



## VCS VERIFICATION REPORT

# NINGXIA ANGLI LINGWU PHOTOVOLTAIC GRID CONNECTED POWER PLANT PROJECT


(VCS PROJECT ID: 1143)



Document Prepared By

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### Summary:

Shenzhen CTI International Certification Co., Ltd (CTI) has performed the verification of the emission reductions reported for the project activity “Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project” (VCS Project ID: 1143) for the monitoring period 01/12/2012 to 30/11/2018, to review and determine the monitored reductions in GHG emissions that have occurred as a result of the project activity. These emission reductions are claimed as Verified Carbon Units (VCU) under the Verified Carbon Standard (VCS) version 4.

The verification was performed on the basis of VCS Programme Guide version 4.0 and VCS Standard version 4.1 for the VCS projects, as well as criteria given to provide for consistent project operations, monitoring and reporting. The verification was conducted by means of document review, follow-up interviews and site inspections, and the resolution of outstanding issues. The verification team identified no CL, CAR or FAR in this monitoring period.

In CTI’s opinion, the GHG emission reductions reported for the project in the monitoring report (version 2.0 dated 17/08/2021) are fairly stated. The GHG emission reductions of the period were calculated correctly on the basis of approved methodology ACM0002 “Consolidated methodology for grid-connected electricity generation from renewable sources” (version 13.0.0) and the monitoring plan contained in the VCS PD

(version 02 dated 09/10/2013).

CTI does not assume any responsibility towards the issuance and utilization of the VCU's hereby verified and certified. Request for issuance of VCU's shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration.

The verification of reported emission reductions is based on the information made available to CTI and the engagement conditions detailed in this report. CTI cannot be held liable by any party for decisions made or not made based on this report.

Hence, CTI is able to certify that the emission reductions from the "Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project" during the period amount to 286,088 tCO<sub>2</sub>e.

# CONTENTS

contents.....	4
<b>1 Introduction.....</b>	<b>6</b>
1.1 Objective.....	6
1.2 Scope and Criteria.....	6
1.3 Level of Assurance.....	7
1.4 Summary Description of the Project.....	7
<b>2 Verification Process.....</b>	<b>8</b>
2.1 Method and Criteria.....	8
2.2 Document Review.....	8
2.3 Interviews.....	9
2.4 Site Inspections.....	10
2.5 Resolution of Findings.....	11
2.6 Eligibility for Validation Activities.....	11
<b>3 Validation Findings.....</b>	<b>12</b>
3.1 Participation under Other GHG Programs.....	12
3.2 Methodology Deviations.....	12
3.3 Project Description Deviations.....	12
3.4 Grouped Project.....	13
<b>4 Verification Findings.....</b>	<b>14</b>
4.1 Project Implementation Status.....	14
4.2 Safeguards.....	20
4.3 AFOLU-Specific Safeguards.....	20
4.4 Accuracy of GHG Emission Reduction and Removal Calculations.....	21
4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals.....	24
4.6 Non-Permanence Risk Analysis.....	24
<b>5 Verification conclusion.....</b>	<b>24</b>
<b>APPENDIX A: Abbreviations.....</b>	<b>27</b>
<b>APPENDIX B: references.....</b>	<b>28</b>

APPENDIX C: Corrective Action Requests, clarification requests and Forward  
Action Requests..... 31

# 1 INTRODUCTION

Climate Bridge (Shanghai) Ltd. has commissioned Shenzhen CTI International Certification Co., Ltd (CTI) to carry out the verification and certification of emission reductions reported for the “Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project” (the project) for the period 01/12/2012 to 30/11/2018. This report contains the findings from the verification and includes a verification statement for the verified carbon units.

## 1.1 Objective

Verification is the periodic independent review and ex-post determination by an accredited verification body of the monitored reductions in GHG emissions that have occurred as a result of the registered VCS project activity during a defined verification period.

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

The objective of this verification was to verify and provide a verification statement of emission reductions reported for the “Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project” for the period 01/12/2012 to 30/11/2018.

## 1.2 Scope and Criteria

The scope of the verification is:

- To verify that actual monitoring systems and procedures are in compliance with the monitoring systems and procedures described in the monitoring plan;
- To evaluate the GHG emission reduction data and express a conclusion with a reasonable level of assurance about whether the reported GHG emissions reduction data is free from material misstatement;
- To verify that reported GHG emissions data is sufficiently supported by evidence.

The criteria of the verification are:

- VCS Program Guide (version 4.0) /23/
- VCS Standard (version 4.1) /22/ and other relevant requirements defined by Verra;
- The approved methodology ACM0002 (version 13.0.0) /26/ applied by the project.

The verification shall ensure that reported emission reductions are complete and accurate in order to be verified.

### 1.3 Level of Assurance

The verification report expresses a conclusion with a reasonable level of assurance about whether the reported GHG emissions reduction data is free from material misstatement. CTI applied a materiality threshold of 5% with respect to omission or misstatements concerning reported quantities as per VCS standard.

### 1.4 Summary Description of the Project

#### **Sectoral Scope and Project Type**

According to the VCS Program Guide (version 4.0) /23/, the project is applicable under the following activity categories:

- Sectoral Scope: 1. Energy (Renewable/non-renewable).
- Project type: Solar power generation project.

According to Annex A of the Kyoto Protocol, the project is applicable under the Sectoral Scope 1: Energy Industries (renewable/ non-renewable sources).

#### **Project Background**

Project title:	Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project
Project proponent:	Datang Angli (Lingwu) New Energy Co., Ltd. (China)
Project location:	Baitugang Country, Lingwu City, Ningxia Hui Autonomous Region, People's Republic of China
VCS Project ID:	1143
Applied methodology:	ACM0002 version 13.0.0
VCS project crediting period:	28/12/2011 to 27/12/2021 (the first VCS crediting period)
VCU verification period:	01/12/2012 to 30/11/2018

## 2 VERIFICATION PROCESS

### 2.1 Method and Criteria

The verification was performed through means of the following three phases in accordance with the requirement of the VCS PD (version 02 dated 09/10/2013), the applied methodology, and the VCS Standard (version 4.1) and other relevant VCS requirements:

- A desk review of the monitoring report and all support documents;
- Follow-up interviews with project stakeholders and site inspection;
- The resolution of outstanding issues and the issuance of the verification report and statement.

The following sections outline each step in more detail.

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project. These include:

- The emission reduction calculations and the relevant data records;
- The calibration and maintenance records for the monitoring instruments;
- The management systems to support the project operation and monitoring.

### 2.2 Document Review

Based on the requirements of competency, experience and qualified sectoral scopes, CTI appointed a verification team in accordance with CTI's internal procedures.

Function	Name	Technical competence	Task Performance*
Team Leader	Wang Guolian	1.2, 3.1, 4.1, 5.1, 5.2, 11.1, 11.2, 12.	<input checked="" type="checkbox"/> DR <input checked="" type="checkbox"/> SV <input checked="" type="checkbox"/> RP <input type="checkbox"/> TR
Technical Reviewer	Lin Shunrong	1.2, 14.1, 15.	<input checked="" type="checkbox"/> DR <input type="checkbox"/> SV <input type="checkbox"/> RP <input checked="" type="checkbox"/> TR

\*DR=Document review; SV=Site visit; RP=Reporting; TR=Technical review

In addition to the VER/VCU monitoring report /1/, VCS PD (version 02 dated 09/10/2013) /11/ and emission reduction calculation spreadsheet /2/, the following documents also were assessed as a part of the verification audit:

- VCS Validation and Verification Report (version 2.0 dated 19/10/2012) /12/
- registered CDM PDD (version 02 dated 19/10/2012) /10/;
- Validation Report of registered CDM PDD (version 01 dated 05/11/2012) /17/;
- CDM PDD for renewal of crediting period (version 04 dated 30/06/2019) /13/;

- Validation Report of renewed CDM PDD (version 02 dated 10/07/2019) /19/;
- Baseline and monitoring methodology ACM0002 applied by the project /26/;
- Relevant decisions, clarifications and guidance from the Verra /22/-/26/; and
- Other information and references relevant to the project activity.

During the desk review, CTI has applied standard auditing techniques to assess the quality of information provided. The following activities were performed:

- A review of the data and information presented to verify their completeness;
- A review of the monitoring plan and monitoring methodology, paying particular attention to the frequency of measurements, the quality of metering equipment including calibration requirements, and the quality assurance and quality control procedures; and

An evaluation of data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

## 2.3 Interviews

On 02/06/2021, CTI visited Datang Angli (Lingwu) New Energy Co., Ltd. performed on-site assessment. The key personnel of the project were interviewed or assisted the verification team /27/. Main topics of the interview cover implementation of the project construction, applicability of selected methodology, implementation of project monitoring, emission reduction calculation, etc.

The key personnel interviewed /27/ are summarized in the table below:

Interviewed personnel	Role	Organization	Subject
Mr. Hao Hai	General Manager	New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.	Operation of the project activity; Implementation of the monitor plan of the project activity; Data collection and data achievement; Calibration of meters and equipment maintenance;
Ms. Yao Junxiu	Vice General Manager	New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.	
Mr. Yin Feiyue	Vice Director	Planning and Marketing Department of New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.	
Mr. Chen Yu	Vice Director	Planning and Marketing Department of New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.	
Mr. Wu Shaohua	Villager	Local resident	The impact of the project activity; The complaint by local stakeholders; The stakeholder consultation during the operation of the project activity.
Mr. Wu Shaoxiang	Villager	Local resident	
Mr. Chen Jun	Director	Climate Department of Local Environment Protection Bureau	
Mr. Huang Chunbin	Project Manager	Climate Bridge (Shanghai) Ltd.	

## 2.4 Site Inspections

The verification team performed the on-site verification (Baitugang Country, Lingwu City, Ningxia Hui Autonomous Region, People's Republic of China) on 02/06/2021. The interviewed personnel and objective are listed in above table. During the on-site assessment, CTI has applied standard auditing techniques to assess the quality of information provided. The following aspects of the project activity have been verified:

- An assessment of the implementation and operation of the registered project activity is as per the VCS PD;
- A review of information flows for generating, aggregating and reporting the monitoring parameters; and
- Interviews with relevant personnel to determine whether the operational and data collection procedures are implemented in accordance with the monitoring plan in the VCS PD;
- A cross-check between information provided in the monitoring report and data from other sources such as plant logbooks and electricity sale receipts;
- A check of the monitoring equipment including calibration performance and observations of monitoring practices against the requirements of the VCS PD and the selected methodology;

- A review of calculations and assumptions made in determining the GHG data and emission reductions; and
- An identification that quality control and quality assurance procedures in place to prevent or identify and correct any errors or omissions in the reported monitoring parameters.

The data presented in the monitoring report were assessed by review of the detailed project documentation and production records, as well as by interviews with personnel from the project developer Datang Angli (Lingwu) New Energy Co., Ltd. and observation of collection of measurements, observation of established monitoring and reporting practices and assessment of the reliability of monitoring equipment. This has enabled the verification team to assess the accuracy and completeness of reported monitoring results, to verify the correct application of the approved monitoring methodology and the determination of the emission reductions.

In addition, all parameters required by the monitoring methodology ACM0002 (version 13.0.0), and the management system were assessed during the site visit.

## 2.5 Resolution of Findings

A corrective action request (CAR) shall be raised, where:

- i. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
- ii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
- iii. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project proponents.

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

The verification team identified no CL or CAR in this monitoring period.

### 2.5.1 Forward Action Requests

A forward action request (FAR) is issued for actions if the monitoring and reporting require attention and/or adjustment for the next monitoring period.

CTI confirmed that there was no FAR identified in previous verification /12/, and no FAR was raised during this verification.

## 2.6 Eligibility for Validation Activities

The VCS PD of the project activity was validated by China Quality Certification Center (CQC) on 09/10/2013 /12/. The registered CDM PDD was validated by Bureau Veritas Certification Holding SAS

on 05/11/2012 /17/. The CDM PDD of RCP was validated by China Classification Society Certification Company (CCSC) on 10/07/2019 /19/. The previous VCS verification was carried out by China Quality Certification Center (CQC) on 09/10/2013 against Voluntary Carbon Standard version 3. The proposed monitoring period 01/12/2012 to 30/11/2018 is 2nd VCS verification, and CTI just undertook verification activities for the project according to the VCS Program Guide. This section is thus not applicable.

## 3 VALIDATION FINDINGS

### 3.1 Participation under Other GHG Programs

The project was validated by Bureau Veritas Certification Holding SAS on 05/11/2012 under CDM scheme for registration /17/, and validated by China Quality Certification Center (CQC) on 09/10/2013 for registration of VCS PD. The CDM PDD of RCP was validated by China Classification Society Certification Company (CCSC) on 10/07/2019 against UNFCCC principles and requirements /19/. CTI only performed verification activities on the proposed monitoring period for the project according to the VCS Program Guide.

### 3.2 Methodology Deviations

The validation process /12/ /17/ has assessed all factors and issues that constitute the basis for emission reductions from the project according to the applicable CDM methodology ACM0002 (version 13.0.0) /26/. There was not any methodology deviation applied to this project. Details refer to section 4.1.

### 3.3 Project Description Deviations

By checking the registered VCS PD /11/ and site visit interview with project owner, it is confirmed that the project started operation on 28/12/2011, which is the project start date according to the requirement of VCS. A deviation was identified for the crediting period of the Project. In the VCS PD, it was mentioned that the VCS crediting period is from 28/12/2011 to 30/11/2012. In the monitoring report, it was mentioned that the project commission date is 28/12/2011 and the VCS crediting period was from 28/12/2011 to 27/12/2021. The project is registered under VCS Version 3 and completed validation before 19/03/2020. As per VCS requirement, it remains eligible to apply the crediting period requirements under VCS version 3 which shall be a maximum of ten years and may be renewed at most twice (theoretically the maximum VCS crediting period is 30 years, from 28/12/2011 to 27/12/2041). Therefore, the first renewable crediting period of the Project is updated from 28/12/2011 - 30/11/2012 to 28/12/2011 - 27/12/2021, which lasts for 10 years. However, as the project is also registered as a CDM project with a seven year twice renewable (7\*3 renewable) project crediting period,

Therefore, the length of total VCS crediting period of the project activity should not be longer than 21 years and is determined as 28/12/2011 to 27/12/2032 and the project activity is not eligible for VCU issuance beyond 27/12/2032. This deviation has no impact on the applicability of the methodology, additionality or the appropriateness of the baseline scenario and meet all appropriate rules and requirements of VCS standard.

Except crediting period related deviations, there were no project description deviations identified by CTI to this monitoring period. The verification team assessed through visual inspection and document review that all physical features of the project activity including data monitoring, reporting and collecting systems have been implemented in accordance with the monitoring plan included in the VCS PD (version 02 dated 09/10/2013) /12/. Details refer to section 4.1.

### 3.4 Grouped Project

The project was not a grouped project; hence this clause is not applicable.

## 4 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project” for the period 01/12/2012 to 30/11/2018.

### 4.1 Project Implementation Status

#### **Project Implementation in accordance with the registered project design document**

The project is a grid-connected solar power plant, which is located in Baitugang Country, Lingwu City, Ningxia Hui Autonomous Region, People’s Republic of China. The installed capacity of the project activity is 39MWp (39.3397MWp precisely), consisting of 15,792 pieces of solar modules with 190W of unit capacity, 150,264 pieces of solar modules with 235W of unit capacity and 4,280 pieces of solar modules with 240W of unit capacity. The average annual power delivered to the grid by the project is expected to be 54,000 MWh. The actual implementation of the project during this verification period was verified in terms of name plate capacities of solar modules and monitoring equipment. The details of solar modules with respect to installation and capacity have been verified to be consistent with description indicated in the VCS PD. The project activity was put into operation on 28/12/2011, which has been verified by site visit interview, checking VCS Validation and Verification Report (version 2.0 dated 16/10/2013) /12/. The electricity generated by the project activity was supplied to the Northwest China Power Grid (NWPG), which can be confirmed by the Power Purchase Agreement (PPA) signed between the project owner and State Grid Ningxia Power Co., Ltd. /3/.

The project start date was identified as 28/12/2011 when the project started to operate and began generating GHG emission reductions. A deviation was identified for the crediting period of the Project. Detail refer to section 3.3 of this report.

All the monitoring system in operation period is consistent with the description and monitoring plan in the VCS PD. The control system at the power plant is automated and assures continuous operation, including monitoring on malfunction of equipment. By checking the daily operation and maintenance records /6/, CTI can confirm that no serious malfunction happened and the plant was under a normal operation as expected in this monitoring period.

On-site training for the related procedures including monitoring, recording and reporting was verified to be in place /5/ and their implementation was confirmed by interview with the key operators /27/ and observing the operation.

As part of the site visit, CTI confirms that the project implementation is in accordance with the project description and monitoring plan contained in the the VCS PD (version 02 dated 09/10/2013). The verification team confirmed through visual inspection and document review that all physical features of the project activity including data collection systems and storage systems have been implemented in accordance with monitoring plan contained in the VCS PD (version 02 dated 09/10/2013).

### Compliance of monitoring plan with monitoring methodology

CTI is able to confirm that the monitoring plan in the VCS PD (version 02 dated 09/10/2013) is in accordance with the approved methodology applied by the project activity, i.e. ACM0002 (version 13.0.0).

### Compliance of monitoring with the monitoring plan

The monitoring has been carried out in accordance with the monitoring plan contained in the VCS PD (version 02 dated 09/10/2013). CTI confirms that all parameters stated in the monitoring plan are monitored and reported appropriately. All parameters required to be monitored by the monitoring plan as per the monitoring methodology ACM0002 (version 13.0.0) and the management system were assessed during the site visit. The monitoring report lists each parameter required by the monitoring plan and the information flow (i.e. from data generation, aggregation, recording, calculation and reporting) for these parameters is provided. The information flow for the each parameter in further verified in the following sections.

### Parameters monitored

According to the VCS PD (version 02 dated 09/10/2013), there are 3 monitoring parameters of the project:

- **Quantity of electricity supplied by the Project to the grid in year y ( $EG_{PJ \text{ to grid, } y}$ )**

The parameter was monitored by 2 bidirectional electricity meters (main meter M1 and backup meter M2) continuously. Both meters were installed at the output of the on site booster station. The meter reading was recorded monthly and archived electronically. Main meter M1 and backup meter M2 are installed at project side which are the monitoring meters belongs to the project owner. However, as per the agreement between local grid company and project owner, a billing meter (belong to local grid company and not available by the project owner) installed at the substation of grid side was used to measure quantity of electricity supplied by the Project to the grid and is the basis of issuing sales receipts by local grid company. The cut-off time was 24:00 hr of last day of each month. At the cut-off time, the staff from project developer read the meter reading of main meter M1 and form Monthly Reading Records (MRRs) /7/, the grid company read the meter reading of bill meter and then transcribes the data into Sales Receipts /8/.  $EG_{PJ \text{ to grid, } y}$  was sourced from Meter Reading Records (MRRs) /7/ issued by the project developer, and Sales Receipts /8/ issued by power grid company covering monitoring period. The conservative data between MRRs and Sales Receipts will be used to calculate the emission reductions.

- **Quantity of electricity imported from the grid by the Project in year y ( $EG_{grid \text{ to PJ, } y}$ )**

The parameter was monitored by 2 bidirectional electricity meters (main meter M1 and backup meter M2) and meter M3 continuously. Meter M1 and M2 were installed at the output of the on site booster station while meter M3 was installed at 10kV backup line. The meter reading was recorded monthly and archived electronically.

Main meter M1 and backup meter M2 are installed at project side which are the monitoring meters belongs to the project owner. However, as per the agreement between local grid company and project owner, a billing meter (belong to local grid company and not available by the project owner) installed at the substation of grid side was used to measure quantity of electricity imported from the grid by the Project and is the basis of issuing sales receipts by local grid company. The cut-off time was 24:00 hr of last day of each month. At the cut-off time, the staff from project developer read the meter reading of main meter M1 and form Monthly Reading Records (MRRs) /7/, the grid company read the meter reading of bill meter and then transcribes the data into Sales Receipts /9/.

For quantity of electricity imported from the grid by the Project measured by M3 installed in 10kV backup line. The cut-off time was 24:00 hr of last day of each month. At the cut-off time, the staff from project developer and the grid company will read M3 together. The project owner record reading of meter M3 and form Monthly Reading Records (MRRs) /7/. The staff from power grid company record reading of meter M3 and then transcribes the data into Sales Receipts /9/.

$EG_{\text{grid to PJ, } y}$  was sourced from Meter Reading Records (MRRs) /7/ issued by the project developer and Sales Receipts /9/ issued by power grid company covering monitoring period. The conservative data between MRRs and Sales Receipts will be used to calculate the emission reductions.

- **Net electricity supplied by the project activity to the grid in year y ( $EG_{\text{facility, } y}$ )**

Electricity generated by this project is sent to the Ningxia power grid, which is part of the Northwest Power Grid (NWPG). Finally the electricity is supplied to the Northeast Power Grid (NWPG) of China. Net electricity supplied by the project activity to the grid in year y ( $EG_{\text{facility, } y}$ ) is calculated by following formula:  $EG_{\text{facility, } y} = EG_{\text{PJ to grid, } y} - EG_{\text{grid to PJ, } y}$

As described above, the meters have been installed in accordance with the monitoring plan of VCS PD (version 02 dated 09/10/2013). CTI has on-site checked the location of the meters against the diagram of power connection system and found them to be consistent.

Data in the monthly reading records were used to the report, through a cross check with Sales Receipts, and the conservative values from electricity supplied to the grid and import from the grid were applied to calculate the net electricity supplied by the project activity to the grid in year y. The data reported in the monitoring report and ERs calculation spreadsheet has been verified by the verification team. Supporting references and data required to determine the net electricity supplied to the grid by the project is found to be complete and transparent.

### **Monitoring equipment and calibration**

The meters have been calibrated periodically as per the relevant industrial standard by the qualified third party to ensure the monitoring equipments' accuracy and in good conditions. The relevant information of meters' calibration is listed as below.

Meter	Serial Number	Type	Accuracy Class	Calibration Frequency	Calibration Date	Validity
Main meter M1/Backup meter M2	0001468380/ 0001468381	DSZ331	0.2s	Annually	12/12/2011	11/12/2012
					12-12-2012	11-12-2013
					10-12-2013	09-12-2014
					01-12-2014	30-11-2015
					01-12-2015	30-11-2016
					01-12-2016	30-11-2017
					01-12-2017	30-11-2018
Meter M3	0001350093	DSZ535	0.5s	Annually	17-12-2011	16-12-2012
					12-12-2012	11-12-2013
					10-12-2013	09-12-2014
					01-12-2014	30-11-2015
					01-12-2015	30-11-2016
					01-12-2016	30-11-2017
					01-12-2017	30-11-2018

The meters were calibrated by Ningxia Electricity Measurement and Testing Center. Calibration records and accreditation certificates /14//15/ have been verified by the verification team. The accuracy of meters are comply with that in the VCS PD. By checking the industrial metering configuration standard “Technical Administrative Code of Electric Energy Metering” /16/, CTI can confirm that the accuracy level of all meters meet the requirement stipulated in this standard. CTI can thus confirm that the accuracy of the meters is in line with the VCS PD and relevant industry standard.

In the monitoring plan of the VCS PD, it stated that the meters will be calibrated and checked annually for accuracy. By checking the calibration reports, CTI found the calibration frequency of these meters is annual, which is in line with the calibrating standard “Technical Administrative Code of Electric Energy Metering” /16/. Hence, CTI can confirm that the meters’ calibration frequency is in line with the monitoring plan of the VCS PD and relevant industry standard, and the calibrations of meters are verified to be valid for the whole reporting period.

#### Data management and control

The project owner is responsible for operation and routine maintenance of power plant under the project activity. The quality assurance and quality control procedures have been addressed in the VER project management and monitoring manual /4/, including the organization structure with the responsibilities, personnel competencies, monitoring procedures and monitoring management. By

interview with the staff /27/ and check records /4/-/6/ during on-site visit, it can be confirmed that the monitoring management system is implemented following the project management and monitoring manual.

All monitoring devices have been calibrated and maintained periodically to ensure the accuracy of measurement. Calibration records of instruments used in measurements were made available during the verification visit and found to be valid for the entire period of the verification. Competence and training records of in-plant personnel engaged in measurement of plant parameters were presented during verification and found to be in order.

By checking UNFCCC website (<https://cdm.unfccc.int/Projects/DB/BVQI1353045070.95/view?cp=1>), it is confirmed by CTI that the project has been registered as CDM project activity on 21/11/2012 with reference No. 8251. No CERs have been issued up to now, including this monitoring period (from 01/12/2012 to 30/11/2018).

Furthermore, CTI checked public information from the REC Mechanism database of China, Chinese Emission Trading System, Gold Standard Registry and interviewed with project owner during site visit, it is confirmed that except CDM and VCS scheme, the project has not been participated or been rejected under any other GHG programs since validation or previous verification.

Therefore, the verification team confirmed that the project only applies CERs and VCU under CDM and VCS, and no rejection from CDM and VCS occurs, there are no other forms of environmental credits applied or issued for the project activity, the emission reduction resulted from the project during this monitoring period would only apply for VCUs.

By checking the registered VCS PD version 02 dated 09/10/2013, and interviewing with stakeholders during site visit, the verification team confirmed that the project would contribute to sustainable development in as below:

- Reducing greenhouse gas emissions compared to a business-as-usual scenario;
- Displacing the power generation of fossil fuel power plants, reducing CO<sub>2</sub>, SO<sub>x</sub> and NO<sub>x</sub> emissions significantly, thus mitigating the air pollution and its adverse impacts on human health;
- Providing clean and renewable energy source, and help to improve energy supply security;
- Promoting application and diffusion of the innovative/creative solar technology in China through the demonstrative practice of the project activity.

The technical parameters have been verified with the nameplates /18/ and Technical Specification of Equipment Contract /21/ as below:

#### Monocrystalline Silicon Cell

Parameters	Unit	Value	
PV Module Type		JAM5(L)-72-190	ATP-190
Capacity	W	190	190

Pieces		10560	5232
Open circuit voltage (Voc)	V	44.87	44.5
Max. power voltage (Vmp)	V	36.48	36.5
Short circuit current (Isc)	A	5.54	5.69
Max. power current (Imp)	A	5.21	5.20
Maximum system voltage	V	1000	1000
Lifetime	Years	25	25
Manufacturer		JA Solar	ATSUN

#### Polycrystalline Silicon Cell

Parameters	Unit	Value		
PV Module Type		JAP6-60-235	ATP-235	JAP6-60-240
Capacity	W	235	235	240
Pieces		117640	32624	4280
Open circuit voltage (Voc)	V	37.34	37.5	37.45
Max. power voltage (Vmp)	V	29.52	30.5	29.58
Short circuit current (Isc)	A	8.40	8.70	8.50
Max. power current (Imp)	A	7.96	7.70	9.10
Maximum system voltage	V	1000	1000	1000
Lifetime	Years	25	25	25
Manufacturer		JA Solar	ATSUN	JA Solar

#### Inverters

Parameters	Unit	Value
Max. Input voltage range	V	800-900
max. Input voltage range	A	1100-1200
rated output voltage range	V	210-310
Max Efficiency	%	≥98.0
Cooling Mode		Air-cooled
Lifetime	years	25
Manufacturer		Sun Grow

The verification team confirmed that there is no proposed or actual change to the VCS PD during this monitoring period. All required equipments and procedures are available and implemented in an

appropriate manner. All necessary monitoring instruments are installed. All required instruments including standby and operating procedures for the same have been implemented in an appropriate manner. The project is completely operational and the same has been confirmed on-site. Neither mistakes nor malfunction on main meters have been observed during this monitoring period.

## 4.2 Safeguards

### 4.2.1 No Net Harm

By checking the EIA summary and conclusion provided in the VCS PD, it is confirmed that solar power is green power and the impact caused by solar power on the surrounding ecosystem and residents, wastewater, solid waste and atmosphere etc. is very little, there would be no net harm caused due to the project activity. Also, the EIA of the project are approved by the government.

Also, no potential environment or social economic matter was found during the site visit. The project is renewable energy project and thus no net harm observed in air or water quality on-site.

### 4.2.2 Local Stakeholder Consultation

As per the registered VCS PD, in September 2011, the local stakeholder's consultation was done through distributing a one-page questionnaire, which was designed to be easily filled in. 40 copies of questionnaire were distributed, and 40 pieces of reply were received. 40 participants filled in the questionnaires included local residents, builders and members of the local authorities. The opinions expressed by the stakeholders were recorded and are available on request.

The survey showed that the proposed project receives strong support from the local community. They all believe the proposed project will promote local economic development and agree with the project development and construction.

By checking the filled questionnaires from local stakeholders, it is confirmed by the verification team that communications with local stakeholders was being carried out every 3 years in December 2014 and December 2017 by the project owner. There are no negative comments received for the project.

Via checking questionnaires from local stakeholders and interviewing with staff from local environmental protection bureau and local residents during the site visit, it is confirmed by the verification team that during the implementation stage of this monitoring period, local authority has conducted spot checks on the implementation of the project periodically as per the request from the local governments' regulations. It is confirmed by the verification team that there were no negative comments and issues from the local stakeholders during this monitoring period and the project passed all the periodic spot checks by local government.

All such conclusion has been verified through site visit and check registered CDM PDD.

## 4.3 AFOLU-Specific Safeguards

For non-AFOLU projects, this section is not required.

## 4.4 Accuracy of GHG Emission Reduction and Removal Calculations

CTI confirms that appropriate methods and formulae for calculating baseline emissions, project emissions and leakage have been followed, and the assumptions, emission factors and default values that are applied in the calculation have been justified.

According to the applied methodology, the emission reductions are determined as the difference between the baseline emissions, project emissions and leakage:

$$ER_y = BE_y - PE_y$$

### Baseline emissions

Baseline reductions are determined as multiplying net electricity supplied by the project activity to the grid in year y ( $EG_{\text{facility},y}$ ) by the validated ex-ante fixed grid emission factor ( $EF_{\text{grid},\text{CM},y}$ ).

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

### Grid emission factor ( $EF_{\text{grid},\text{CM},y}$ )

The parameters determine  $EF_{\text{grid},\text{CM},y}$ , including Power Generation,  $EG_y$ ,  $FC_{i,y}$ ,  $EF_{\text{CO}_2,i,y}$ , Best electricity supply efficiency of thermal power,  $NCV_{i,y}$  are monitored ex-ante in the VCS PD. In this monitoring report, parameter  $EF_{\text{grid},\text{CM},y}$  is determined ex-ante by China DNA, which is comply with the VCS PD. EF is the grid emission factor that has been verified ex-ante in the validation stage in the VCS PD (version 02 dated 09/10/2013) as 0.89635 tCO<sub>2</sub>e/MWh.

### Net electricity supplied by the project activity to the grid in year y ( $EG_{\text{facility},y}$ )

$$EG_{\text{facility},y} = EG_{\text{PJ to grid},y} - EG_{\text{grid to PJ},y}$$

$EG_{\text{PJ to grid},y}$  and  $EG_{\text{grid to PJ},y}$  are determined by readings of main meter and backup meter. Data in the Sales Receipts were used to cross-checked with that in the Monthly Reading Records (MRRs). The most conservative values have been applied to calculate the electricity supplied by the project activity to the grid.

Period	EG PJ to grid, y (MWh)			EG grid to PJ, y (MWh)						EG facility,y (MWh)
				Measured by M1/M2			Measured by M3			
	MRRs	Sales receipt	Conservative value	MRRs	Sales receipt	Conservative value	MRRs	Sales receipt	Conservative value	
01/12/2012~ 31/12/2012	3,723.72	3,702.00	3,702.00	42.39	43.26	43.26	0.00	0.00	0.00	3,658.74
2013	58,849.98	58,283.00	58,283.00	257.91	261.24	261.24	305.09	305.09	305.09	57,716.67
2014	61,268.34	60,606.00	60,606.00	296.55	300.24	300.24	186.83	186.83	186.83	60,118.93
2015	54,094.74	53,550.00	53,550.00	326.30	330.18	330.18	87.02	87.02	87.02	53,132.80
2016	53,341.26	52,748.00	52,748.00	360.79	365.40	365.40	148.84	148.84	148.84	52,233.76
2017	47,620.02	47,047.00	47,047.00	333.42	337.68	337.68	119.85	119.85	119.85	46,589.47
01/01/2018~ 30/11/2018	46,739.70	46,192.00	46,192.00	286.54	289.80	289.80	142.58	142.58	142.58	45,759.62
<b>Total</b>	<b>325,637.76</b>	<b>322,128.00</b>	<b>322,128.00</b>	<b>1,903.90</b>	<b>1,927.80</b>	<b>1,927.80</b>	<b>990.20</b>	<b>990.20</b>	<b>990.20</b>	<b>319,210.00</b>

Hence, the corresponding baseline emission reductions are calculated as:

Period	EG <sub>facility</sub> ,	EF <sub>grid,CM,y</sub>	BE <sub>y</sub>
	MWh	tCO <sub>2</sub> /MWh	tCO <sub>2</sub>
01/12/2012~31/12/2012	3,658.74	0.89635	3,279
2013	57,716.67	0.89635	51,728
2014	60,118.93	0.89635	53,883
2015	53,132.80	0.89635	47,620
2016	52,233.76	0.89635	46,812
2017	46,589.47	0.89635	41,755
01/01/2018~30/11/2018	45,759.62	0.89635	41,011
Total	319,210.00	/	286,088

### Project emissions

As stated in the VCS PD, for the photovoltaic power activities, the project emissions from the project is zero. Hence, PE<sub>y</sub> during the monitoring period from Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project is zero.

### Leakages

Leakage does not need to be accounted for this project as per the VCS PD .

### Emission reductions

The emission reductions for this monitoring period was calculated as:

Monitoring period	GHG emission reductions or removals (tCO <sub>2</sub> e)
01/12/2012~31/12/2012	3,279
2013	51,728
2014	53,883
2015	47,620
2016	46,812
2017	41,755
01/01/2018~30/11/2018	41,011
Total ERs claimed (in 2191 days)	286,088

### Comparison of actual emission reductions or net anthropogenic GHG removals by sinks with estimates in validated VCS PD

The emission reductions claimed are 286,088 tCO<sub>2</sub>e in this monitoring period (i.e. 2191 days). Compared with yearly expected emission reductions 290,545 tCO<sub>2</sub>e (calculated as 48,402 tCO<sub>2</sub>e/365d

×2191d) in the VCS PD, the reported emission reductions in this monitoring period are 1.53% less than the expected, which is considered to be in the reasonable variation range.

CTI is able to confirm that the actual power supply and also emission reductions reported in this monitoring period are reasonable and appropriate. CTI verified the input data for calculating emission reductions and the calculating process, and confirmed the result were complete and transparent.

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

All necessary documentations are collected, referenced and aggregated, which is easily accessible in hard-copy or electronic format. Measurements are performed by calibrated equipment, and the key data can also be cross-checked via other sources, such as records, receipts and inventory data. No assumptions are used that have any material influence on reported emission reductions.

CTI concludes that during this monitoring period, the evidences for determination of emission reductions are sufficient and reasonable, and the calculation of emission reductions is reliable.

#### 4.6 Non-Permanence Risk Analysis

The project is not AFOLU project, and thus non-permanence risk analysis is not applicable for the project.

## 5 VERIFICATION CONCLUSION

Shenzhen CTI International Certification Co., Ltd (CTI) has performed the verification of the emission reductions that have been reported for the project activity “Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project” in China (VCS Project ID: 1143) for the period 01/12/2012 to 30/11/2018.

The verification is based on the baseline and monitoring methodology ACM0002 (version 13.0.0), VCS PD (version 02 dated 09/10/2013) and the monitoring report (version 2.0 dated 17/08/2021). The verification consisted of the following three phases: i) desk review of the project design and the baseline and monitoring plan; ii) follow-up interviews with project stakeholders; iii) resolution of outstanding issues and the issuance of the final verification and certification report.

The project proponents are responsible for the collection, calculation and determination of the GHG data in accordance with the monitoring plan and the reporting of GHG emission reductions on the basis set out within the project monitoring report.

Our verification approach was based on the requirements as defined under the applicable VCS Version 4 and relevant UNFCCC requirements. Our approach is risk-based, drawing on an understanding of the

risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

- the project is implemented and operated as per the VCS PD;
- the monitoring plan in VCS PD is as per the applied methodology;
- the monitoring complies with the monitoring plan in the VCS PD;
- the monitoring report and other supporting documents provided are complete and verifiable and in accordance with the applicable VCS Version 4 and CDM requirements;
- the installed equipment being essential for generating emission reduction runs reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

It is CTI's responsibility to provide an independent verification statement on the reported GHG emission reductions for the project. Based on an understanding of the risks associated with reporting of GHG emission data and the controls in place to mitigate these, CTI planned and performed our work to obtain the information and explanations that we considered necessary to provide reasonable assurance that reported GHG emission reductions are fairly stated.

CTI does not assume any responsibility towards the issuance and utilization of the VCU's hereby verified and certified. Request for issuance of VCU's shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration.

The verification of reported emission reductions is based on the information made available to CTI and the engagement conditions detailed in this report. CTI cannot be held liable by any party for decisions made or not made based on this report.

In CTI's opinion the GHG emissions reductions of the "Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project" for the period 01/12/2012 to 30/11/2018 are fairly stated in the monitoring report (version 2.0 dated 17/08/2021). The GHG emission reductions were calculated correctly on the basis of the approved methodology ACM0002 (version 13.0.0) and the monitoring plan contained in the VCS PD (version 02 dated 09/10/2013).

CTI can confirm that the GHG emission reductions are calculated without material misstatements. Based on the evidence and information that are considered necessary to guarantee that GHG emission reductions are appropriately calculated, CTI confirms the following statement:

Verification period: From 01/12/2012 to 30/11/2018

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

Year	Baseline emissions or	Project emissions or removals	Leakage emissions	Net GHG emission
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	removals (tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	(tCO <sub>2</sub> e)	reductions or removals (tCO <sub>2</sub> e)
01/12/2012~31/12/2012	3,279	0	0	3,279
2013	51,728	0	0	51,728
2014	53,883	0	0	53,883
2015	47,620	0	0	47,620
2016	46,812	0	0	46,812
2017	41,755	0	0	41,755
01/01/2018~30/11/2018	41,011	0	0	41,011
Total	286,088	0	0	286,088

*Wang Guolian*

Ms. Wang Guolian

Team Leader

17/08/2021

*Shunrong Lin*

Ms. Lin Shunrong

Technical Reviewer

17/08/2021

# APPENDIX A: ABBREVIATIONS

CAR	Corrective Action Request
CER	Certified Emission Reduction(s)
CL	Clarification request
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
CTI	Shenzhen CTI International Certification Co., Ltd
DOE	Designated Operational Entity
EF	Emission Factor
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
MP	MONITORING REPORT
MR	Monitoring Report
NWPG	Northwest China Power Grid
PD	Project Description
PP	Project Proponent
VCS	Verified Carbon Standard
VCU	Verified Carbon Unit

## APPENDIX B: REFERENCES

Documentation used to verify the information provided by the project proponents

- /1/ Climate Bridge (Shanghai) Ltd.: VER/VCU Monitoring Report for Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project, version 01 dated 30/05/2021, version 1.1 dated 04/06/2021, version 1.2 dated 04/08/2021, version 2.0 dated 17/08/2021.
- /2/ Climate Bridge (Shanghai) Ltd.: Emission reduction calculation spreadsheet for Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project, version 1.1 dated 04/06/2021.
- /3/ Datang Angli (Lingwu) New Energy Co., Ltd. and State Grid Ningxia Power Co., Ltd.: Power Purchase Agreement for Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project.
- /4/ Datang Angli (Lingwu) New Energy Co., Ltd.: VER monitoring manual and management procedure.
- /5/ Datang Angli (Lingwu) New Energy Co., Ltd.: Records of training for on-site staff.
- /6/ Datang Angli (Lingwu) New Energy Co., Ltd.: Operation log, from 01/12/2012 to 30/11/2018.
- /7/ Datang Angli (Lingwu) New Energy Co., Ltd.: Monthly reading records (MMRs) of Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project from 01/12/2012 to 30/11/2018.
- /8/ State Grid Ningxia Power Co., Ltd.: Monthly electricity sales receipt of electricity supplied to the grid measured by main meter, from 01/12/2012 to 30/11/2018.
- /9/ State Grid Ningxia Power Co., Ltd.: Monthly electricity sales receipt of imported electricity from the grid measured by main meter, from 01/12/2012 to 30/11/2018.
- /10/ Climate Bridge (Shanghai) Ltd.: the registered CDM PDD, version 02 dated 19/10/2012.
- /11/ Registered VCS PD version 02 dated 09/10/2013.
- /12/ China Quality Certification Center (CQC): VCS Validation and Verification Report, version 2.0 dated 16/10/2013
- /13/ CDM PDD for renewal of crediting period version 04 dated 30/06/2019.
- /14/ Ningxia Quality and Technical Supervision Bureau: Accreditation certificate of Ningxia Electricity Measurement and Testing Center issued on 21/06/2011 valid till 20/06/2016, issued on 21/06/2016 valid till 20/06/2021.
- /15/ Ningxia Electricity Measurement and Testing Center: Calibration certificates for meters

- covering this monitoring period.
- /16/ State Economic and Trade Commission: Technical administrative code of electric energy metering (DL/T 448-2016).
  - /17/ Bureau Veritas Certification Holding SAS: the Validation Report of registered CDM PDD, version 01 dated 05/11/2012.
  - /18/ Datang Angli (Lingwu) New Energy Co., Ltd.: nameplate of the equipment
  - /19/ China Classification Society Certification Company (CCSC): the Validation Report of CDM PDD for renewal of crediting period, version 02 dated 10/07/2019
  - /20/ Climate Bridge (Shanghai) Ltd.: VER/VCU Monitoring Report for Ningxia Angli Lingwu Photovoltaic Grid Connected Power Plant Project of previous monitoring period, version 02 dated 09/10/2013
  - /21/ Technical Specification of Equipment Contract signed between Datang Angli (Lingwu) New Energy Co., Ltd. And Shandong Angli Tiansheng Photovoltaic Technology Co., Ltd.

#### Methodologies, tools and other guidance

- /22/ Verified Carbon Standard: VCS Standard, version 4.1.
- /23/ Verified Carbon Standard: VCS Program Guide, version 4.0.
- /24/ Verified Carbon Standard: VCS Sectoral Scopes  
<http://v-c-s.org/node/448>
- /25/ Verified Carbon Standard: Registration and Issuance Process, version 4.0.
- /26/ UNFCCC EB: Approved methodology, ACM0002, version 13.0.0

#### Persons interviewed

- /28/ Mr. Hao Hai, General Manager, New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.
- Ms. Yao Junxiu, Vice General Manager, New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.
- Mr. Yin Feiyue, Vice Director, Planning and Marketing Department of New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.
- Mr. Chen Yu, Vice Director, Planning and Marketing Department of New Energy Division of Datang Angli (Lingwu) New Energy Co., Ltd.
- Mr. Chen Jun, Director, Climate Department of Local Environment Protection Bureau

Mr. Wu Shaohua, Villager, local resident

Mr. Wu Shaoxiang, Villager, local resident

# APPENDIX C: CORRECTIVE ACTION REQUESTS, CLARIFICATION REQUESTS AND FORWARD ACTION REQUESTS

Table 1: Corrective Action Requests

CAR ID	Corrective Action Request	Response by Project Proponent	Verification Team Assessment
NA	NA	NA	NA

Table 2: Clarification Requests

CL ID	Clarification Request	Response by Project Proponent	Verification Team Assessment
NA	NA	NA	NA

Table 3: Forward Action Requests

FAR ID	Forward Action Request	Response by Project Proponent	Verification Team Assessment
NA	NA	NA	NA