



GROUPED CONNECT SOLAR PV POWER GENERATION PROJECT IN CHINA



Document Prepared By Shenzhen CTI International Certification Co., Ltd

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Summary:

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

The grouped project activity developed in 30 provinces of China, is a grouped connect solar PV power generation project, aims to generate electricity by using renewable solar PV energy to the grid. The initial seven instances of the Grouped Project displace electricity generated from Northwest China Power Grid (NWPNG). The grouped project can reduce GHG emissions by using renewable solar PV energy to the grid and replacing equivalent electricity generated by fossil fuel fired power plants connected to the State Grid or China Southern Power Grid. The grouped project started operation on 23-January-2013 and the initial seven project instances are the CPA of the Grid Connect Solar PV Power Generation Plant Programme (PoA 8868) under CDM, which were included into the PoA on 04-February-2015. After conduct the group project validation under VCS program, the group project was allocated with VCS ID 1461.

- ***The purpose and scope of verification***

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

- ***The monitoring period***

This is the 1st monitoring period started from 23-January-2013 to 31-December-2018 for VCS scheme.

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

Verification is conducted using Shenzhen CTI International Certification Co., Ltd procedures in line with the requirements specified in the latest version of the VCS Validation and Verification Manual and applying auditing techniques. The verification team assessed the grouped project activity's compliance against the VCS Version 4.1, the selected CDM methodology and the grouped project monitoring report. The grouped project is eligible under Project Scope 1. Energy Industries (renewable- /non-renewable resources). The verification criteria followed the guidance documents provided by VCS included the following:

VCS Version 4.1, VCS Program Guide Version 4.0 and the applied CDM methodology "ACM0002. Grid-connected electricity generation from renewable sources" (Version 16.0).

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

In the course of the verification, 4 Corrective Action Requests (CARs), 4 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in the report.

- ***Any uncertainties associated with the verification***

There are no restrictions of uncertainty with the verification.

- ***Summary of the verification conclusion***

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 1st periodical verification of the grouped project, "Grouped Connect Solar PV Power Generation Project in China" (No. 1461) with regards to the relevant requirements of VCS standard Version 4.1. CTI confirms all verification activities including objectives, scope and criteria, level of assurance, monitoring and monitoring report adhere to VCS Version 4.1 and all associated updated as documented in this report, are complete.

CTI concludes that the grouped project activity "Grouped Connect Solar PV Power Generation Project in China" in China, as described in the final version of the Monitoring Report, meets all relevant requirements for VCS verification activity and correctly applied the methodology ACM0002 Version 16.0. Hence CTI is able to certify that the GHG emission reduction from the grouped project during the monitoring period from 23-January-2013 to 31-December-2018 amount to 1,265,672 tCO₂e.

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1. INTRODUCTION

1.1 Objective

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 1st periodical verification of the grouped project for the monitoring period from 23-January-2013 to 31-December-2018. The objective of verification is to have an independent review ex-post determination by a VVB of the monitored GHG emission reductions that have occurred as a result of the grouped project activity implemented during a defined monitoring period. The evaluation is done against the requirements of the VCS Version 4.1 based on the monitoring report. In order to confirm that the GHG emission reductions sound reasonable and meet the identified criteria, the verification involves the assessment of monitoring plan conformance to VCS rules and applied methodology. Verification is requirement and is seen as necessary to provide assurance on the generation of VCUs.

1.2 Scope and Criteria

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

1.3 Level of Assurance

All GHG sinks, sources and GHG emissions equal to or greater than 2% of the total GHG assertions are considered. The grouped project as generated average of 212,988 VCUs per year, and therefore can be considered as a normal project per the VCS rules, in regards to its GHG emission reduction values, subject to a 2% materiality threshold.

The assessment was conducted to provide a reasonable level of assurance of compliance against the defined audit criteria and materiality threshold within the audit scope. Based on the audit findings the verification statement reasonably assures that the GHG assertion is materially correct and is a fair representation of the GHG data and information.

1.4 Summary Description of the grouped project

The grouped project is implemented by China Three Gorges Renewables (Group) Co., Ltd.¹, the main purpose of this project activity is to generate electricity by using renewable solar PV energy to the grid consists of solar PV Power Generation plants located in 30 provinces of China. During this monitoring period, the grouped project included initial seven project activity instances with total installed capacity of 260MW/3/. The estimated annual average GHG emission reduction from the initial seven project activity instances is 302,268 tCO₂e and the total estimate GHG emissions reductions over the first crediting period is 3,026,288 tCO₂e/3/.

The grouped project can reduce GHG emissions by generate electricity by using renewable solar PV energy to the grid and replacing equivalent electricity generated by fossil fuel fired power plants connected to the State Grid or China Southern Power Grid/3/. In the monitoring period from 23-January-2013 to 31-December-2018, total net electricity supplied to the grid is 1,522,819.617 MWh. The total verified carbon units (VCUs) achieved in the monitoring period are 1,265,672 tCO₂e, which has been verified by on-site inspection, and checking the related documentations, interview with the grouped project implementer.

The grouped project activity generates electricity by using renewable solar PV energy to the grid and replacing equivalent electricity generated by fossil fuel fired power plants connected to the State Grid or China Southern Power Grid thus the grouped project generates GHG emission reductions and produces financial, social and environmental benefits. The grouped project has resulted in the local sustainable development as described in Section 1 of the Monitoring Report. The grouped project started operation on 23-January-2013 and the initial seven project instances are the CPA of the Grid Connect Solar PV Power Generation Plant Programme (PoA 8868) under CDM, which were included into the PoA on 04-February-2015. After conduct the group project validation under VCS program, the group project was allocated with VCS ID 1461 and the emission reductions have been certified as verified carbon units (VCUs) for this monitoring period.

¹ In the registered PD, the name of the PP is China Three Gorges New Energy Corp. And this English name is changed to China Three Gorges Renewables (Group) Co., Ltd. on 26-June-2019 which is confirmed by checking the statement of the EN name change/39/.

2. VERIFICATION PROCESS

2.1 Method and Criteria

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

- VCS Standard, v4.1/28/
- VCS Program Guide, v4.0/27/
- VCS Program Definitions, v4.1/26/
- CDM methodology ACM0002 "Grid-connected electricity generation from renewable sources" (Version 16.0)/22/

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

- Contract review
- Appointment of team members and technical reviewers
- A desk review of the VCS Monitoring Report/1/ submitted by the client and additional supporting documents with the use of customized verification documents checklist
- Verification planning
- On-Site assessment
- Background investigation and follow-up interviews with personnel of the grouped project developer and related farmers, technicians
- Draft verification reporting
- Resolution of Corrective Action Requests (CARs) and Clarification Requests (CLs)
- Final verification reporting
- Technical review
- Final approval of the verification.

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

2.2 Document Review

The VCS MR/1/ and supporting background documents related to the grouped project implementation were reviewed. Document review was conducted to ensure consistency with and identify any deviation from VCS program requirements. Desk review included an examination of the grouped project details, data and parameters, and quantification of GHG emission reductions.

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

The references used in the course of this verification are summarized in Appendix 3.

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

2.3 Interviews

The objective of the interview process was to solicit important information from personnel related to project and relevant to the verification process. Onsite interviews and information discussions were conducted with representatives from project implementers, operation staffs, local officers, residents and Project VCS development consultant. The interviews were performed by the verification team on-site and the following is a list of the main interviewees and subject.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Guo	Haiwei	Three Gorges New Energy Pishan Power Generation Co., Ltd. /Pishan Solar Power Plant Manager	17-August-2021	- General aspects of the grouped project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Project ownership	Lei Zhang

2.	Ren	Qiuli	Three Gorges New Energy Pishan Power Generation Co., Ltd. /Duty Chief	17-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Lei Zhang
3.	Aili	Aihemaiti	Three Gorges New Energy Pishan Power Generation Co., Ltd. /Vice Duty Chief	17-August-2021		
4.	Alimu	Achangpu	Three Gorges New Energy Pishan Power Generation Co., Ltd. /Vice Duty Chief	17-August-2021		
5.	Kuerban	Aimaiti	Three Gorges New Energy Pishan Power Generation Co., Ltd. /Operation Staff	17-August-2021		
6.	Zhang	Rong	Three Gorges New Energy Pishan Power Generation Co., Ltd. /Business Manager	17-August-2021		
7.	Xiao	Wenbin	Hetian City Environment Protection Bureau/Staff	17-August-2021	- Environmental aspects - Environmental protection Measurements	Lei Zhang
8.	Peng	Yumei	Climate Bridge (Shanghai) Ltd./Project Manager	17-August-2021	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS MR	Lei Zhang
9.	Min	Hongwei	Three Gorges New Energy Jinchang Wind Power Co., Ltd. /Dazhaitan Solar Power Plant Manager	17-August-2021	- General aspects of the grouped project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system	Ziqi Li (another TM)

					- Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Project ownership	
10.	Wang	Chongyun	Three Gorges New Energy Jinchang Wind Power Co., Ltd. /Duty Chief	17-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Ziqi Li
11.	Liu	Shijun	Jinchang City Environment Protection Bureau/Section Chief	17-August-2021	- Environmental aspects - Environmental protection Measurements	Ziqi Li
12.	Li	Fuhai	Local resident	17-August-2021	- Local stakeholder communication - Stakeholder comments	Ziqi Li
13.	Zhang	Xuezhong	Local resident	17-August-2021		
14.	Huang	Chunbin	Climate Bridge (Shanghai) Ltd./Project Manager	17-August-2021	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS MR	Ziqi Li
15.	Min	Hongwei	Three Gorges New Energy	18-August-2021	- General aspects of the grouped project	Ziqi Li

			Jinchang Wind Power Co., Ltd. /Heqingtian Solar Power Plant Manager		- Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Project ownership	
16.	Li	Shuangde	Three Gorges New Energy Jinchang Wind Power Co., Ltd. /Vice Duty Chief	18-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Ziqi Li
17.	Wang	Chongyun	Three Gorges New Energy Jinchang Wind Power Co., Ltd. /Duty Chief	18-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Ziqi Li
18.	Liu	Shijun	Jinchang City Environment Protection Bureau/Section Chief	18-August-2021	- Environmental aspects - Environmental protection Measurements	Ziqi Li
19.	Liu	Fuhai	Local Resident	18-August-2021	- Local stakeholder communication - Stakeholder comments	Ziqi Li
20.	Zhang	Xuezhong				
21.	Huang	Chunbin	Climate Bridge (Shanghai) Ltd./Project Manager	18-August-2021	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation	Ziqi Li

					- Monitoring measurements - Editorial issues of the VCS MR	
22.	Tang	Qiang	Three Gorges New Energy Hami Wind Power Co., Ltd. /Hami Solar Power Plant Manager	19-August-2021	- General aspects of the grouped project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Project ownership	Lei Zhang
23.	Sheng	Peiyuan	Three Gorges New Energy Hami Wind Power Co., Ltd./Duty Chief	19-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Lei Zhang
24.	Zhao	Xu	Three Gorges New Energy Hami Wind Power Co., Ltd./Operation Staff	19-August-2021		
25.	Gao	Bin	Hami City Environment Protection Bureau/Staff	19-August-2021	- Environmental aspects - Environmental protection Measurements	Lei Zhang
26.	Peng	Yumei	Climate Bridge (Shanghai) Ltd./Project Manager	19-August-2021	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions	Lei Zhang

					- Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS MR	
27.	Yan	Zhengcai	Jiuquan Zhaoyang New Energy Power Generation Co., Ltd./ Zhaoyang Dongdongtan Phase I Solar Power Plant Business Manager	19-August-2021	- General aspects of the grouped project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Project ownership	Ziqi Li
28.	Yang	Rong	Jiuquan Zhaoyang New Energy Power Generation Co., Ltd./Duty Chief	19-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Ziqi Li
29.	Cui	Chenyang	Jiuquan Zhaoyang New Energy Power Generation Co., Ltd./Vice Duty Chief	19-August-2021		
30.	Zou	Fangting	Jiuquan City Environment Protection Bureau/Director	19-August-2021	- Environmental aspects - Environmental protection Measurements	Ziqi Li
31.	Mao	Shiwei	Local resident	19-August-2021	- Local stakeholder communication - Stakeholder comments	Ziqi Li

32.	Huang	Chunbin	Climate Bridge (Shanghai) Ltd./Project Manager	19-August-2021	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS MR	Ziqi Li
33.	Li	Zhaoning	Jiuquan Zhaoyang New Energy Power Generation Co., Ltd./ Sanyang Dongdongtan Phase II Solar Power Plant Manager	20-August-2021	- General aspects of the grouped project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Project ownership	Ziqi Li
34.	Feng	Xiaomin	Jiuquan Zhaoyang New Energy Power Generation Co., Ltd./Duty Chief	20-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities	Ziqi Li
35.	Li	Wuqiang	Jiuquan Zhaoyang New Energy Power Generation Co., Ltd./Vice Duty Chief	20-August-2021	- Training and practice of the operational personnel - Implementation of the monitoring plan - Maintenance - Environmental aspects - Job creation - Working environment	Ziqi Li
36.	Zou	Fangting	Jiuquan City Environment	20-August-2021	- Environmental aspects	Ziqi Li

			Protection Bureau/Director		- Environmental protection Measurements	
37.	Guo	Rui	Local resident	20-August-2021	- Local stakeholder communication - Stakeholder comments	Ziqi Li
38.	Huang	Chunbin	Climate Bridge (Shanghai) Ltd./Project Manager	20-August-2021	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS MR	Ziqi Li
39.	Zhang	Yu	Wulan Jinfeng New Energy PV Power Co., Ltd./ Business Manager	21-August-2021	- General aspects of the grouped project - Changes since validation / previous verifications - Calibration procedures - Power generation situation - Quality management system - Involved personnel and responsibilities - Training and practice of the operational personnel - Implementation of the monitoring plan - Monitoring data management - Data uncertainty and residual risks - Procedural aspects of the verification - Maintenance - Environmental aspects - Project ownership	Lei Zhang
40.	Li	Yuan	Wulan Jinfeng New Energy PV Power Co., Ltd./ Wulan Solar Power Plant Manager	21-August-2021	- Calibration procedures - Power generation situation - Involved personnel and responsibilities	Lei Zhang
41.	Li	Yuefeng	Wulan Jinfeng New Energy PV Power Co., Ltd./Operation Staff	21-August-2021	- Training and practice of the operational personnel - Implementation of the monitoring plan	

42.	Xu	Tianwei	Wulan Jinfeng New Energy PV Power Co., Ltd./ Operation Staff	21-August-2021	- Maintenance - Environmental aspects - Job creation - Working environment	
43.	Zhang	Guozheng	Wulan Jinfeng New Energy PV Power Co., Ltd./ Operation Staff	21-August-2021		
44.	Luo	Cheng	Wulan County Environment Protection Bureau/ Director	21-August-2021	- Environmental aspects - Environmental protection Measurements	Lei Zhang
45.	Peng	Yumei	Climate Bridge (Shanghai) Ltd./Project Manager	21-August-2021	- Financial aspects - Deviations - Monitoring period - Project activity starting date - Assumptions - Monitoring plan and implementation - Monitoring measurements - Editorial issues of the VCS MR	Lei Zhang

2.4 Site Inspections

The verification site inspection was conducted on 17-August-2021~21-August-2021. A ground inspection of the 7 instances in the grouped project was conducted during the site visit by verification team divided by two groups and the verification team interviewed representatives from project implementers, operation staffs, local officers, residents and Project VCS development consultant. Details as provided in the above table.

During the site inspection, the grouped project location, main equipment, monitoring equipment and project implementation were inspected and document evidence were checked, details as following table,

Duration of on-site inspection: 17-August-2021~21-August-2021				
No.	Activity performed on-site	Site location	Date	Team member
1.	Opening meeting for different instances Interview with representatives from project implementers, operation staffs, local officers, residents	Office in different companies for operate each instance	17-August-2021~21-August-2021	Lei Zhang Ziqi Li
2	On-site inspection of project	7 Solar plants in P.R. China, refer to table 4-2 for different locations	17-August-2021~21-August-2021	Lei Zhang Ziqi Li

3	Documents check	Office in different companies for operate each instance	17-August-2021~21-August-2021	Lei Zhang Ziqi Li
4	Finding Summary	Office in different companies for operate each instance	17-August-2021~21-August-2021	Lei Zhang Ziqi Li
5	Close Meeting	Office in different companies for operate each instance	17-August-2021~21-August-2021	Lei Zhang Ziqi Li

2.5 Resolution of Findings

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

A Corrective Action Request (CAR) is established where:

The grouped project participants have made mistakes that will influence the ability of the grouped project activity to achieve real, measurable additional emission reductions;

The VCS Version 4.1 requirements have not been met;

There is a risk that the emission reductions cannot be monitored or calculated.

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

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

A detailed list of the CARs CLs and FAR raised and discussed in the course of this verification is included in Appendix 4 of this report.

In the course of the verification, 4 Corrective Action Requests (CARs), 4 Clarification Requests (CLs) were raised and successfully closed. The assessment is included in Appendix 4 of the report.

2.5.1 Forward Action Requests

This is the 1st periodical verification, and there is no FAR raised in the validation report /4/.

2.6 Eligibility for Validation Activities

The VVB Shenzhen CTI International Certification Co., Ltd holds accreditation for both validation and verification for the relevant sectoral scope 1.

3. VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

The Grouped Project has not been registered or is seeking registration under any other GHG programs which has been checked during the validation process/4/.

The Grouped Project started operation on 23-January-2013 and the initial seven project instances are the CPA of the Grid Connect Solar PV Power Generation Plant Programme (PoA 8868) under CDM, which were included into the PoA on 04-February-2015 verified by checking the dedicated UNFCCC website/37/. After conduct the group project (including initial seven project instances) validation under VCS program, the group project was allocated with VCS ID 1461.

The Grouped Project period under VCS started on 23-January-2013 and will be expired on 22-January-2023.

The Grouped Project is located in China and is developed and operated by China Three Gorges Renewables (Group) Co., Ltd. and project owners of each instance which are all Chinese Investment Enterprise/5/.

The Grouped Project has sought the registration with the VCS Program and validation was conducted by VVB and has been successfully registered in VCS Program and via checking the VCS dedicated website of the grouped project/38/.

The verification team also checked the Gold Standard Registry/31/ and the Climate Action Reserve to determine if the grouped project is producing other environmental credits. It was confirmed that the grouped project is not listed on these registries and therefore there is no other environmental credit (for example renewable energy certificate) which has or will be produced by or obtained for the grouped project.

Via on-site interview with the grouped project implementer and checking the UNFCCC website of the Grid Connect Solar PV Power Generation Plant Programme (PoA 8868)/37/. It is verified that the implementation of the grouped project is consistent with the description in the Project Description/3/ and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 23-January-2013 to 31-December-2018.

3.2 Methodology Deviations

There is no methodology deviation applied to this monitoring period.

3.3 Project Description Deviations

There is no project description deviation applied to this monitoring period.

3.4 Grouped Project

There is no inclusion of new project activity instances into the Grouped Project in this monitoring period.

4. VERIFICATION FINDINGS

4.1 Project Implementation Status

Through the onsite visit, interviewing the grouped project developer and reviewing the grouped project operation, CTI confirmed that the grouped project was implemented to generate electricity by using renewable solar PV energy to the grid consists of solar PV Power Generation plants located in 30 provinces of China. During this monitoring period, the grouped project included initial seven project activity instances with total installed capacity of 260MW/1/ which is consistent with the value in PD/3/.

The grouped project can reduce GHG emissions by generate electricity by using renewable solar PV energy to the grid and replacing equivalent electricity generated by fossil fuel fired power plants connected to the State Grid or China Southern Power Grid/3/. In the monitoring period from 23-January-2013 to 31-December-2018, total net electricity supplied to the grid is 1,522,819.617 MWh. The total verified carbon units (VCUs) achieved in the monitoring period are 1,265,672 tCO₂e, which has been verified by on-site inspection, and checking the related documentations, interview with the grouped project implementer.

Via checking the MR/1/ and by site inspection, CTI verified that there are no changes on the key equipment and technology since the validation of the grouped project.

On the basis of site visit and the reviewed project monitoring report/1/ and other supporting docs as listed in Appendix 3, it can be confirmed that the realized technology, as well as the monitoring and metering equipment, the grouped project has been implemented and operated as applied methodology/22/ and monitoring plan described in the registered PD/3/.

This verification covers the period from 23-January-2013 to 31-December-2018 (including both days).

The commenced electricity generation date of each project activity instance is as below table, which has been confirmed in the commissioning records/8/ against the validation report/4/.

Table 4-1 Construction and Commissioning started date of initial seven project activity instances

Instance No.	Name	Construction Date	Commission Date
01	Yongchang County Dazhaitan 50MW Grid Connected Solar PV Power Generation Project	25-August-2012	06-March-2013
02	Yongchang County Heqingtian Phase II 50MW Grid Connected Solar PV Power Generation Project	01-September-2013	26-December-2013
03	Wulan 20MW Grid Connected Solar PV Power Generation Project	04-November-2012	23-January-2013
04	Three Gorges New Energy Hetian Pishan Phase II 20M Grid Connected Solar PV Power Generation Project	10-October-2013	21-December-2013
05	Three Gorges New Energy Hami 20MW Grid Connected PV Power Generation Project	10-October-2013	26-December-2013
06	Suzhou Zhaoyang Dongdongtan Phase I 50MW Grid Connected Solar PV Power Generation Project	30-November-2012	20-July-2013

07	Suzhou Sanyang Dongdongtan Phase II 50MW Grid Connected Solar PV Power Generation Project	30-November-2012	30-June-2013
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As part of the site visit the Verification Team was able to confirm that the grouped project implementation is in accordance with the grouped project description contained in the registered PD/3/. There are no any material discrepancies between project implementation and the grouped project description.

The Grouped Project started operation on 23-January-2013 and the initial seven project instances are the CPA of the Grid Connect Solar PV Power Generation Plant Programme (PoA 8868) under CDM, which were included into the PoA on 04-February-2015 verified by checking the dedicated UNFCCC website/37/. After conduct the group project (including initial seven project instances) validation under VCS program, the group project was allocated with VCS ID 1461.

The net GHG emission reductions during this monitoring period from the grouped project was not used for compliance with emission trading programs or to meet binding limits on GHG emissions confirmed via on-site interview with the grouped project implementer and checking the UNFCCC website of the Grid Connect Solar PV Power Generation Plant Programme (PoA 8868)/37/.

It is verified that the implementation of the grouped project is consistent with the description in the Project Description/3/ and the monitoring system is fully functional to generate Verified Carbon Units (VCUs) without any double counting for this monitoring period from 23-January-2013 to 31-December-2018.

Besides, based on VVB's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO₂e/year which has been verified in the public website/35/, and it is confirmed that the grouped project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the grouped project owner by checking the enforced company list in public information/36/. Hence, it is confirmed that the emission reductions will not be double counted.

The grouped project was registered as a VCS project activity with the VCS Ref. No. 1461/38/, with 10 years of 1st crediting period started from 23-January-2013 to 22-January-2023 under VCS Program.

This monitoring period (23-January-2013 to 31-December-2018) is the 1st monitoring period in the first 10-years crediting period.

Details of the grouped project location and geographic coordinates are given in table 4-2 below:

Table 4-2: Project Location of initial seven project activity instances

No.	Project Location	Geographical coordinates
Instance 01	Yongchang County, Jinchang City, Gansu Province of China	102° 17'49"E, 38° 16'29"N
Instance 02	Yongchang County, Jinchang City, Gansu Province of China	102° 16'40"E, 38° 16'58"N
Instance 03	Wulan County, Qinghai Province of China	98° 23'50"E, 37° 00'42"N
Instance 04	Pishan County, Hetian City and Xinjiang Uygur Autonomous Region of China	78° 14'51"E, 37° 32'21"N
Instance 05	Hami City, Xinjiang Uygur Autonomous Region of China	93° 37'07"E, 43° 02'44"N
Instance 06	Jiuquan City, Gansu Province of China	98° 34'30"E, 39° 35'06"N
Instance 07	Jiuquan City, Gansu Province of China	98° 34'20"E, 39° 35'27"N

The locations of the initial seven project activity instances' project site are verified with on-site investigation by GPS devices and confirmed by checking the map/30/.

Details of the grouped project equipment technical parameters are given in table 4-3~4-9 below:

Table 4-3 Project equipment technical parameters of **Instance 01**

Parameter	Unit	Value		
290MWp polycrystalline silicon solar cells				
Model	-	JKM290P-72		
Number	-	172800		
Maximum power (Pmax)	Wp	290W±3%		
Maximum power current (Imp)	V	36.5		
Open-circuit voltage (Voc)	A	7.97		
Short-circuit current (Isc)	V	44.9		
Maximum system voltage	A	8.89		
Operation period	years	25		
Manufacturer	-	Jinko Solar Co., Ltd.		
Inverters				
Model	-	SSL0500	KNGI900-500HEA	SG500KTL
Rated Output Power	KW	500	500	500
Maximum DC voltage	V	900	900	1000
Maximum input Short-circuit current	A	/	/	1450
MPPT Voltage Range	V	500-750	450-820	450-820
Maximum Input current	A	1200	1168	1200
Rated output voltage	V	400	270	270
Rated frequency	Hz	50	50	50
Maximum Output current	A	/	1188	1176
Operation period	Year	25	25	25
Manufacturer	-	Emerson Network Power Co., Ltd.	Beijing Kenuo Weiye Technology Co., Ltd.	Sungrow Power Supply Co., Ltd.

The Instance 01 involves the installation of a grid-connected solar photovoltaic power plant. The total installed capacity of the grid connected photovoltaic power station is 50MW (50.112MWp of total solar cell modules) consists of 172,800 pieces of 290Wp polycrystalline silicon solar cells/11/. 100 sets of inverters with capacity 500kW were installed in the project/11/. The electricity generated by solar cell module connected to dc-to-ac inverter, inverters are connected to boost transformers, and then transformed together with Instance 02 to transformer substation before delivered to NWPG. The implementation status of Instance 01 is verified by site inspection and checking the equipment purchase contract/11/, Grid-connected wiring diagram/12/, Power Purchase Agreement/13/ and operation logs/14/.

Table 4-4 Project equipment technical parameters of **Instance 02**

Parameter	Unit	Value
295MWp and 300MWp polycrystalline silicon solar cells		

Parameter	Unit	Value		
Model	-	TSM-300PC14	TSM-295PC14	JC295M-24/Ab
Number	-	92,340	10,260	68,400
Maximum power (Pmax)	Wp	300±3%	290W±3%	295W±5W
Maximum power Voltage (Vmp)	V	36.9	36.6	36.3
Maximum power current (Imp)	A	8.13	8.07	8.13
Open-circuit voltage (Voc)	V	45.3	45.2	44.7
Short-circuit current (Isc)	A	8.60	8.55	8.62
Maximum system voltage	V	1000	1000	1000
Operation period	years	25	25	25
Manufacturer	-	Trina Solar Changzhou Co., Ltd.		Renesola Zhejiang Co., Ltd.
Inverters				
Model	-	EP-0500-A		
Rated Output Power	KW	500		
Maximum DC voltage	V	1000		
Maximum input Short-circuit current	A	1327		
MPPT Voltage Range	V	500-820		
Maximum Input current	A	1128		
Rated output voltage	V	315		
Rated frequency	Hz	50		
Maximum Output current	A	1008		
Operation period	Year	25		
Manufacturer	-	Wuxi Shangneng new energy Co., Ltd.		

The Instance 02 involves the installation of a grid-connected solar photovoltaic power plant. The total installed capacity of the grid connected photovoltaic power station is 50MW (50.9067MWp of total solar cell modules) consists of 78,660 pieces of 295Wp and 92,340 pieces of 300Wp polycrystalline silicon solar cells/11/. 100 sets of inverters with capacity 500kW were installed in the project/11/. The electricity generated by solar cell module connected to dc-to-ac inverter, inverters are connected to boost transformers, and then transformed together with Instance 01 to transformer substation before delivered to NWPG. The implementation status of Instance 02 is verified by site inspection and checking the equipment purchase contract/11/, Grid-connected wiring diagram/12/, Power Purchase Agreement/13/ and operation logs/14/.

Table 4-5 Project equipment technical parameters of Instance 03

Parameter	Unit	Value
Polycrystalline silicon solar cells		
Model	-	YL245P-29b
Number	-	82200
Maximum power (Pmax)	Wp	245(0±3W)

Parameter	Unit	Value
Rated Voltage	V	30.2
Rated current	A	8.11
Open-circuit voltage (Voc)	V	37.8
Short-circuit current (Isc)	A	8.63
Maximum system voltage	V	1000
Operation period	years	25
Manufacturer		Yingli Energy (China) Co., Ltd.
Inverters		
Model	-	DS500KTL
Rated Output Power	KW	500
Maximum DC voltage	V	1000
MPPT Voltage Range	V	450-880
Maximum Input current	A	1200
Rated output voltage	V	270
Rated frequency	Hz	50
Maximum Output current	A	1070
Operation period	Year	25
Manufacturer	-	Anhui Jinfeng New Energy Co., Ltd.

The Instance 03 involves the installation of a grid-connected solar photovoltaic power plant. The total installed capacity of the grid connected photovoltaic power station is 20MW (20.139MWp of total solar cell modules) consists of 82,200 pieces of 245Wp polycrystalline silicon solar cells/11/. 40 sets of inverters with capacity 500kW were installed in the project/11/. The electricity generated by solar cell module connected to dc-to-ac inverter, inverters are connected to boost transformers, and then transformed to transformer substation before delivered to NWPG. The implementation status of Instance 03 is verified by site inspection and checking the equipment purchase contract/11/, Grid-connected wiring diagram/12/, Power Purchase Agreement/13/ and operation logs/14/.

Table 4-6 Project equipment technical parameters of Instance 04

Parameter	Unit	Value
250MWp polycrystalline silicon solar cells		
Model	-	EG250-P60-C
Maximum power (Pmax)	Wp	250(0±3%)
Rated Voltage	V	30.20
Rated current	A	8.28
Open-circuit voltage (Voc)	V	37.72
Short-circuit current (Isc)	A	8.81
Maximum system voltage	V	1000
Operation period	years	25
Manufacturer	-	ChangZhou EGing Photovoltaic Technology Co., Ltd
Inverters		
Model	-	EP-0500-A
Rated Output Power	KW	500

Parameter	Unit	Value
Maximum DC voltage	V	1,000
MPPT Voltage Range	V	420-850
Maximum Input current	A	1,128
Rated output voltage	V	270
Rated frequency	Hz	50
Maximum Output current	A	1,069
Operation period	Year	25
Manufacturer	-	Wuxi Shangneng New Energy Co., Ltd.

The Instance 04 involves the installation of a grid-connected solar photovoltaic power plant. The total installed capacity of the grid connected photovoltaic power station is 20MW (20MWp of total solar cell modules) consists of 80,000 pieces of 250Wp polycrystalline silicon solar cells/11/. 40 sets of inverters with capacity 500kW were installed in the project/11/. The electricity generated by solar cell module connected to dc-to-ac inverter, inverters are connected to boost transformers, and then transformed to transformer substation before delivered to NWPG. The implementation status of Instance 04 is verified by site inspection and checking the equipment purchase contract/11/, Grid-connected wiring diagram/12/, Power Purchase Agreement/13/ and operation logs/14/.

Table 4-7 Project equipment technical parameters of Instance 05

Parameter	Unit	Value	
Polycrystalline silicon solar cells			
Model	-	JAP6-60-3BB-250	JC250M-24/Bb
Number	-	40800	40800
Maximum power (Pmax)	Wp	250(0±5W)	250(>=0)
Maximum power Voltage (Vmp)	V	29.98	30.1
Maximum power current (Imp)	A	8.34	8.31
Open-circuit voltage (Voc)	V	37.54	37.4
Short-circuit current (Isc)	A	8.84	8.83
Maximum system voltage	V	1000	1000
Operation period	years	25	25
Manufacturer		Hefei JA Solar Technology Co., Ltd	Renesola Zhejiang Ltd
Inverters			
Model	-	YLSSL-500	
Rated Output Power	KW	500	
Maximum DC voltage	V	1000	
MPPT Voltage Range	V	420-850	
Maximum Input current	A	1200	
Rated output voltage	V	270	
Rated frequency	Hz	50	
Maximum Output current	A	1069	

Parameter	Unit	Value
Operation period	Year	25
Manufacturer	-	Shenzhen WinLine Technology Co., Ltd.

The Instance 05 involves the installation of a grid-connected solar photovoltaic power plant. The total installed capacity of the grid connected photovoltaic power station is 20MW (20.4MWp of total solar cell modules) consists of 81,600 pieces of 250Wp polycrystalline silicon solar cells/11/. 40 sets of inverters with capacity 500kW were installed in the project/11/. The electricity generated by solar cell module connected to dc-to-ac inverter, inverters are connected to boost transformers, and then transformed to transformer substation before delivered to NWPG. The implementation status of Instance 05 is verified by site inspection and checking the equipment purchase contract/11/, Grid-connected wiring diagram/12/, Power Purchase Agreement/13/ and operation logs/14/.

Table 4-8 Project equipment technical parameters of Instance 06

Parameter	Unit	Value	
Polycrystalline silicon solar cells			
Model	-	JAP6-60-3BB-250/3BB	JKM250P-60
Maximum power (Pmax)	Wp	250±3%	250±5%
Maximum power Voltage (Vmp)	V	30.00	30.40
Maximum power current (Imp)	A	8.32	8.23
Open-circuit voltage (Voc)	V	37.79	37.60
Short-circuit current (Isc)	A	8.67	8.81
Maximum system voltage	V	1000	1000
Operation period	years	25	25
Manufacturer		JA Solar	JINKO Solar
Inverters			
Model	-	SG500MX	SG630KTL
Rated Output Power	KW	500	630
Maximum DC voltage	V	1000	1000
MPPT Voltage Range	V	500-850	500-820
Maximum Input current	A	1120	1400
Rated output voltage	V	315	315
Rated frequency	Hz	50	50
Operation period	Year	25	25
Manufacturer	-	SUNGROW POWER SUPPLY CO., LTD	

The Instance 06 involves the installation of a grid-connected solar photovoltaic power plant. The total installed capacity of the grid connected photovoltaic power station is 50MW (50MWp of total solar cell modules) consists of 200,000 pieces of 250Wp polycrystalline silicon solar cells/11/. 50 sets of 500kW inverters and 40 sets of 630 kW inverters were installed in the project/11/. The electricity generated by solar cell module connected to dc-to-ac inverter, inverters are connected to boost transformers, and then transformed together with Instance 07 to transformer substation before delivered to NWPG. The implementation status of Instance 06 is verified by site inspection and

checking the equipment purchase contract/11/, Grid-connected wiring diagram/12/, Power Purchase Agreement/13/ and operation logs/14/.

Table 4-9 Project equipment technical parameters of Instance 07

Parameter	Unit	Value	
Polycrystalline silicon solar cells			
Model	-	CS6P-250P	JKM250P-60
Maximum power (Pmax)	Wp	250	250±5%
Maximum power Voltage (Vmp)	V	30.10	30.40
Maximum power current (Imp)	A	8.30	8.23
Open-circuit voltage (Voc)	V	37.20	37.60
Short-circuit current (Isc)	A	8.87	8.81
Maximum system voltage	V	1000	1000
Operation period	years	25	25
Manufacturer		Canadian Solar	JINKO Solar
Inverters			
Model	-	SG500MX	SG630KTL
Rated Output Power	KW	500	630
Maximum DC voltage	V	1000	1000
MPPT Voltage Range	V	500-850	500-820
Maximum Input current	A	1120	1400
Rated output voltage	V	315	315
Rated frequency	Hz	50	50
Operation period	Year	25	25
Manufacturer		SUNGROW POWER SUPPLY CO., LTD	

The Instance 07 involves the installation of a grid-connected solar photovoltaic power plant. The total installed capacity of the grid connected photovoltaic power station is 50MW (50MWp of total solar cell modules) consists of 200,000 pieces of 250Wp polycrystalline silicon solar cells/11/. 50 sets of 500kW inverters and 40 sets of 630 kW inverters were installed in the project/11/. The electricity generated by solar cell module connected to dc-to-ac inverter, inverters are connected to boost transformers, and then transformed together with Instance 06 to transformer substation before delivered to NWPG. The implementation status of Instance 07 is verified by site inspection and checking the equipment purchase contract/11/, Grid-connected wiring diagram/12/, Power Purchase Agreement/13/ and operation logs/14/.

Furthermore, via site inspection of the nameplate of the equipment during site visit/21/ and checking the Equipment purchases contracts/11/, CTI verified that the technical parameters listed in above tables are correct and actual and consistent with PD.

The approved consolidated methodology applied in the grouped project activity is ACM0002 “Grid-connected electricity generation from renewable sources” (Version 16.0)/22/. Also refers to the latest approved version of the following tools and guidelines:

- “Tool to calculate the emission factor for an electricity system” (version 04.0)/23/;
- “Tool for the demonstration and assessment of additionality” (Version 7.0.0)/24/

Via on-site inspection and interview with the grouped project implementer, CTI verified that the grouped project contributes the sustainable development goal through the following aspects:

- *SDG 1 No Poverty: bring significant income to the local village by selling the emission reduction credit by implementation of the grouped project– verified by checking the Emission Reduction Calculation sheet /2/;*
- *SDG 7 Affordable and Clean Energy: displace the power generation of fossil fuel power plants, reducing CO₂, SO_x and NO_x emissions significantly – verified by checking the Emission Reduction Calculation sheet/2/;*
- *SDG 9 Industry, Innovation and Infrastructure: promote application and diffusion of the innovative/creative solar PV technology in China verified by checking the project implementation and interview with local officers.*

Via checking the validation report/4/, CTI verified that there were no any previously validated methodology deviations.

In conclusion, Verification Team was able to confirm that the grouped project implementation is in accordance with the grouped project description contained in the registered PD/3/.

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

4.2 Safeguards

4.2.1 No Net Harm

The analysis of the potential environmental and socio-economic impacts of the project activity is described in MR/1/. The assessment is as below,

The grouped project has no negative environmental impact and social economic impact as it results in zero GHG emissions due to installation and operation of clean and renewable energy technology for electricity generation.

By checking Environmental Impact Assessment (EIA) Reports/6/ for the initial 7 instances, also Environmental Impact Assessment approvals of the initial 7 instances issued by Local Environmental Protection Bureau/7/, the verification team confirm all environmental impacts has been analyzed and no net harm was detected.

Besides, no potential environment or social economic matter was found during the site visit. The project is renewable energy project and thus no net harm observed in air or water quality on-site thus no negative environmental and socio-economic impacts during this verification period.

Furthermore, via site inspection, CTI confirmed that the project using clean renewable energy to reduce greenhouse gas emissions and the environmental pollution. Meanwhile, the implementation of the project improved local socio-economic development through creating career opportunities and paying taxes which has been confirmed by site interview with local officer and resident.

4.2.2 Local Stakeholder Consultation

A stakeholder survey was carried out by the grouped project developer in October 2013 during the project preparation stage.

Representatives of relevant personnel of local government, and surrounding villages within the project boundary of these seven projects were invited to attend the survey, totally 210 copies of questionnaires were issued to relevant representatives with all pieces of reply received. The stakeholders' comments from questionnaires were assessed during the validation process/4/.

During the implementation stage of this monitoring period, via checking the local communication survey records/18/ and interview with the local officers and local residents during site visit, it is confirmed that the local authority has conducted follow-up interviews and ongoing communication with local stakeholders to collect any comments or inputs to the grouped project implementation. Based on the verification team's expertise, it is confirmed that the local government agencies and competent authorities conducted spot checks on the implementation of the grouped project from time to time as per the request from the local government's regulations.

Moreover, the grouped project owner carried out two questionnaire surveys for the local stakeholder to collect the relevant comments and suggestions in January 2015 and May 2017 during this monitoring period. Via checking the filled 70 questionnaires/18/, interview with the local officer and local resident during site visit, it is verified that 100% of respondents agreed with the development of the Project and 100% believed that the project will have positive impact on local economic development.

And via checking the filled 70 questionnaires/18/, it is confirmed that no one thinks that the grouped project will have a negative impact on the local life. Hence there is no need to change the grouped project design based on the stakeholder inputs and CTI confirmed that all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals which in compliance with the VCS requirements.

CL 02 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.3 AFOLU-Specific Safeguards

N.A.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

4.4.1 Assessment of Data and parameters Available at Validation

By means of comparison of the MR/1/ and the ER calculation/2/ with the registered PD/3/, the verification team has checked whether all parameters fixed ex-ante have been applied correctly.

The parameters that are fixed ex ante are following:

Parameters	Source of data	Values applied	Demonstration by Verification team
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$EF_{OM,y}$ - Operating margin emission factor of the grid connected by each instance	Data derived from “2014 Baseline Emission Factors for Regional Power Grids in China” issued by China’s DNA in February. 4, 2015, which has been verified and determined in the registered PD, validation report.	Northwest Power Grid: 0.9578	This is an ex-ante fixed value during first 10 years crediting period, the value is verified as consistent among the registered PD/3/ and the validation report/4/.
$EF_{BM,y}$ - Operating margin emission factor of the grid connected by each instance	Data derived from “2014 Baseline Emission Factors for Regional Power Grids in China” issued by China’s DNA in February. 4, 2015, which has been verified and determined in the registered PD, validation report.	Northwest Power Grid: 0.4512	This is an ex-ante fixed value during first 10 years crediting period, the value is verified as consistent among the registered PD/3/ and the validation report/4/.
$EF_{grid,CM,y}$ - Combined margin CO ₂ emission factor for grid connected by each instance	Data derived from “2014 Baseline Emission Factors for Regional Power Grids in China” issued by China’s DNA in February. 4, 2015, which has been verified and determined in the registered PD, validation report.	Northwest Power Grid: 0.83115	This is an ex-ante fixed value during first 10 years crediting period, the value is verified as consistent among the registered PD/3/ and the validation report/4/.

In conclusion, the parameter fixed ex ante has been indicated in the registered PD/3/. And the MR is checked as in line with the PD/3/.

4.4.2 Assessment of Data and parameters Monitored

During the verification all relevant monitoring parameters as listed in PD/3/ have been verified and summarized in the below table.

$EG_{facility,y}$	Net quantity of electricity delivered to the grid by a typical instance in year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes – MWh
Appropriate description?	Yes
Monitored Value?	1,522,819.617 (Refer to ER sheet for details of each instance)
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes—it is monitored by electric meters installed at project site of each instance with accuracy at least 0.5s
Choice of data correctly justified?	Yes –monitored by electric meters installed at project site of each instance
Measurement method and procedures correctly described?	Yes –it is monitored by bi-directional electric meters installed at project site of each instance with accuracy at least 0.5s for measuring both the Electricity delivered and imported from grid as per the power purchase agreement/13/.

	The meters monitor the electricity generation by the grouped project activity. The meter readings are recorded by the operators monthly/9/. Meanwhile, the automatic monitoring system will collect the data from the meters every month and deliver them to the PP. The meter readings are recorded by the PP, based on that, related transaction receipts/10/ have been issued. The PP gather all the values from initial 7 instances and get the total value $EG_{facility,y}$.
Calculation method?	Yes – the net quantity of electricity delivered to the grid by a typical instance is calculate by electricity delivered to grid minus the electricity imported from grid monthly. The value for this monitoring period is the sum of monthly data/9/ of initial 7 instances
Monitoring frequency correctly described?	Continuously measured and monthly recorded/9/ - verified as per PD/3/ and the applied methodology/22/ At 24:00 on last day of each month for each instance, the monitoring team record the bidirectional electricity meter's readings and complete Meter Reading Records/9/. The staff from power grid company issue the electricity transaction receipts/10/ according to the meter readings monthly.
Monitoring equipment correctly described?	Refer to Appendix 5 for the details of each monitoring device. The model, serial No., accuracy class and calibration information of the equipment used has been provided, the electricity meters were calibrated by qualified third parties/17/ annually, which are confirmed in line with the frequency defined in PD as once in one year, by checking the calibration report/16/, it is confirmed that the calibration for this equipment was valid for this monitoring period.
QA/QC procedure correctly described?	Yes- the electricity transaction receipts/10/ have been used for cross-check and via comparing the electricity transaction receipts/10/ for this motoring period with the electricity meter reading records/9/ of each instance, CTI verified that the values are conservative. The calibration frequency of electricity meters with accuracy of at least 0.5s is verified in compliance with national standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2000 and DL/T 448-2016)/20/.
Purpose of data?	Calculation of baseline emission
Comments?	N/A

$EG_{output,y}$	Electricity delivered by a typical instance to the grid in year y
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes – MWh
Appropriate description?	Yes
Monitored Value?	1,563,384.329 (Refer to ER sheet for details of each instance)
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes–it is monitored by electric meters installed at project site of each instance with accuracy at least 0.5s
Choice of data correctly justified?	Yes –monitored by electric meters installed at project site of each instance
Measurement method and procedures correctly described?	Yes –it is monitored by bi-directional electric meters installed at project site of each instance with accuracy at least 0.5s for measuring both the Electricity delivered and imported from grid as per the power purchase agreement/13/.

	The meters monitor the electricity generation by the grouped project activity. The meter readings are recorded by the operators monthly/9/. Meanwhile, the automatic monitoring system will collect the data from the meters every month and deliver them to the PP. The meter readings are recorded by the PP, based on that, related transaction receipts/10/ have been issued. The PP gather all the values from initial 7 instances and get the total value of $EG_{output,y}$.
Calculation method?	Yes – The value for this monitoring period is the sum of monthly data/9/ of initial 7 instances
Monitoring frequency correctly described?	Continuously measured and monthly recorded/9/ - verified as per PD/3/ and the applied methodology/22/ At 24:00 on last day of each month for each instance, the monitoring team record the bidirectional electricity meter's readings and complete Meter Reading Records/9/. The staff from power grid company issue the electricity transaction receipts/10/ according to the meter readings monthly.
Monitoring equipment correctly described?	Refer to Appendix 5 for the details of each monitoring device. The model, serial No., accuracy class and calibration information of the equipment used has been provided, the electricity meters were calibrated by qualified third parties/17/ annually, which are confirmed in line with the frequency defined in PD as once in one year, by checking the calibration report/16/, it is confirmed that the calibration for this equipment was valid for this monitoring period.
QA/QC procedure correctly described?	Yes- the electricity transaction receipts/10/ have been used for cross-check and via comparing the electricity transaction receipts/10/ for this motoring period with the electricity meter reading records/9/ of each instance, CTI verified that the values are conservative. The calibration frequency of electricity meters with accuracy of at least 0.5s is verified in compliance with national standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2000 and DL/T 448-2016)/20/.
Purpose of data?	Calculation of baseline emission
Comments?	N/A

$EG_{input,y}$	<i>Electricity imported by a typical instance to the grid in year y</i>
Title in line with Methodology?	Yes
Data unit correctly expressed?	Yes – MWh
Appropriate description?	Yes
Monitored Value?	40,564.712 (Refer to ER sheet for details of each instance)
Correct value provided?	Yes
Source clearly referenced? (appropriate?)	Yes–it is monitored by electric meters installed at project site of each instance with accuracy at least 0.5s
Choice of data correctly justified?	Yes –monitored by electric meters installed at project site of each instance
Measurement method and procedures correctly described?	Yes –it is monitored by bi-directional electric meters installed at project site of each instance with accuracy at least 0.5s for measuring both the Electricity delivered and imported from grid as per the power purchase agreement/13/. The meters monitor the electricity imported by the grouped project activity. The meter readings are recorded by the operators monthly/9/. Meanwhile, the automatic monitoring system will collect

	the data from the meters every month and deliver them to the PP. The meter readings are recorded by the PP, based on that, related transaction receipts/10/ have been issued. The PP gather all the values from initial 7 instances and get the total value of $EG_{output,y}$.
Calculation method?	Yes – The value for this monitoring period is the sum of monthly data/9/ of initial 7 instances
Monitoring frequency correctly described?	Continuously measured and monthly recorded/9/ - verified as per PD/3/ and the applied methodology/22/ At 24:00 on last day of each month for each instance, the monitoring team record the bidirectional electricity meter's readings and complete Meter Reading Records/9/. The staff from power grid company issue the electricity transaction receipts/10/ according to the meter readings monthly.
Monitoring equipment correctly described?	Refer to Appendix 5 for the details of each monitoring device. The model, serial No., accuracy class and calibration information of the equipment used has been provided, the electricity meters were calibrated by qualified third parties/17/ annually, which are confirmed in line with the frequency defined in PD as once in one year, by checking the calibration report/16/, it is confirmed that the calibration for this equipment was valid for this monitoring period.
QA/QC procedure correctly described?	Yes- the electricity transaction receipts/10/ have been used for cross-check and via comparing the electricity transaction receipts/10/ for this motoring period with the electricity meter reading records/9/ of each instance, CTI verified that the values are conservative. The calibration frequency of electricity meters with accuracy of at least 0.5s is verified in compliance with national standard Technical Administrative Code of Electric Energy Metering (DL/T 448-2000 and DL/T 448-2016)/20/.
Purpose of data?	Calculation of baseline emission
Comments?	N/A

In conclusion, CTI confirmed that all monitoring parameters have been measured / determined without material misstatements and in line with PD/3/, applied methodology, all applicable standards and relevant requirements.

CAR 03 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.3 Assessment of in Compliance with monitoring plan

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

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

The verification team has checked the monitoring system in MR against the applied methodology and monitoring plan of the PD.

The monitoring system has been operated as per the monitoring plan in the PD as in compliance with the latest applicable version of the methodology (ACM0002 Version 16.0)/22/.

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

Monitoring structure

The PD contains a diagram illustrating the Management structure of VCS monitoring to be implemented by the PP of each instance in order to implement the grouped project activity. Via the MR and PD, the monitoring team consists of the project manager, data processing and reporting staffs and QA/QC staffs and by site interview with the monitoring representatives of each instance, CTI confirmed that the roles of the monitoring team of each instance have been clearly defined and the responsibilities have been implemented by monitoring team of each instance sufficiently. The organizational structure is considered sufficient to fulfil the monitoring requirements of the methodology and to ensure that emission reductions can be verified.

Monitoring process

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

The MR contains diagrams illustrating each instance monitoring diagram which is confirmed as consistent with the Grid-connected wiring diagram/12/, Power purchase agreement/13/ and verified as actual by site inspection.

The monitoring procedures applied by the project compliance with the registered monitoring plan/3/ is demonstrated as below:

For monitoring parameters, the Net quantity of electricity delivered to the grid by a typical instance in year y is calculated as follows:

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

Where:

$EG_{facility,y}$ = Net quantity of electricity delivered to the grid by a typical instance in year y

$EG_{output,y}$ = Electricity delivered by a typical instance to the grid in year y

$EG_{input,y}$ = Electricity imported by a typical instance to the grid in year y

Electricity delivered by a typical instance to the grid in year y ($EG_{output,y}$) and Electricity imported by a typical instance to the grid in year y ($EG_{input,y}$) are monitored by bi-directional main electricity meters which are installed at project site of each instance. Besides, backup bi-direction electricity meters are installed at the plant of each instance for backup, the accuracy of both meters is at least 0.5s.

Main meter is recorded by grid company and/or PP according to the Power Purchase Agreement/13/, and based on the monthly meter reading records/9/, the grid company issued monthly Electricity Transaction receipts/10/ to each instance.

The data from the receipts is crossed checked with the data from meter. The lower value for the exported electricity and the higher value for the imported electricity between receipts and meters are used for emission reduction calculation which is verified as conservative.

For all the monitored parameters, refer to above tables in section 4.4.2 for detail assessment of the monitoring method and process.

All monitoring devices were calibrated/16/ by qualified third parties/17/ in line with the national calibration standard and applied methodology and PD.

Data Management

Via site inspection, CTI verified that all monitoring data are well kept with both electronic copy and hard copy. All data collected as part of monitoring will be archived and be kept at least for 2 years after the end of the crediting period.

QA/QC

The accuracy of all the monitoring devices is in line with the related requirements as confirmed in the calibration report/16/. Calibration of equipment has been implemented periodically by qualified party/17/ according to national standards and rules/16/. All the records have been documented by the PP.

The monitoring team was trained for basic conception and management of the grouped project activity by checking the training records of each instance/15/, specific staff collected the measured methane values and electricity data regularly and complete the corresponding records, keeping all the data collected as part of monitoring archived electronically. Internal audit was conducted by QA/QC manager for cross check all the data.

Emergency procedure

Monitoring team of each instance will take actions to deal with emergencies if any malfunction and the monitoring data can't be calculated conservatively for emission calculations.

By site interview with monitoring staff of each instance and checking the related evidence for data/14/,/9/,/10/,/16/, CTI verified that no emergency situations have been occurred. Thus no emergency procedure was used for this monitoring period.

Based on above assessment, CTI verified that the monitoring system complies with the applied methodology and the monitoring plan and all applied procedures are completely in compliance to the methodology ACM0002 (Version 16.0) and PD.

CL 03 and CAR 04 were raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.4.4 Compliance with the calibration frequency requirements for measuring instruments

During the verification the relevant monitoring equipment has been checked whether the calibration requirements have been met; especially if the calibration frequency is in line with the requirements of the registered PD/3/ and/or the applicable calibration standards.

The information of monitoring equipment used for monitoring in this monitoring period is listed in PD and the calibration information/16/ has been assessed in above section 4.4.2 in each monitoring parameter table.

Furthermore, via checking the certificate of third party who conducted the calibration/17/, CTI confirmed that the third party get the related qualification.

In conclusion, the equipment used for monitoring is controlled and calibrated in accordance with the monitoring plan in PD. Based on that CTI can confirm that all installed monitoring equipment has been duly calibrated for this entire monitoring period.

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

4.4.5.1 Calculation of baseline GHG emissions or removals

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

$$BE_y = EG_{facility,y} \times EF_{grid,CM,y}$$

Where:

- BE_y = Baseline emissions in yeay y (tCO₂e)
- $EG_{facility,y}$ = Net quantity of electricity delivered to the grid by a typical instance in year y (MWh)
- $EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected by each instance (tCO₂e/MWh)

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

Where:

- $EG_{facility,y}$ = Net quantity of electricity delivered to the grid by a typical instance in year y
- $EG_{output,y}$ = Electricity delivered by a typical instance to the grid in year y
- $EG_{input,y}$ = Electricity imported by a typical instance to the grid in year y

Table 4-10 Baseline Emission calculation during this monitoring period

Year	$EG_{facility,y}$ (MWh)	$EF_{grid,CM,y}$ (tCO ₂ e/MWh)	BE_y (tCO ₂ e)
23-January-2013~31-December-2013	108,005.828	0.83115	89,767
01-January-2014~31-December-2014	300,946.554	0.83115	250,129
01-January-2015~31-December-2015	272,160.309	0.83115	226,202
01-January-2016~31-December-2016	252,968.752	0.83115	210,252

01-January-2017~31-December-2017	269,786.967	0.83115	224,230
01-January-2018~31-December-2018	318,951.207	0.83115	265,092
Total	1,522,819.617	-	1,265,672

The electricity data for each instance has been verified by checking the meter reading records/9/ and cross check with transaction receipts/10/, it is confirmed that the original values in ER sheet and final values in MR are actual and correct and conservative for ER calculation.

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

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

According to the PD and methodology, for solar power project activity, $PE_y = 0$, hence the grouped project emissions is 0.

4.4.5.3 Calculation of leakage GHG emissions

In accordance with the PD and methodology, the leakage is not considered.

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

The verification team has checked the MR includes a summary table of the emission reductions calculation. Summary of emission reductions during the monitoring period,

$$ER_y = BE_y - PE_y - LE_y$$

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

Table 4-11 Emission Reductions Calculation during this monitoring period

Parameters Period	Baseline Emissions BE_y	Project Emissions PE_y	Leakage Emissions LE_y	Net GHG emission reductions or removals ER
	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
23-January-2013~31-December-2013	89,767	0	0	89,767
01-January-2014~31-December-2014	250,129	0	0	250,129
01-January-2015~31-December-2015	226,202	0	0	226,202
01-January-2016~31-December-2016	210,252	0	0	210,252
01-January-2017~31-December-2017	224,230	0	0	224,230
01-January-2018~31-December-2018	265,092	0	0	265,092
Total	1,265,672	0	0	1,265,672

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

Via checking the values in MR/1/ against the ER calculation sheet/2/, CTI confirmed that the emission reductions calculation is overall correct.

4.4.5.5 Comparison of actual GHG emission reductions or net anthropogenic GHG removals by sinks with estimates in registered PD

The comparison of actual values of the monitoring period with the estimations in the registered PD has been carried out by VVB.

As per the PD/3/, VVB confirmed that the annual estimated emission reduction is 302,268 tCO₂e, thus the estimated emission reduction in this monitoring period is 1,730,853 tCO₂e, i.e. $1,730,853 \text{ tCO}_2\text{e} = 302,268 \text{ tCO}_2\text{e} \times 2,169 \text{ days} / 365 \text{ days}$. The actual emission reductions in this monitoring period are 1,265,672 tCO₂e, which is 26.88% less than the estimation in the registered PD/3/.

Via checking with the commission started date of different instances, CTI compared with the estimated emission reduction and actual emission reduction achieved in this monitoring period for each instance, it is confirmed that the actual emission reductions in this monitoring period are less than the estimation in the registered PD/3/ for each instance. Via site inspection and interview with the operation staffs, it is verified that all the instances were operated normally but due to the supplied electricity ration and equipment maintenance and the illumination intensity in some months is insufficient, so the variation is considered as within a reasonable range for solar power projects based on the expertise of verification team.

PP has listed the comparison result in the MR/1/ and ER sheet/2/, and the related reason has been clarified in the MR which is verified by CTI as correct and reasonable.

CL 04 was raised and successfully closed. Refer to Appendix 4 for detail assessment.

4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

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

For each reported data, the evidence is provided and verified as sufficient and quality is appropriate. Also, the cross-checks have been performed on the reported data with different source of evidence. The information flow from data generation and aggregation, to recording, calculation and final transposition into the monitoring report has been assessed by VVB in section 4.4 for each parameter and the calibration have been conducted as per the frequency of monitoring equipment defined in the registered PD.

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

4.6 Non-Permanence Risk Analysis

N/A

5. VERIFICATION CONCLUSION

Climate Bridge (Shanghai) Ltd. has commissioned the Shenzhen CTI International Certification Co., Ltd to carry out the Verified Carbon Standard (VCS) 1st periodic verification of the grouped project activity Grouped Connect Solar PV Power Generation Project in China, VCS Ref. No. 1461 for the period 23-January-2013 to 31-December-2018, with regard to the relevant requirements for VCS Version 4.1.

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

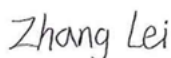
- the grouped project has been implemented and operated as per the registered PD;
- there is no project description deviation identified for this monitoring period;
- the grouped project complies with the verification criteria for projects set out in VCS Version 4.1;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS requirement;
- the monitoring is in place as per the applied monitoring methodology;
- the monitoring complies with the monitoring plan in the validated PD;

It is certified that the GHG emission reductions from the grouped project during the monitoring period amount as follows:

Verification period: From 23-January-2013 to 31-December-2018

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

Year	Baseline Emissions <i>BE_y</i>	Project Emissions <i>PE_y</i>	Leakage Emissions <i>LE_y</i>	Net GHG emission reductions or removals <i>ER</i>
	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)	(tCO ₂ e)
23-January-2013~31-December-2013	89,767	0	0	89,767
01-January-2014~31-December-2014	250,129	0	0	250,129
01-January-2015~31-December-2015	226,202	0	0	226,202
01-January-2016~31-December-2016	210,252	0	0	210,252
01-January-2017~31-December-2017	224,230	0	0	224,230
01-January-2018~31-December-2018	265,092	0	0	265,092
Total	1,265,672	0	0	1,265,672



Lei Zhang
CTI
Verification Team Leader
26-October-2021



Zhou Lu
CTI
Final Approval
26-October-2021

APPENDIX 1: ABBREVIATIONS

Abbreviations	Full texts
CA	Corrective Action / Clarification Action
CAR	Corrective Action Request
CCER	China Certified Emission Reduction
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
CP	Certification Program // Crediting Period
DverR	Draft Verification Report
EIA	Environmental Impact Assessment
ER	Emission Reduction
ETS	Emission Trading Scheme
FAR	Forward Action Request
FverR	Final Verification Report
GHG	Greenhouse gas(es)
GS	Gold Standard
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MR	Monitoring Report
NWPG	Northwest China Power Grid
PA	Project Activity
PD	Project Description
PP	Project Participant
PPA	Power Purchase Agreement
QA/QC	Quality Assurance / Quality Control
UNFCCC	United Nations Framework Convention on Climate Change
VVS	Validation and Verification Standard
VCS	Verified Carbon Standard
VCSA	Verified Carbon Standard Association
VCU	Verified Carbon Unit
VVB	Validation/Verification Body

APPENDIX 2: COMPETENCE OF TEAM MEMBERS AND TECHNICAL REVIEWERS

Mr. Lei ZHANG

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

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

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation
	TA 1.2: Energy generation from renewable energy sources
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater

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

Approved by: *Wu Lin*

Wu LIN

Technical Competent Manager

Shenzhen, 01/01/2021

Mr. Ziqi LI

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

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

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.2: Energy generation from renewable energy sources
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 5: Chemical industry	TA 5.1: Chemical industry
	TA 5.2: Caprolactam, nitric and adipic acid
SS 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	TA 11.1: Emissions of fluorinated gases
	TA 11.2: Refrigerant gas production
SS 12: Solvents use	TA 12.1: Chemical industry
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

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

Approved by:

Wu Lin

Wu LIN

Technical Competent Manager

Shenzhen, 01/01/2021

Mr. Wu LIN

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

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

Scope	Technical Area
SS 1: Energy industries (renewable/non-renewable sources)	TA 1.1: Thermal energy generation
	TA 1.2: Energy generation from renewable energy sources
SS 2: Energy distribution	TA 2.1: Electricity distribution
SS 3: Energy demand	TA 3.1: Energy demand
SS 4: Manufacturing industries	TA 4.1: Cement and lime production
SS 5: Chemical industry	TA 5.1: Chemical industry
	TA 5.2: Caprolactam, nitric and adipic acid
SS 10: Fugitive emissions from fuels (solid, oil and gas)	TA 10.1: Fugitive emissions from oil and gas
SS 11: Fugitive emissions from production and consumption of halocarbons and sulphur hexafluoride	TA 11.1: Emissions of fluorinated gases
	TA 11.2: Refrigerant gas production
SS 12: Solvents use	TA 12.1: Chemical industry
SS 13: Waste handling and disposal	TA 13.1: Solid waste and wastewater
	TA 13.2: Manure

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

Approved by:
Lu ZHOU



General Manager

Shenzhen, 01/01/2021

APPENDIX 3: DOCUMENTS REVIEWED OR REFERENCED

No	Author	Title	References to the document	Provider
1.	Climate Bridge (Shanghai) Ltd.	Monitoring Report	Monitoring Report for the 1 st monitoring period Draft version 1.0, dated 16-August-2021 Final version 2.0, dated 25-October-2021	PP
2.	Climate Bridge (Shanghai) Ltd.	Emission Reduction Calculation Sheet	Emission Reduction Calculation sheets (related to MR) Draft version 1.0, dated 16-August-2021 Final version 2.0, dated 16-October-2021	PP
3.	Climate Bridge (Shanghai) Ltd.	Project Description	VCS approved Project Description (PD) for project: "Grouped Connect Solar PV Power Generation Project in China" version 02, dated 15-June-2015	PP
4.	BV	Validation report	Validation Report for CDM project "Grouped Connect Solar PV Power Generation Project in China" version 02, dated 26-June-2015	VERRA website
5.	Local Industrial and Commercial Bureau	Business License of PP and project owner for each instance	Business License of below parties • China Three Gorges Renewables (Group) Co., Ltd. • Three Gorges New Energy Jinchang Wind Power Co., Ltd. • Wulan Jinfeng New Energy PV Power Co., Ltd. • Three Gorges New Energy Pishan Power Generation Co., Ltd. • Three Gorges New Energy Hami Wind Power Co., Ltd. • Jiuquan Zhaoyang New Energy Power Generation Co., Ltd.	PP
6.	Design Institutes	Environmental Impact Assessment	Environmental Impact Assessment Reports of the initial seven instances	PP
7.	Local Environmental Protection Bureau	EIA approval	Environmental Impact Assessment approvals of the initial seven instances issued by Local Environmental Protection Bureau	PP
8.	Project owner of each instance	Commissioning records	Commissioning records of each instance	PP
9.	Project owner of each instance	Meter Reading Records	Monthly Meter reading records of all the electricity meters of initial seven instances covering this monitoring period	PP

No	Author	Title	References to the document	Provider
10.	Project owner of each instance	Electricity transaction receipts	Monthly electricity transaction receipts of initial seven instances covering this monitoring period	PP
11.	Project owner of each instance	Equipment purchase contract	Equipment purchase contract including - Purchase contracts of polycrystalline silicon solar cells of the initial seven instances - Purchase contracts of inverter of the initial seven instances - Technical agreements of the installed equipments of the initial seven instances	PP
12.	Project owner of each instance	Grid-connected wiring diagram	Grid-connected wiring diagrams of the initial seven instances	PP
13.	Project owner of each instance and local grid company	Power Purchase Agreement	Power Purchase Agreement signed by both project owner of each instance and local grid company valid for this monitoring period	PP
14.	Project owner of each instance and local grid company	LOG	- Sample copy of project operation records - Equipment daily check log - Equipment mandatory maintenance records	PP
15.	China Three Gorges Renewables (Group) Co., Ltd. and Project owner of each instance	Training and Competence Records	Project Responsibilities, Training and Competence Records of each instance - Project Organization Chart and responsibilities - Staff Training Records of each instance - Operator Certificates of each instance	PP
16.	State Grid Gansu Electric Power Company Electric Power Research Institute Metrology Center	Calibration certificates	Calibration Certificates for M1, M2 of Instance 01 and 02, 06 and 07 covering this monitoring period (detail calibrated time refer to Appendix 5)	PP
	Qinghai Province Electric Energy Measurement and Verification Center		Calibration Certificates for M1 and M2 of Instance 03 covering this monitoring period (detail calibrated time refer to Appendix 5)	
	Xinjiang Electric Power Research Institute		Calibration Certificates for M1, M2 and M3 of Instance 04 covering this monitoring period (detail calibrated time refer to Appendix 5)	
	Xinjiang Electric Power Research Institute		Calibration Certificates for M1, M2 of Instance 05 covering this monitoring period (detail calibrated time refer to Appendix 5)	

No	Author	Title	References to the document	Provider
17.	Gansu Provincial Bureau of Quality and Technical Supervision	Certificate of Metrological Authorization	Certificate of metrological authorization to State Grid Gansu Electric Power Company Electric Power Research Institute Metrology Center i. valid from 29-September-2012 to 28-September-2015 ii. valid from 29-September-2015 to 28-September-2018 ii. valid from 29-September-2018 to 28-September-2022	PP
	Qinghai Provincial Bureau of Quality and Technical Supervision		Certificate of metrological authorization to Qinghai Province Electric Energy Measurement and Verification Center, valid from 25-July-2011 to 24-July-2019	
	Xinjiang Provincial Bureau of Quality and Technical Supervision		Certificate of metrological authorization to Xinjiang Electric Power Research Institute, i. valid from 10-April-2013 to 09-April-2018 ii. valid from 20-April-2015 to 19-April-2019	
18.	PP and local stakeholder	Local stakeholder consultation records	local stakeholder communication survey filled questionnaires conducted in January 2015 and May 2017	PP
19.	China Three Gorges Renewables (Group) Co., Ltd.	Statement	Statement of No double counting dated 11-October-2021	PP
20.	National Energy Bureau	DL/T 448-2000 DL/T 448-2016	Technical Administrative Code of Electric Energy Metering (DL/T 448-2000, DL/T 448-2016)	Public website
21.	On-site verification team	Photographs of Project Site	Photographs of each instance solar power plant site, Central Control Room, DCS System, all the meters and nameplate of the equipment taken by verification team during the on-site verification	On-site Verification team
22.	UNFCCC	Applied methodology	Approved CDM methodology ACM0002: "Grid-connected electricity generation from renewable sources" (Version 16.0)	UNFCCC Website
23.	UNFCCC	Tool	"Tool to calculate the emission factor for an electricity system" (version 04.0)	UNFCCC Website
24.	UNFCCC	Tool	"Tool for the demonstration and assessment of additionality" (Version 7.0.0)	UNFCCC Website
25.	VERRA	Monitoring Report Template	VCS- Monitoring-Report -Template-v4.0	VERRA
26.	VERRA	VCS Program Definitions	VCS Program Definitions, v4.1	VCS website

No	Author	Title	References to the document	Provider
27.	VERRA	VCS Program Guide	VCS Program Guide, v4.0	VCS website
28.	VERRA	VCS Standard	VCS Standard, v4.1	VCS website
29.	China CER Exchange Info-platform	China CER	http://cdm.ccchina.org.cn/ccer.aspx	Website
30.	Google	Google Earth Map	earth.google.com	Website
31.	GS	Gold Standard	http://www.goldstandard.org/	Website
32.	Intergovernmental Panel on Climate Change	IPCC Guidelines	2016 IPCC Guidelines for National Greenhouse Gas Inventories: work book	www.ipcc-nggip.iges.or.jp
33.	UNFCCC	UNFCCC	http://cdm.unfccc.int	Website
34.	VCS	VCS	https://verra.org/project/vcs-program/	Website
35.	Ministry of Ecology and Environment of China	China cap & trade scheme	http://www.mee.gov.cn/xxgk2018/xxgk/xxgk02/202101/t20210105_816131.html	Public Website
36.	Ministry of Ecology and Environment of China	Enforced company list	http://mee.gov.cn/xxgk2018/xxgk/xxgk03/202012/W020201230736907682380.pdf	Public Website
37.	UNFCCC	CDM dedicated website for PoA 8868	https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/J7XM6V4NEI30WB01GRYPT9HDKUA2ZL/view	UNFCCC Website
38.	VERRA	VCS dedicated website for grouped project	https://registry.verra.org/app/projectDetail/34/1461	VERRA Website
39.	China Three Gorges Renewables (Group) Co., Ltd.	Statement of Change English Name	Statement of Change English Name of PP	China Three Gorges Renewables (Group) Co., Ltd.

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

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

FAR ID	N/A	Section no.		Date:
Description of FAR				
Project participant response				Date:
Documentation provided by project participant				
VVB assessment				Date:

Table 2. CL from this verification

CL ID	01	Section no.	1.9	Date : 27/08/2021
Description of CL				
In section 1.9,				
1. The evidence of project owner confirmed there is no double counting is not provided.				
2. The demonstration of no double counting is not complete, only confirmed by project owner is not sufficient.				
Project participant response				Date : 16/10/2021
1. The evidence of no double counting confirmation is provided by the project owner.				
2. After checking on the CDM website and the other platforms, the seven instances didn't register or seek registration under the other GHG programs.				
China has a national emissions trading scheme only cover the high-emission industries, such as thermal power generation, petrochemical, chemical, building materials, iron and steel, non-ferrous, paper, aviation and other key emission industries that emitted at least 26,000 tons of CO ₂ e/year, not including renewable project. And the project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the project owner according to the enforced company list in public information. Hence, it is confirmed that the emission reductions will not be double counted.				
The project does not reduce GHG emissions from activities that are included in an emissions trading program or any other mechanism that includes GHG allowance trading				
Documentation provided by project participant				
/1/- version 2.0				
/19/				
VVB assessment				Date: 22/10/2021
1. The statement of no double counting/19/ has been provided by PP which is confirmed as reasonable.				
2. The revised MR is checked, CTI confirmed that the information has been supplemented. Based on VVB's local expertise, China has a national emissions trading scheme only cover the high-emission industries, such as power generation sector that emitted at least 26,000 tons of CO ₂ e/year which has been verified in the public website/35/, and it is confirmed that the grouped project activity is not included the mandatory emission control scheme and there is no emission cap enforced for the grouped project owner by checking the enforced company list in public information/36/. Hence, it is confirmed that the emission reductions will not be double counted.				

CL 01 is closed.

CL ID	02	Section no.	2.2	Date : 27/08/2021
Description of CAR				
The detail information of the questionnaire survey for the local stakeholder to collect the relevant comments and suggestions in January 2015 and May 2017 are not provided.				
Project participant response				Date : 16/10/2021
During this monitoring period, the project owner has conducted two local stakeholder and consultations in January 2015 and May 2017, and the questionnaires have been distributed to understand the local residents' opinion. The project owner interviewed 70 local residents each time and there is no negative response, the summary of response and the category of participants are detailed in the report.				
Documentation provided by project participant				
/1/- version 2.0 /18/				
VVB assessment				Date: 22/10/2021
The revised MR is checked, CTI confirmed that the information has been provided. During the implementation stage of this monitoring period, via checking the local communication survey records/18/ and interview with the local officers and local residents during site visit, it is confirmed that the local authority has conducted follow-up interviews and ongoing communication with local stakeholders to collect any comments or inputs to the grouped project implementation. Based on the verification team's expertise, it is confirmed that the local government agencies and competent authorities conducted spot checks on the implementation of the grouped project from time to time as per the request from the local government's regulations. Moreover, the grouped project owner carried out two questionnaire surveys for the local stakeholder to collect the relevant comments and suggestions in January 2015 and May 2017 during this monitoring period. Via checking the filled 70 questionnaires/18/, interview with the local officer and local resident during site visit, it is verified that 100% of respondents agreed with the development of the Project and 100% believed that the project will have positive impact on local economic development. And via checking the filled 70 questionnaires/18/, it is confirmed that no one thinks that the grouped project will have a negative impact on the local life. Hence there is no need to change the grouped project design based on the stakeholder inputs and CTI confirmed that all the processes have been implemented to receive comments from local stakeholders as well as communicate with them at periodic intervals which in compliance with the VCS requirements.				
CL 02 is closed.				

CL ID	03	Section no.	4.3	Date : 27/08/2021
Description of CL				
In section 4.3, the roles and responsibilities of the monitoring staffs in the organization in Figure 4-1 are not clarified.				
Project participant response				Date : 16/10/2021
An emission team is established and consists of project manager, data processing and reporting staff, QA&QC staff, and staff. The staffs would record the electricity in real time and submit the data to the data processing and reporting staff monthly. The data processing and reporting staff and QA&QC staff are appointed by the project owner, who supervise and verify metering and recording, collect data (the data on the meter, sales/purchasing invoice or the balance bill), calculate emission reductions and prepare monitoring report. The project manager takes the responsibility for the monitoring plan implementation.				
Documentation provided by project participant				
/1/- version 2.0				
VVB assessment				Date: 22/10/2021

The revised MR is checked, CTI confirmed that the information has been added.
The roles and responsibilities of the monitoring staffs in the organization of each instance has been elaborated and confirmed as actual and correct by site inspection and interview.
CL 03 is closed.

CL ID	04	Section no.	5.4	Date : 27/08/2021
Description of CAR				
In section 5.4 and ER sheet,				
1. The reason of why the variation between the estimated value and actual value is -26.88% is not complete due to some instance not started from the first day of this monitoring period.				
2. The comparison between estimated value and actual value for each instance is not provided.				
Project participant response				Date : 16/10/2021
1. The commission dates of instance are different: the earliest commission date is Instance 03 Wulan Station, 23-01-2013, and the latest date is Instance 02 Heqingtian Station, 26-12-2013, there is a large gap between different instances start date, but the starting time of the grouped project is calculated from the earliest operation date of the instance, so it is normal to have an error between the actual power generation and the expected power generation. The Table 5-2 presents all the instances' commission date. (2). Due to the supplied electricity ration and equipment maintenance, the illumination intensity in some months is insufficient.				
2. The table of comparison between the estimated value and actual value was added in the ER and MR.				
Documentation provided by project participant				
/1/- version 2.0				
/2/- version 2.0				
/9/				
VVB assessment				Date: 22/10/2021
1. The revised MR is checked, CTI confirmed that the information has been added. Via checking with the commission started date of different instances, CTI compared with the estimated emission reduction and actual emission reduction achieved in this monitoring period for each instance, it is confirmed that the actual emission reductions in this monitoring period are less than the estimation in the registered PD/3/ for each instance. Via site inspection and interview with the operation staffs, it is verified that all the instances were operated normally but due to the supplied electricity ration and equipment maintenance and the illumination intensity in some months is insufficient, so the variation is considered as within a reasonable range for solar power projects based on the expertise of verification team. PP has listed the comparison result in the MR/1/ and ER sheet/2/, and the related reason has been clarified in the MR which is verified by CTI as correct and reasonable.				
2. The revised MR and ER sheet is checked, CTI confirmed that the information has been added accordingly.				
CL 04 is closed.				

Table 3. CAR from this verification

CAR ID	01	Section no.	1.1	Date : 27/08/2021
Description of CAR				
In section 1.1, the dates of construction is missing as per the template request.				
Project participant response				Date : 16/10/2021
According to the document provided by project owner, the construction date is listed in the report, the earliest is 25-August-2012 and the latest is 10-October-2013.				
Documentation provided by project participant				
/1/- version 2.0				
VVB assessment				Date: 22/10/2021

The revised MR is checked, CTI confirmed that the information has been provided which is confirmed as in line with the information in PDD and validation report.
CAR 01 is closed.

CAR ID	02	Section no.	3.1	Date : 27/08/2021
Description of CAR				
For each instance, the technical process of the solar photovoltaic based power station is not complete, how the electricity generated and finally supplied to grid is not clarified and related technical diagram is missing.				
Project participant response				Date : 16/10/2021
The electricity generation processes and the technical diagrams of each instance were added in the report.				
Documentation provided by project participant				
/1/- version 2.0 /12/ /13/				
VVB assessment				Date: 22/10/2021
The revised MR is checked, CTI confirmed that the related information and technical diagrams of each instance has been provided which is verified as correct by site inspection and checking the Grid-connected wiring diagram/12/ and Power Purchase Agreement/13/. CAR 02 is closed.				

CAR ID	03	Section no.	4.2	Date : 27/08/2021
Description of CAR				
For monitored parameter $EG_{facility,y}$, how the meter measuring both electricity output and input and calculation method of $EG_{facility,y}$ is missing.				
Project participant response				Date : 16/10/2021
The net electricity supplied to the Grid by the Project is calculated through electricity supplied by the Project to the grid ($EG_{output,y}$) minus electricity purchased from the Grid ($EG_{input,y}$).				
Documentation provided by project participant				
/1/- version 2.0 /10/ /9/				
VVB assessment				Date: 22/10/2021
The revised MR is checked, CTI confirmed that the information has been added accordingly and verified as correct by checking the meter reading records/9/ and transaction receipts/10/ for both electricity imported and exported. CAR 03 is closed.				

CAR ID	04	Section no.	4.3	Date : 27/08/2021
Description of CAR				
For monitoring system, the diagram for each instance is not provided to illustrate the monitoring equipment and system.				
Project participant response				Date : 16/10/2021
The diagrams of monitoring system for each instance are added in the report.				
Documentation provided by project participant				
/1/- version 2.0 /12/ /13/				
VVB assessment				Date: 22/10/2021

The revised MR is checked, CTI confirmed that the diagram of monitoring system for each instance is provided which is confirmed as correct and actual by checking the Grid-connected wiring diagram/12/ and Power Purchase Agreement/13/.
CAR 04 is closed.

Table 4. FAR from this verification

FAR ID	N/A	Section No.	-	Date: -
Description of FAR				
Project participant response				Date: -
Documentation provided by project participant				
VVB assessment				Date:

APPENDIX 5: CALIBRATION DATES AND VALIDITY OF INSTALLED MONITORING EQUIPMENT

Monitoring equipment	Related monitoring parameter as per applicable registered monitoring plan	Serial number	Type	Accuracy or accuracy class	Previous calibration (last calibration before start of this monitoring period)	Calibration date(s) during this monitoring period	Validity of calibration(s)	Delay in calibration: yes/no	Period of delayed calibration
Instance 01-M1	$EG_{output,y}$ $EG_{input,y}$	41600068	WU.TE.432q	0.2s	27-Apr-2012	26-Apr-2013 25-Apr-2014 24-Apr-2015 23-Apr-2016 22-Apr-2017 21-Apr-2018	27-Apr-2012~ 20-Apr-2019	☒ No ☐ Yes	From: To:
Instance 01-M2	$EG_{output,y}$ $EG_{input,y}$	41600067	WU.TE.432q	0.2s	27-Apr-2012	26-Apr-2013 25-Apr-2014 24-Apr-2015 23-Apr-2016 22-Apr-2017 21-Apr-2018	27-Apr-2012~ 20-Apr-2019	☒ No ☐ Yes	From: To:
Instance 02-M1	$EG_{output,y}$ $EG_{input,y}$	41600068	WU.TE.432q	0.2s	27-Apr-2012	26-Apr-2013 25-Apr-2014 24-Apr-2015 23-Apr-2016 22-Apr-2017 21-Apr-2018	27-Apr-2012~ 20-Apr-2019	☒ No ☐ Yes	From: To:
Instance 02-M2	$EG_{output,y}$ $EG_{input,y}$	41600067	WU.TE.432q	0.2s	27-Apr-2012	26-Apr-2013 25-Apr-2014 24-Apr-2015 23-Apr-2016	27-Apr-2012~ 20-Apr-2019	☒ No ☐ Yes	From: To:

						22-Apr-2017 21-Apr-2018			
Instance 03-M1	$EG_{output,y}$ $EG_{input,y}$	01200309	DTSD341	0.2s	05-Dec-2012	04-Dec-2013 03-Dec-2014 02-Dec-2015 01-Dec-2016 30-Nov-2017 29-Nov-2018	05-Dec-2012 ~ 28-Nov-2019	☒ No ☐ Yes	From: To:
Instance 03-M2	$EG_{output,y}$ $EG_{input,y}$	01200310	DTSD341	0.2s	05-Dec-2012	04-Dec-2013 03-Dec-2014 02-Dec-2015 01-Dec-2016 30-Nov-2017 29-Nov-2018	05-Dec-2012 ~ 28-Nov-2019	☒ No ☐ Yes	From: To:
Instance 04-M1	$EG_{output,y}$ $EG_{input,y}$	7000018	DTSD341	0.2s	15-Apr-2013	08-Apr-2014 07-Apr-2015 06-Apr-2016 05-Apr-2017 04-Apr-2018	15-Apr-2013 ~ 03-Apr-2019	☒ No ☐ Yes	From: To:
Instance 04-M2	$EG_{output,y}$ $EG_{input,y}$	7000017	DTSD341	0.2s	15-Apr-2013	08-Apr-2014 07-Apr-2015 06-Apr-2016 05-Apr-2017 04-Apr-2018	15-Apr-2013 ~ 03-Apr-2019	☒ No ☐ Yes	From: To:
Instance 04-M3	$EG_{input,y}$	3383644	DSZ311	0.2s	15-Apr-2013	08-Apr-2014 07-Apr-2015 06-Apr-2016 05-Apr-2017 04-Apr-2018	15-Apr-2013 ~ 03-Apr-2019	☒ No ☐ Yes	From: To:
Instance 05-M1	$EG_{output,y}$ $EG_{input,y}$	9787408	DTSD341	0.2s	17-Jan-2013	16-Jan-2014 15-Jan-2015 14-Jan-2016 13-Jan-2017 12-Jan-2018	17-Jan-2013 ~ 11-Jan-2019	☒ No ☐ Yes	From: To:
Instance 05-M2	$EG_{output,y}$ $EG_{input,y}$	9787409	DTSD341	0.2s	17-Jan-2013	16-Jan-2014 15-Jan-2015	17-Jan-2013 ~	☒ No ☐ Yes	From: To:

						14-Jan-2016 13-Jan-2017 12-Jan-2018	11-Jan-2019		
Instance 06-M1	$EG_{output,y}$ $EG_{input,y}$	211650965	MK6E	0.2s	24-Mar-2012	23-Mar-2013 22-Mar-2014 21-Mar-2015 20-Mar-2016 19-Mar-2017 18-Mar-2018	24-Mar-2012 ~ 17-Mar-2019	☒ No ☐ Yes	From: To:
Instance 06-M2	$EG_{output,y}$ $EG_{input,y}$	211650966	MK6E	0.2s	24-Mar-2012	23-Mar-2013 22-Mar-2014 21-Mar-2015 20-Mar-2016 19-Mar-2017 18-Mar-2018	24-Mar-2012 ~ 17-Mar-2019	☒ No ☐ Yes	From: To:
Instance 07-M1	$EG_{output,y}$ $EG_{input,y}$	211650965	MK6E	0.2s	24-Mar-2012	23-Mar-2013 22-Mar-2014 21-Mar-2015 20-Mar-2016 19-Mar-2017 18-Mar-2018	24-Mar-2012 ~ 17-Mar-2019	☒ No ☐ Yes	From: To:
Instance 07-M2	$EG_{output,y}$ $EG_{input,y}$	211650966	MK6E	0.2s	24-Mar-2012	23-Mar-2013 22-Mar-2014 21-Mar-2015 20-Mar-2016 19-Mar-2017 18-Mar-2018	24-Mar-2012 ~ 17-Mar-2019	☒ No ☐ Yes	From: To: