | 0 | 1,338,564 |

# APPENDIX 1: REFERENCE LIST

1. Monitoring report, Version 01, dated 17/09/2020; version 03, dated 13/11/2020

2. ER calculation spreadsheet

3. Registered CDM PDD, version 05, dated 04/02/2010;

   Revised monitoring plan, approved on 03/03/2011

4. Validation report, No. QT-EC0417-08 - 08/233, version 1.2, completed by TÜV NORD CERT GmbH;

   VCS Validation Report, completed on 10/06/2011 by GLC

5. VCS standard version 4.0, dated on 19/09/2019

6. Statement issued by project owner

7 Approved methodology ACM0002, version 10.0, dated 11/06/2009

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 covering 2012 to 2016 issued by Gansu Power Company Electricity Measurement and Testing Center

   Calibration certificates of meters covering 2017 to 2018 issued by State Grid Gansu Power Company Electricity Science Research Institute Measurement and Testing Center

13 Accreditation certificates for Gansu Power Company Electricity Measurement and Testing Center issued by Quality and Technical Supervision Bureau of Gansu valid from 26/01/2011 to 25/01/2016

Accreditation certificates for State Grid Gansu Power Company Electricity Science Research Institute Measurement and Testing Center issued by Quality and Technical Supervision Bureau of Gansu valid from 29/09/2014 to 28/09/2018

14 Notification on 2008 baseline emission factors for regional power grids in China, issued by China on 18/07/2008

15 Meter change record

16 Survey Report issued by Gansu water conservancy and hydropower survey and design institute