

**GOLD STANDARD FOR THE GLOBAL GOALS (GS4GG)
REPORT
-
VERIFICATION**



Project Title: Taishan Geothermal Central Heating System
Monitoring Period: 01/04/2023 - 31/03/2024
GS project ID: 11167
Internal ID: A+SH_SYST_GS_VER_01724
Customer: Profit Carbon Environmental Energy Technology
(Shanghai) Co., Ltd.
Date: 30/08/2024
Revision: 02

SUMMARY			
Reference No.	Date (first version)	Version No.	Date (last version)
A+SH_SYST_GS_VER_01724	08/05/2024	02	30/08/2024
GS4GG Verification			
GS4GG Certified Product (sought):		GHG Emission Reductions	
GS4GG SDG Impact Statement (sought):		Not Applicable	
General Information			
Client	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd.		
Project Title	Taishan Geothermal Central Heating System		
Project Participants	Zhengzhou Onar Heating Co., Ltd		
Project Location	Taishan Village, Longhu Town, Xinzheng City of Henan Province, China		
Contact Person	Zhu Yanan		
Monitoring Period:	01/04/2023 - 31/03/2024 (both dates inclusive)		
GS4GG Version: GS4GG Principles and Requirements Version 1.2 GS4GG Activity Requirements: Community Service Activity Requirements Version 1.2 Applied Methodology Version: AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0) Current Methodology Version: AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0)		GS4GG Sectoral Scope: 2 UNFCCC CDM Sectoral Scope: 1 Technical Area: 1.1	
Initial Monitoring Report Version: 01 Date: 15/04/2024		Final Monitoring Report Version: 03 Date: 28/08/2024	
Certified Project Design Document Version: 04 Date: 26/09/2021			
Estimated Annual Emission Reductions: 143,987 tCO ₂ e for 1st crediting period			
Indicator	Estimated Value	Actual Value	
SDG 7	2,480.907 thousand m ² for residential buildings and 94.516 thousand m ² for commercial buildings	2,459,732.33 m ² for residential buildings and 94,236.26 m ² for commercial buildings	
SDG 8	10 jobs created including 5 males and 5 females with average monthly salary of 3,500 RMB/Person	10 jobs created including 5 males and 5 females with average monthly salary of 4,550 RMB/Person	
SDG 13	143,987 tCO ₂	136,205 tCO ₂	
Selected Sustainable Development Goals (SDGs): SDG 7; SDG 8; SDG 13			
Verification Summary			
LGAI Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been contracted by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. to perform the 4th periodical verification of Taishan Geothermal Central Heating System (GS Ref. No. 11167) applying the methodology AM0072 Fossil Fuel Displacement by Geothermal Resources			

for Space Heating (Version 03.0). The management of Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions.

A desk review and follow-up onsite visit have been conducted to verify the data submitted in the monitoring report. Applus+ Certification confirms the following has been reviewed:

- (a) Monitoring report (s) /01/;
- (b) ER calculation spreadsheet /02/;
- (c) The registered GS PDD /03/ and the corresponding validation report /04/;
- (d) Monitoring reports and the corresponding verification reports of previous monitoring period /12/;
- (e) The applied monitoring methodology /09/;
- (f) Relevant decisions, clarifications and guidance from the CMP;
- (g) The GS4GG Principles and Requirements Version 1.2 /05/;
- (h) The Community Service Activity Requirements Version 1.2 /06/;
- (i) The GHG emission reduction & sequestration product requirements version 2.1 /07/;
- (j) Site visit and remote audit requirements version 2.0 /08/.

All information and references relevant to the project activity's resulting in emission reductions. The report describe a total number of findings which include:

- 1 Corrective Action Request (CAR);
- 1 Clarification Request (CL/CR);
- 0 Forward Action Requests (FARs).

The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the Client and Applus+ Certification to guarantee the transparency of the verification process, the concerns raised and responses given are summarized in Appendix 1 below.

Taishan Geothermal Central Heating System (hereafter referred to as "the project" or "the project activity") involves the construction and operation of geothermal system with a total heating load of 115.90MW which can supply geothermal heat to 2,460.120 thousand m² of residential buildings and 94.516 thousand m² of commercial buildings. The aim of the project activity is to introduce geothermal energy-based space heating system to realize heat supply to a series of new residential buildings and commercial buildings over winter season, which will displace heat supply from isolated coal-fired boilers as a business-as-usual scenario in the project area in Taishan Village, Longhu Town, Xinzheng City, Henan Province, P.R. China. The project activity enables a series of new residential buildings and commercial buildings to use of geothermal energy instead of the combustion of fossil fuel for space heating, finally provides the affordable and clean Energy to communities in China. As per validation report /04/ of registered GS4GG PDD, the project started construction on 20/05/2020, started test run from 24/10/2020 to 31/10/2020 and was put into operation on 01/11/2020 (winter season). The project is expected to reduce CO₂ emissions with an estimated 143,987 tCO₂e per year during the 1st crediting period.

Applus+ Certification confirms that the project is implemented in accordance with the validated and registered GS4GG PDD /03/. The monitoring plan complies with the applied methodology AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0) /09/, the GS4GG Principles and Requirements Version 1.2 /05/, the Community Service Activity Requirements Version 1.2 /06/, and the monitoring has been carried out in accordance with the monitoring plan. The monitoring system is in place and the emission reductions are calculated without material misstatements. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project

baseline and monitoring and its associated documents. Based on the information reviewed and evaluated Applus+ Certification confirms that the implementation of the project has resulted in 136,205 tCO₂e emission reductions during period 01/04/2023 to 31/03/2024.

ASSESSMENT TEAM	
Team Members	Organization
Lead Auditor: Doris Dai	Applus+ Certification
Auditor / Technical Expert: Doris Dai	Applus+ Certification
Technical Reviewer: Simon Shen	Applus+ Certification

ABBREVIATIONS	
ACM	Approved Consolidated Methodology
AM	Approved Methodology
AMS	Approved Methodology Small Scale
Applus+ Certification / Applus+	LGAI Technological Center, S.A. (Applus+)
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CER	Certified Emission Reduction
CL / CR	Clarification Request
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GS4GG (or GS)	Gold Standard for Global Goals
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
NGO	Non-Governmental Organization
SDG	Sustainable Development Goal
TAC	Gold Standard Technical Advisory Committee
PDD	Project Design Document
PP	Project Participant
UNFCCC	United Nations Framework Convention for Climate Change
VVB	Validation and Verification Body
VVS	Validation and Verification Standard

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1. INTRODUCTION

1.1 Objective

LGAi Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been contracted by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. to perform the 4th periodical verification of Taishan Geothermal Central Heating System (GS Ref. No. 11167) applying the methodology AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0), the GS4GG Principles and Requirements Version 1.2, the Community Service Activity Requirements Version 1.2. Gold Standard projects must undergo periodic audits and verification of emission reductions as the basis for issuance of Gold Standard VERs.

The objective of the verification work is to comply with the GS4GG Principles and Requirements Version 1.2. According to this assessment Applus+ Certification shall:

- ensure that the project activity "Taishan Geothermal Central Heating System" has been implemented and operated as per registered GS4GG PDD (Version 04 dated 26/09/2021), and that all physical features (technology, project equipment, monitoring and metering equipment) of the project are in place;
- ensure that the final MR and other supporting documents provided are complete, verifiable and in accordance with applicable VVS and Gold Standard requirements;
- ensure that the actual monitoring systems and procedures comply with the monitoring systems and procedures described in the monitoring plan and the approved methodology;
- evaluate the data recorded and stored as per GS Methodology "AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0)".

1.2 Scope

The verification scope encompasses an independent and objective review and ex-post determination of the monitored reductions in GHG emissions by the VVB. The verification is based on the submitted monitoring report, the validated and registered GS4GG PDD as well as its validation report, the applied monitoring methodology, relevant decisions, clarifications and guidance from the CMP and the EB, the GS4GG Principles and Requirements Version 1.2, the Community Service Activity Requirements Version 1.2, and any other information and references relevant to the project activity's resulting emission reductions. These documents are reviewed against the requirements of the Kyoto Protocol, the Gold Standard for Global Goals and related rules and guidance.

Based on the rules defined by GS4GG, as appropriate to the PA, Applus+ Certification has applied a rule-based approach for the verification of the project. The principles of accuracy, completeness, relevance, reliability and credibility were combined with a conservative approach to establish a traceable and transparent verification opinion.

The verification considers both quantitative and qualitative information on emission reductions. The verification also considers the monitoring of sustainable parameters.

The verification is not meant to provide any consultancy towards the client. However, stated requests for clarifications, corrective and/or forward actions may provide input for improvement of the monitoring activities.

1.3 Description of the project activity

Project activity:	Taishan Geothermal Central Heating System
Gold Standard registration number:	11167
Project Participants:	Zhengzhou Onar Heating Co., Ltd. (Project Owner)
Location of the project:	Geographic coordinates (Verified through Google Earth): 113°37'23.8" to 113°38'33.1"E, 34°34'42.8" to 34°35'17.0"N
Date of registration:	22/09/2021
Starting date of the crediting period:	01/04/2023 (1st crediting period)

As per registered GS4GG PDD /03/, the project activity involves the construction and operation of geothermal system with a total heating load of 116.84 MW which can supply geothermal heat to 2,480.907 thousand m² of residential buildings and 94.516 thousand m² of commercial buildings. During this monitoring period, the actual geothermal heat was supplied to 2,459,732.33 m² of residential buildings and 94,236.26 m² of commercial buildings with a total heating load of 115.87 MW. The aim of the project activity is to introduce geothermal energy-based space heating system to realize heat supply to a series of new residential buildings and commercial buildings over winter season, which will displace heat supply from isolated coal-fired boilers as a business-as-usual scenario in the project area in Taishan Village, Longhu Town, Xinzheng City, Henan Province, P.R. China. The project activity enables a series of new residential buildings and commercial buildings to use of geothermal energy instead of the combustion of fossil fuel for space heating, finally provides the affordable and clean Energy to communities in China. As per validation report /04/ of registered GS4GG PDD, the project started construction on 20/05/2020, started test run from 24/10/2020 to 31/10/2020 and was put into operation on 01/11/2020 (winter season). The project is expected to reduce CO₂e emissions with an estimated 143,987 tCO₂e per year during the 1st crediting period.

2. METHODOLOGY

Applus+ Certification's approach to the verification is a two-stage process.

In the 1st stage, Applus+ Certification completed a strategic review and risk assessment of the projects activities and processes in order to gain a full understanding of:

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

Applus+ Certification used a periodical Verification Checklist which, based on the risk-based assessment of the parameters and data collection and handling processes for each of those parameters, describes the verification approach and the sampling plan.

In the 2nd stage, using the Verification Checklist, Applus+ Certification verified the implementation of the monitoring plan and the data presented in the Monitoring Report for the period in question. This involved a site visit (if applicable) and a desk review of the Monitoring Report. This Verification Report describes the findings of this assessment.

2.1 Appointment of the assessment team

According to the sectoral scope / technical area and experience in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of Applus+ Certification.

The composition of audit team shall be approved by the Applus+ Certification ensuring that the required skills are covered by the team.

The four qualification levels for team members that are assigned by formal appointment rules are as presented below:

- Lead Auditor (LA).
- Auditor (A) / Auditor in Training (AiT).
- Technical Expert (TE).
- Technical Reviewer (TR).

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect
Doris Dai	LA/TE	1	1.1	NA
Simon Shen	TR	1	1.1	NA

The curricula vitae of the VVB's validation team members are provided below:

Doris Dai (Master's Degree in Environmental Sciences, Bachelor's Degree in Environmental Technology) is an Auditor appointed by Applus+ LGAI for the GHG project assessment and auditing. She has more than 8 years of working experience in CDM/VCS project assessment and more than 3 years of working experience in GS4GG project assessment. Before she joined Applus+ LGAI, she has been working for CTI Certification as senior GHG Auditor for 3.5 years.

Simon Shen (Master's Degree in Thermal Energy Engineering, Bachelor's Degree in Environmental Engineering) is an Auditor appointed by Applus+ LGAI for the GHG project assessment, auditing and technical review. He has more than 8 years of work experience in CDM/GS4GG/VCS project assessment and review with Applus+, apart from the years of experience working as GHG Auditor and ISO 9001/14001 in TUV SUD before he joined Applus+ for 3.5 years. Simon Shen has extensive experience also as former Applus+ Shanghai CDM Technical Manager.

2.2 Application of materiality

A detailed audit/verification plan has been prepared based on and are responsive to the assessed risks of material errors, omissions or misstatements, and has been submitted to the project participant(s) in due time before the site visit. The project is a large-scale project activity with total emission reductions less than 300,000 tCO₂e per year; as such, as per para 326 of the "CDM validation and verification standard for project activities" version 03.0, a 2% materiality threshold is applied. The errors identified in the project are below the threshold limit of materiality and hence not material. The GHG emission reductions are calculated without material misstatements.

2.3 Document review

The Monitoring Report version 01 was submitted to VVB before the verification activities started. The MR was assessed based on all the relevant documents. The aim of the assessment in the desk review was to:

- verify the completeness of the data and the information presented in the MR;
- check the compliance of the MR with respect to the monitoring plan depicted in the registered GS4GG PDD, verify that the applied methodology was carried out. Particular attention to the frequency of measurements, the quality of the metering equipment including calibration requirements, and the quality assurance and quality control procedures was paid;
- evaluate the data management and the quality assurance and quality control system in the context of their influence on the generation and reporting of emission reductions.

A complete list of documents reviewed is available in chapter 5 of this report.

2.4 Site assessment and follow up interviews

A site visit was conducted on 29/04/2024, the objective of the assessment is to:

- confirm the implementation and operation of the project;
- review the data flow for generating, aggregating and reporting the monitoring parameters;
- confirm the correct implementation of procedures for operations and data collection;
- cross-check the information provided in the MR documentation with other sources;
- check the monitoring equipment against the requirements of the GS4GG PDD and the approved methodology, including calibrations, maintenance, etc.;
- review the calculations and assumptions used to obtain the GHG data and ER;
- identify if the quality control and quality assurance procedures are in place to prevent or correct errors or omissions in the reported parameters.

The standard auditing techniques was applied for verification as referred to GS principles, eg. PRINCIPLES & REQUIREMENTS, RENEWABLE ENERGY ACTIVITY REQUIREMENTS etc. in order to understand general aspects of the project, changes since validation / previous verifications, project operation, implementation of monitoring plan, calibration procedures, quality management system etc. (details has been listed in "subject" in table below). Moreover, the assessment team requests PP to provide supportive materials regarding to the verification during document review stage. The assessment team obtained adequate information to verify the implementation and current situation of the project activity, data management, QA/QC system, project technology and equipment, training provided, implementation of monitoring plan, SDG contributions and safeguarding, calculation of emission reductions, and the consistency between the registered GS4GG PDD and presented situation etc.. During the site visit, the verification team implemented measures which has been established to mitigate the identified risks, and actual risks were not higher than initially assessed. The auditing has been successfully finished. Applus Certification confirms it is sufficient for the purpose of verification by these means.

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			

1.	Liu	Yue	Zhengzhou Onar Heating Co., Ltd. /Vice General Manager	29/04/2024	- General aspects of the project - Changes since validation / previous verifications - Main equipment - Technical parameters - Project boundary - Heat supply situation - Calibration procedures - 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 - Employment	Doris Dai
2.	Zhang	Xiaodong	Zhengzhou Onar Heating Co., Ltd. /Staff	29/04/2024		Doris Dai
3.	Zhang	Panpan	Zhengzhou Onar Heating Co., Ltd. /Staff			
4.	Wang	Yuanyuan	Zhengzhou Onar Heating Co., Ltd. /Staff			
5.	Chen	Qishan	Zhengzhou Onar Heating Co., Ltd. /Staff			
6.	Zhang	Weixiao	End user-local property management Companies (Henan Shangzhou property service Co., LTD) /Staff			
7.	Zhang	Ningning	End user-local property management Companies (Henan Hongbao property service Co., LTD) /Staff	29/04/2024	- Heat supply situation - Heat price - Carbon waiver - Scenario before the project started	Doris Dai
8.	Wang	Guodong	End user-local property management Companies (Henan Tingrui property service Co., LTD) /Staff			
9.	He	Bin	End user-local property management Companies (Zhengzhou Wanjia property service Co., LTD) /Staff			
10.	Shi	Runsheng	Local officer/Xinzheng Development and Reform Commission	29/04/2024	- The impact of the project activity - SDG contribution of the project activity	Doris Dai

11.	Feng	Shengli	Local officer/Xinzheng Branch of Zhengzhou Ecological Environment Bureau		- Any complaints by local stakeholders - Local legislation to heat - Water Usage Permission	
12.	Wang	Yinchao	Local officer/Xinzheng Water Resources Bureau			
13.	Ren	Fan	Local residents in both residential buildings and commercial buildings from Taishan Village	29/04/2024	- Any complaints by local stakeholders - Grievances mechanism and inputs	Doris Dai
14.	Chen	Heyue				
15.	Gao	Wenyan				
16.	Zhang	Chenglin				
17.	Sun	Ronghua				
18.	Qian	Sheng	Local residents from Wangdong Community			
19.	Wang	Yishan	Local residents from No.4 Village Group			
20.	Yang	Yunyun				
21.	Sun	Qiao	Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. / Project Manager	29/04/2024	- Data collection, MR completion and ER calculation	Doris Dai

During the on-site assessment, staffs from project implementer, local authorities, and local stakeholders as above table to confirm that the correctness of the project implementation, SDG contributions and information reported by the PP. The questions asked were basically based on requirements of the GS4GG and MR description. The main topics included, but not limited to, the subjects listed in table above. A summary of key interview questions to stakeholders and feedback received are presented in the below table:

Questions for staffs/stakeholders during the site interviews	Summary of feedback
1. Did the project activity operate normally in winter season during April 2023 to March 2024?	Staff from the project owner: Yes, all the equipment and measuring instruments were working well during this period.
2. What's the main work of the operation staffs?	Staff from the project owner: plant operation and maintenance, data recording etc.
3. Have sufficient trainings have been provided?	Staff from the project owner: All the staffs have accepted a series of training on the plant operation technology, safety, monitoring, environment protection, emergency, maintenance. The training plan was issued and records was prepared and achieved.

Questions for staffs/stakeholders during the site interviews	Summary of feedback
4. Do you think that this project offers opportunities for employment?	Staff from the project owner: Creating 10 full-time job opportunities (5 male and 5 female) for local people during operational period. Local Stakeholder: job opportunities are provide to local residents (5 male and 5 female).
5. Do you think the working condition is safe and healthy?	Staff from the project owner: Yes, it's safe and healthy.
6. How about the income level of the staff?	Staff from the project owner: The salary level is higher than lowest local level.
7. Have social insurance, housing fund and regular physical examination been provided?	Staff from the project owner: The social security and housing fund have been provided.
8. Are you satisfied with your salary?	Staff from the project owner: yes.
9. Are there any comments received from local residents for operation of the project activity?	Staff from the project owner: No.
10. What's the function of property management agency?	Staff from local property management Companies: providing heat supply service to local communities, i.e. Taishan Villa, Zhengrongfu, Wangdong Community and Fourth Villagers Group, transact electricity fee with local grid company, etc.
11. What is the heating area?	Staff from local property management Companies: local communities, i.e. Taishan Villa, Zhengrongfu, Wangdong Community and No.4 Village Group.
12. During April 2023 to March 2024, what is the heat supply period of project activity?	Staff from local property management Companies: November 2023 to March 2024.
13. What's the scenario before the project started and after the project implemented?	Staff from local property management Companies: supplying several building through a small heat distribution network by coal-fired boilers
14. Do you know you have waived ownership of GHG ERs of this project?	Staff from local property management Companies: yes, already mentioned in the Heating Supply Agreement.
15. What about the heat price?	Staff from local property management Companies: preferential heating price was provided to local communities, i.e. 0.185 Yuan/m ² /day, lower than Xinzhen City heating pipe network price (0.19 Yuan/m ² /day).
16. What about Local legislation to geothermal heat?	Staff from local authorities: renewable energy is promoted in local area, the project has acquired approval from local government.
17. What about Water Usage Permission of the project activity?	Staff from local authorities: water is permitted to be used for heating in local area in winter season. The project has acquired Water Usage Permission from local government.
18. Are there any complaints received from local residents?	Staff from local authorities: No. Local residents in both residential buildings and commercial buildings: No.

Questions for staffs/stakeholders during the site interviews	Summary of feedback
19. How do you communicate your questions or comments to the PP?	Staff from local authorities: visit the project site and communicate with the project owner or call the project owner etc. Local residents in both residential buildings and commercial buildings: write comments in comment book, telephone of the project owner is available on the comment book.

The assessment team along with onsite observation, objective evidence collections, data generation and recording analysis also considered the views obtained in these interviews while arriving at Verification Opinion.

2.5 Sampling approach

N.A.

2.6 Quality of evidences

Sufficient evidence covering the full verification period in the required frequency is available to verify the figures stated in the final MR. The source of the evidences will be discussed in section 3 of this report. Specific cross-checks have been done in cases that further sources were available. The monitoring report's figures were checked by the assessment team against the raw data. The data collection system meets the requirements of the monitoring plan as per the methodology.

2.7 Reporting of findings

As an outcome of the verification process, the assessment team can raise different types of findings.

Where a non-conformance arises the assessment team shall raise a Corrective Action Request (CAR). A CAR is issued, where:

- Non-compliance with the monitoring plan or methodology are found in monitoring and reporting and has not been sufficiently documented by the project participants, or if the evidence provided to prove conformity is insufficient;
- Modifications to the implementation, operation and monitoring of the registered project activity has not been sufficiently documented by the project participants;
- Mistakes have been made in applying assumptions, data or calculations of emission reductions that will impact the quantity of emission reductions;
- Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

The assessment team shall raise a Clarification Request (CR) if information is insufficient or not clear enough to determine whether the applicable GS requirements have been met.

All CARs and CRs raised during verification shall be resolved prior to submitting a request for issuance.

Forward Action Requests (FARs) may be raised during verification for actions where the monitoring and reporting require attention and/or adjustment for the next verification period.

The report describe a total number of findings which include:

- 1 Corrective Action Request (CAR);
- 1 Clarification Request (CL/CR);

- 0 Forward Action Requests (FARs).

All CARs, CRs and FARs for this verification period are included in chapter 4 of the report.

2.8 Internal Quality Control

As a final step of verification, the final documentation including the verification report have to undergo an internal quality control by the Technical Reviewer. Each report has to be finally approved either by the VVB's Technical Manager or the Deputy. In case one of these two persons is part of the assessment team, the approval can only be given by the person who is not a part of the assessment team. If the documents have been satisfactorily approved, the Request for Issuance is submitted to the GS Registry along with the relevant documents.

3. VERIFICATION FINDINGS

In the following sections, the results of the verification are stated. The verification results related to the project performance as documented and described in the registered GS4GG PDD (Version 04 dated 26/09/2021) /03/ and Monitoring Report (version 03 dated 28/08/2024) /01/. The verification findings for each verification subject are presented below.

3.1 FARs from Validation / Previous Verification

As this is the 4th periodical verification, after checking validation and verification reports, it is confirmed that no FARs is requested.

3.2 Project Implementation in accordance with the registered Project Design Document

The project activity was fully implemented according to the description presented in registered GS4GG PDD (Version 04 dated 26/09/2021) /03/. The assessment team confirms, through the site visit that all physical features of the project activity including data collecting systems and storage have been implemented in accordance with the registered GS4GG PDD (Version 04 dated 26/09/2021) /03/.

The technical features of the equipments during this monitoring period have been verified by the assessment team during site visit by checking nameplate of main equipment and Heating Supply Agreement /28/, and has been compared with information in the registered GS4GG PDD /03/, which is listed below:

No.	Sub-area	Heat substation	Geothermal wells		Registered GS4GG PDD		This monitoring period	
			Number of production wells	Number of Re-injection wells	Heat load (MW)	Heating area (thousand m ³)	Heat load (MW)	Heating area (thousand m ³)
1	No.4 Village Group	1# TS4G	2	2	11.55	256.6	11.49	255.2728
		2# TS4G	2	2	23.11	513.4	22.92	509.34984
2	Zhengrongfu	3# TSZR	2	2	32.86	730.4	32.43	720.58243
3	Taishan Villa	4# TSTS	1	1	5.20	Commercial buildings 94.516	5.18	Commercial buildings 94.24
		5# TSTS	2	2	19.37	Residential buildings 430.507	19.15	Residential buildings 425.59873
4	Wangdong Community	6# TSWD	2	2	24.75	550	24.70	548.92853
Total		6	11	11	116.84	Residential buildings 2,480.907 Commercial buildings 94.516	115.87	Residential buildings 2,459.73233 Commercial buildings 94.23626

During site visit, the assessment team confirmed that the project introduced geothermal energy-based space heating system to realize heat supply to a series of new residential buildings and commercial buildings over winter season, which will displace heat supply from isolated coal-fired boilers as a business-as-usual scenario in the project area in Taishan Village, Longhu Town, Xinzheng City, Henan Province, P.R. China.

By checking Feasibility Study Report /29/ and monitoring reports and verification reports of previous monitoring periods /8/, it was verified the project uses geothermal resources in cascade levels. The high temperature water can be used to supply heat directly through plate heat exchanger, and the low-temperature water enters the geothermal heat pumps after the heat exchange. Through the secondary heat exchange of the geothermal heat pumps, the temperature of the feed water can be increased to meet the requirements of the terminal heating design parameters. Total of 22 geothermal wells with a design depth of 2,100 meters were constructed and implemented confirmed during site visit, of which the 11 production wells with an average flow rate of 150 m³/h will supply the feed geothermal water at temperature of 75°C to 6 heat substations through primary heating network. The 11 re-injection wells will receive the return water at temperature of 9°C after secondary heat exchange. The 6 heat substations will supply the feed water at temperature of 45°C to the project buildings and receive the return water at temperature of 35°C from them. Besides, a total of 6 heat substations in 4 sub-areas were constructed and implemented to enable the heat exchange between geothermal water transported by the primary heating network and the clean circulation water transported by the secondary network. In addition to water source geothermal heat pumps and air source geothermal heat pumps, the main equipment of the heat substations also includes deep well pumps, hydro-cyclones, plate heat exchangers, circulating pumps, make-up pumps, tanks and water-softening facilities. All the geothermal wells, heat substations and related facilities were newly constructed which has been verified by site inspection.

As per registered GS4GG PDD /03/, the project activity involves the construction and operation of geothermal system with a total heating load of 116.84 MW which can supply geothermal heat to 2,480.907 thousand m² of residential buildings and 94.516 thousand m² of commercial buildings. However, during this monitoring period, since all the communities covered by the project are newly built, some of the local residents haven't moved in yet (no heat demand yet), so the actual geothermal heat was supplied to 2,459,732.33 m² of residential buildings and 94,236.26 m² of commercial buildings with a total heating load of 115.87 MW which has been verified by checking Heating Supply Agreements /28/ and confirmed by on-site inspection and interview. Besides, by checking Operation Logbook /37/, it was verified the utilization hours of the geothermal heating system for residential buildings and commercial buildings were 3,648 and 2,525 hours respectively during this monitoring period.

The project was registered at 22/09/2021 under GS scheme as confirmed by the mail sent by Gold Standard. Moreover, the assessment team has verified the location of the installed equipment and also checked the metering system, found that the installed equipment and metering system are in place and fully consistent with the registered GS4GG PDD /03/.

By checking operation logbook /37/, it is confirmed that no changes were observed during the on-site visit on the physical and spatial configuration of the project. By checking operation logbook /37/, the assessment team is able to confirm that there was no special event occurred during this monitoring period.

As per registered GS4GG PDD and its validation report, it was verified the Project applies 3*5 renewable crediting period. The 1st CP is from 01/11/2020 to 31/10/2025. This monitoring period is from 01/04/2023 to 31/03/2024, which is within 1st CP.

The emission reductions achieved during the current monitoring period are 136,205 tCO₂e within the estimated quantity (143,987 tCO₂e) in the registered PDD for the comparable period.

In conclusion, in view of the information' s verified during site visit, the assessment team is able to confirm that:

- All physical features (technology, project equipment, and monitoring and metering equipment) of the registered GS4GG project activity are in place and that the project participants have operated the project activity as per the registered GS4GG PDD /03/.

- The monitoring system including the measurement of parameters, data collection and archiving was also implemented and operated inline to the registered GS4GG PDD /03/.
- The project contributes to the sustainable development which includes, but not limited to, providing renewable geothermal energy for local communities, creating equal job opportunities for male and female, providing salary higher than local lowest level, providing social insurance, providing trainings and many other benefits to the local residents.
- The emission reduction was achieved in compliance with applied GS methodology and the registered GS4GG PDD /03/. No information with regard to data and variables was identified that may surpass the estimated quantity of ERs in the registered GS4GG PDD /03/.
- There's no post registration change has been occurred during this monitoring period.

3.3 Compliance of the Monitoring Plan with the Monitoring Methodology

The monitoring plan is in accordance with the approved methodology AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0) /09/, applied by the proposed GS project activity. No deviation, correction or permanent change to the monitoring plan has been requested.

Compliance of the monitoring activities related to parameters used in the emission reduction calculations were already verified during the site visit. The monitoring plan outlined in the registered GS4GG PDD /03/ is in accordance with the applied GS methodology "AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0)" /09/ and correctly applied by the registered GS4GG project activity. During the site visit, the assessment team has verified the sustainability of the monitoring plan and found to be in compliance with the registered GS4GG PDD /03/.

The monitoring plan outlined in the registered GS4GG PDD /03/ is in accordance with the applied GS methodology and correctly applied by the project activity.

3.4 Completeness of Data and parameters monitored

GHG parameters:

Relevant SDG Indicator	SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to implement adaptation, mitigation and technology transfer, and development actions.							
Data/parameter:	$\Delta t_{j,d,y}$							
Unit	°C							
Description	Average temperature difference between inlet and outlet temperatures at the downstream of each heat exchanger in year y							
Measured/calculated/default	Measured and calculated							
Source of data	Operation record of the geothermal based space heating system /14/							
Value(s) of monitored parameter	Sub-areas	Heat Substations	Production and Re-injection Well	Nov-2023	Dec-2023	Jan-2024	Feb-2024	Mar-2024
	No.4 Village Group	1# TS4G	1#	11.53	11.49	11.49	11.51	11.52
			2#	11.49	11.54	11.49	11.48	11.45
		2# TS4G	3#	11.47	11.47	11.47	11.49	11.42
			4#	11.25	11.22	11.18	11.20	11.26
	Zhengrongfu	3# TSZR	5#	11.44	11.39	11.41	11.44	11.48

		6#	11.29	11.27	11.26	11.24	11.26																				
	Taishan Villa	4# TSTS	7#	11.69	11.72	11.77	11.72	11.73																			
		5# TSTS	8#	11.29	11.23	11.25	11.27	11.27																			
	9#		11.45	11.49	11.55	11.51	11.48																				
	Wangdong Community	6# TSWD	10#	10.98	11.08	11.02	10.94	11.03																			
11#			11.19	11.05	11.09	11.09	11.17																				
	During site visit, checking equipment and interviewing with the project owner, it was verified the project only operated during winter heating season (November of 2023 till March of 2024) during this monitoring period. The same has been confirmed through checking Research on Heating in Winter of Taishan Village published by Xinzheng Housing and Urban-Rural Development Bureau /13/. Therefore, value of this parameter in rest of this monitoring period other than November 2023 - March 2024 are 0.																										
Information Flow	During site visit, it was verified 22 ultrasonic calorimeters have been installed at downstream inlet and outlet points of 11 heat exchanger systems. For each heat exchanger system, 2 ultrasonic calorimeters were installed, with 1 ultrasonic calorimeter measuring temperature of supply water (outlet) and 1 ultrasonic calorimeter measuring temperature of return water (inlet). The data was continuously measured by these ultrasonic calorimeters and hourly recorded in Operation record of the geothermal based space heating system /14/. The daily average inlet and outlet temperature has been calculated based on hourly monitoring value, while the monthly average inlet and outlet temperature has been calculated based on daily average value. The monthly temperature difference has been calculated via equation “monthly average outlet temperature minus monthly average inlet temperature”. Monitoring of this parameter was verified to be in compliance with registered GS4GG PDD /03/. The calculated temperature difference of this monitoring period has been crosschecked with the Statement from Local Expert which mentioned the temperature difference of end users in local communities should be in the range of 10 - 15°C /15/. Therefore, it was verified the average temperature difference of this monitoring period is within this range and thereby deemed as reasonable. Besides, by checking monitoring reports and verification reports of previous monitoring periods /12/, it was verified the average temperature difference of this monitoring period (11.36°C) was comparable with that of previous monitoring period, i.e. 11.85°C. Data in Operation record of the geothermal based space heating system /14/ have been sent to the Consultant for reporting of GHG emission reduction.																										
Monitoring equipment	Ultrasonic calorimeters, which have been confirmed during site visit.																										
Calibration	The calibration information of ultrasonic calorimeters /21/ have been verified by the assessment team and shown as below: Outlet temperature <table><tr><th>Serial number</th><th>Accuracy Class</th><th>Temperature measurement range</th><th>Calibration date</th><th>Validity date</th></tr><tr><td>Lu00000858</td><td>0.01 °C</td><td>4 °C to 95 °C</td><td>16/10/2023</td><td>15/10/2026</td></tr><tr><td>Lu00000859</td><td>0.01 °C</td><td>4 °C to 95 °C</td><td>16/10/2023</td><td>15/10/2026</td></tr><tr><td>Lu00000860</td><td>0.01 °C</td><td>4 °C to 95 °C</td><td>16/10/2023</td><td>15/10/2026</td></tr></table>							Serial number	Accuracy Class	Temperature measurement range	Calibration date	Validity date	Lu00000858	0.01 °C	4 °C to 95 °C	16/10/2023	15/10/2026	Lu00000859	0.01 °C	4 °C to 95 °C	16/10/2023	15/10/2026	Lu00000860	0.01 °C	4 °C to 95 °C	16/10/2023	15/10/2026
Serial number	Accuracy Class	Temperature measurement range	Calibration date	Validity date																							
Lu00000858	0.01 °C	4 °C to 95 °C	16/10/2023	15/10/2026																							
Lu00000859	0.01 °C	4 °C to 95 °C	16/10/2023	15/10/2026																							
Lu00000860	0.01 °C	4 °C to 95 °C	16/10/2023	15/10/2026																							

	Lu00000861	0.01 °C	4 °C to 95 °C	17/10/2023	16/10/2026
	Lu00000862	0.01 °C	4 °C to 95 °C	17/10/2023	16/10/2026
	Lu00000863	0.01 °C	4 °C to 95 °C	17/10/2023	16/10/2026
	Lu00000864	0.01 °C	4 °C to 95 °C	18/10/2023	17/10/2026
	Lu00000865	0.01 °C	4 °C to 95 °C	18/10/2023	17/10/2026
	Lu00000866	0.01 °C	4 °C to 95 °C	18/10/2023	17/10/2026
	Lu00000867	0.01 °C	4 °C to 95 °C	19/10/2023	18/10/2026
	Lu00000868	0.01 °C	4 °C to 95 °C	19/10/2023	18/10/2026
	Inlet temperature				
	Serial number	Accuracy Class	Temperature measurement range	Calibration date	Validity date
	Lu00000869	0.01 °C	4 °C to 95 °C	19/10/2023	18/10/2026
	Lu00000870	0.01 °C	4 °C to 95 °C	20/10/2023	19/10/2026
	Lu00000871	0.01 °C	4 °C to 95 °C	20/10/2023	19/10/2026
	Lu00000872	0.01 °C	4 °C to 95 °C	20/10/2023	19/10/2026
	Lu00000873	0.01 °C	4 °C to 95 °C	21/10/2023	20/10/2026
	Lu00000874	0.01 °C	4 °C to 95 °C	21/10/2023	20/10/2026
	Lu00000875	0.01 °C	4 °C to 95 °C	22/10/2023	21/10/2026
	Lu00000876	0.01 °C	4 °C to 95 °C	22/10/2023	21/10/2026
	Lu00000877	0.01 °C	4 °C to 95 °C	22/10/2023	21/10/2026
	Lu00000878	0.01 °C	4 °C to 95 °C	23/10/2023	22/10/2026
	Lu00000879	0.01 °C	4 °C to 95 °C	23/10/2023	22/10/2026
	The calibration was conducted by Tianjin Academy of Metrology Supervision and Testing Science, which is accredited by China National Accreditation Service for Conformity Assessment /23/, valid from 31/01/2019 to 30/01/2025. By checking Verification Regulation of Heat Meters (JJG 225-2001) /16/, it was verified the calibration frequency of heat meters should be no longer than 3 years. Therefore, it was verified the calibration frequency is in compliance with JJG 225-2001.				
Measuring/reading/recording	Continuously measured and hourly recorded				

frequency:	
Calculation method (if applicable):	The monthly temperature difference was calculated based on monthly average inlet temperature minus outlet temperature.
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	Calculation of baseline reductions
Additional comments:	Not applicable
Means of verification:	Data of the parameter was verified by checking Operation record of the geothermal based space heating system /14/ and Statement from Local Expert /15/, and the data in the MR is in line with the data source; Information flow was verified by checking Operation record of the geothermal based space heating system /14/, and all information are consistent; Monitoring method was verified by checking monitoring instruments and calibration certificate /21/ during site visit, all monitoring method meets the description in the registered GS4GG PDD; Calibration was verified by checking calibration certificate /21/ and accreditation of calibration party /23/, all calibration of monitoring equipment meets the requirement indicated in the registered GS4GG PDD /03/ and national standard /16/.

Relevant SDG Indicator	SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to implement adaptation, mitigation and technology transfer, and development actions.
Data/parameter:	$FR_{j,d,y}$
Unit	kg/h
Description	Average flow rate at the downstream of each heat exchanger (upstream of which is connected with water supply from the geothermal well j) in year y
Measured/calculated/default	Measured
Source of data	Operation record of the geothermal based space heating system /14/

Value(s) of monitored parameter	Sub-areas	Heat Substation s	Product ion and Re-injectio n Well	Nov-2023	Dec-2023	Jan-2024	Feb-2024	Mar-2024
	No.4 Village Group	1# TS4G	1#	850,190.00	850,278.91	851,228.98	849,992.04	849,809.41
			2#	838,977.00	838,756.90	837,378.43	837,076.78	838,075.73
		2# TS4G	3#	846,560.86	845,323.23	846,891.95	845,277.13	845,129.40
			4#	830,940.86	830,644.34	830,598.51	829,738.23	830,593.31
	Zhengrongfu	3# TSZR	5#	852,414.86	850,659.95	850,869.66	852,596.93	851,461.47
			6#	837,284.46	837,191.77	837,484.03	837,189.83	837,247.85
	Taishan Villa	4# TSTS	7#	845,621.22	845,513.94	845,088.02	844,915.60	845,226.10
		5# TSTS	8#	845,210.07	844,846.01	845,914.41	845,624.05	844,313.90
			9#	830,087.44	831,464.45	831,843.88	830,837.30	831,272.22
	Wangdong Community	6# TSWD	10#	860,592.25	860,072.92	861,129.02	861,498.26	861,290.55
			11#	850,072.50	849,788.55	850,228.32	849,111.06	850,259.99
During site visit, checking equipment and interviewing with the project owner, it was verified the project only operated during winter heating season (November of 2023 till March of 2024) during this monitoring period. The same has been confirmed through checking Research on Heating in Winter of Taishan Village published by Xinzheng Housing and Urban-Rural Development Bureau /13/. Therefore, value of this parameter in rest of this monitoring period other than November 2023 - March 2024 are 0.								
Information Flow	During site visit, it was verified 11 ultrasonic calorimeters have been installed at downstream of 11 heat exchanger systems (1 ultrasonic calorimeter for each heat exchanger system). The data was continuously measured by these ultrasonic calorimeters and hourly recorded in Operation record of the geothermal based space heating system /14/. The daily average flow rate has been calculated based on hourly monitoring value, while the monthly average flow rate has been calculated based on daily average value. The monitoring of this parameter was verified to be in compliance with registered GS4GG PDD /03/. Value of this parameter of this monitoring period was identified to be lower than circulating pumps rates indicated in Table 3 of the registered GS4GG PDD /03/. By checking monitoring reports and verification reports of previous monitoring periods /12/, it was verified average flow rate of all heat exchangers of this monitoring period (844.18 m³/h) was comparable with that of previous monitoring period, i.e. 844.41 m³/h /12/. Besides, as per the Statement from Local Expert, it was verified the average flow rate of heat exchanger of the project activity is about 850m³/h /17/. Therefore, it was verified value of this parameter of this monitoring period is reasonable. Data in Operation record of the geothermal based space heating system /14/ have been sent to the Consultant for reporting of GHG emission reduction.							
Monitoring equipment	Ultrasonic calorimeters, which have been confirmed during site visit.							
Calibration	The calibration information of ultrasonic calorimeters /21/ have been verified by the assessment team and shown as below:							
	Serial	Accuracy	Highest	Calibration	Validity			

	number	Class	measurement flow rate range	date	date
	Lu00000858	0.01 m³/h	1,000 m³/h	16/10/2023	15/10/2026
	Lu00000859	0.01 m³/h	1,000 m³/h	16/10/2023	15/10/2026
	Lu00000860	0.01 m³/h	1,000 m³/h	16/10/2023	15/10/2026
	Lu00000861	0.01 m³/h	1,000 m³/h	17/10/2023	16/10/2026
	Lu00000862	0.01 m³/h	1,000 m³/h	17/10/2023	16/10/2026
	Lu00000863	0.01 m³/h	1,000 m³/h	17/10/2023	16/10/2026
	Lu00000864	0.01 m³/h	1,000 m³/h	18/10/2023	17/10/2026
	Lu00000865	0.01 m³/h	1,000 m³/h	18/10/2023	17/10/2026
	Lu00000866	0.01 m³/h	1,000 m³/h	18/10/2023	17/10/2026
	Lu00000867	0.01 m³/h	1,000 m³/h	19/10/2023	18/10/2026
	Lu00000868	0.01 m³/h	1,000 m³/h	19/10/2023	18/10/2026
	The calibration was conducted by Tianjin Academy of Metrology Supervision and Testing Science, which is accredited by China National Accreditation Service for Conformity Assessment /23/, valid from 31/01/2019 to 30/01/2025. By checking Verification Regulation of Heat Meters (JJG 225-2001) /16/, it was verified the calibration frequency of heat meters should be no longer than 3 years. Therefore, it was verified the calibration frequency is in compliance with JJG 225-2001.				
Measuring/reading/recording frequency:	Continuously measured and hourly recorded				
Calculation method (if applicable):	Not applicable				
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.				
Purpose of data:	Calculation of baseline reductions				
Additional comments:	Not applicable				
Means of verification:	Data of the parameter was verified by checking Operation record of the geothermal based space heating system /14/, monitoring reports and verification reports of previous monitoring period /12/ and Statement from Local Expert /17/, and the data in the MR is in line with the data source; Information flow was verified by checking Operation record of the geothermal based space heating system /14/, and all information are consistent; Monitoring method was verified by checking monitoring instruments and calibration certificate /21/ during site visit, all monitoring method meets the description in the registered GS4GG PDD; Calibration was verified by checking calibration certificate and accreditation of calibration party, all calibration of monitoring equipment meets the requirement indicated in the registered GS4GG PDD /03/ and national standard /16/.				
Relevant SDG Indicator	SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to				

	implement adaptation, mitigation and technology transfer, and development actions.								
Data/parameter:	T_j								
Unit	Hours								
Description	Hours per hear heat utilization in well j								
Measured/calculated/default	Measured								
Source of data	Operation record of the geothermal based space heating system /14/								
Value(s) of monitored parameter	Sub-areas	Heat Substations	Production and Re-injection Well	Nov-2023	Dec-2023	Jan-2024	Feb-2024	Mar-2024	Total
	No.4 Village Group	1# TS4G	1#	720	744	744	696	744	3,648
			2#	720	744	744	696	744	3,648
		2# TS4G	3#	720	744	744	696	744	3,648
			4#	720	744	744	696	744	3,648
	Zhengrongfu	3# TSZR	5#	720	744	744	696	744	3,648
			6#	720	744	744	696	744	3,648
	Taishan Villa	4# TSTS	7#	480	496	527	464	558	2525
		5# TSTS	8#	720	744	744	696	744	3,648
			9#	720	744	744	696	744	3,648
	Wangdong Community	6# TSWD	10#	720	744	744	696	744	3,648
			11#	720	744	744	696	744	3,648
	During site visit, checking equipment and interviewing with the project owner, it was verified the project only operated during winter heating season (November of 2023 till March of 2024) during this monitoring period. The same has been confirmed through checking Research on Heating in Winter of Taishan Village published by Xinzheng Housing and Urban-Rural Development Bureau /13/. Therefore, value of this parameter in rest of this monitoring period other than November 2023 - March 2024 are 0.								
	Information Flow	This parameter was monthly recorded in Operation record of the geothermal based space heating system /14/ by GS monitoring team based on the geothermal based space heating system. The monitoring of this parameter is in compliance with the registered GS4GG PDD /03/. By checking Research on Heating in Winter of Taishan Village published by Xinzheng Housing and Urban-Rural Development Bureau /13/, it is confirmed that winter heating season of Taishan Village is usually from November 1 of this year to March 31 of the next year, 24-hour continuous heating supply are required for residential buildings and 24-hour continuous heating supply is not required for commercial buildings (usually 15-20 hours a day). Therefore, as per this research, for this monitoring period, the operation hours of residential buildings were 152days*24hrs=3648hrs in total, while the operation hours of commercial buildings were 2280 - 3040 hrs in total (152 days*15 hrs and 152 days*20 hrs). Considering Production and Re-injection Well 1#~6# and 8#~11# are serviced for residential buildings, while Production and Re-injection Well 7# is serviced for commercial buildings, it was verified the operation hours of Production and Re-injection Wells recorded in Operation record of the geothermal based space heating system /14/ are reasonable. Besides, by checking monitoring reports and verification reports of previous monitoring periods /12/, it was verified the operation hours during this monitoring period (3,648 hours for residential buildings and 2,525 hours for commercial buildings) was comparable with that of previous monitoring period, i.e. 3,624 hours for residential buildings and 2,420 hours for commercial buildings.							

	Data in Operation record of the geothermal based space heating system /14/ have been sent to the Consultant for reporting of GHG emission reduction.
Monitoring equipment	Not applicable
Calibration	Not applicable
Measuring/reading/recording frequency:	Monthly
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	Calculation of baseline reductions
Additional comments:	Not applicable
Means of verification:	Data of the parameter was verified by checking Operation record of the geothermal based space heating system /14/ and Research on Heating in Winter of Taishan Village published by Xinzhen Housing and Urban-Rural Development Bureau /13/, and the data in the MR is in line with the data source; Information flow was verified by checking Operation record of the geothermal based space heating system /14/, and all information are consistent; Monitoring method was verified by site visit, checking Operation record of the geothermal based space heating system /14/, all monitoring method meets the description in the registered GS4GG PDD; Calibration was not applicable for this parameter.

Relevant SDG Indicator	SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to implement adaptation, mitigation and technology transfer, and development actions.
Data/parameter:	HI _m
Unit	W/m ²
Description	Heating index for construction type m
Measured/calculated/default	Measured
Source of data	Design standards for urban heating pipe networks CJJ/T34-2022
Value(s) of monitored parameter	HI_{m,residential} = 45 W/m² HI_{m,commercial} = 55 W/m²
Information Flow	By checking Design standards for urban heating pipe networks CJJ/T34-2022 /18/ issued by Ministry of Housing and Urban-Rural Development of P.R.China on 29/04/2022, HI_{m,residential} = 45 W/m² for residential buildings while HI_{m,commercial} = 55 W/m² for commercial buildings. By checking monitoring reports and verification reports of previous monitoring periods /12/, it was verified the same value has been applied in previous monitoring period. The data in Design standards for urban heating pipe networks CJJ/T34-2022 /18/ have been sent to the Consultant for reporting of GHG

	emission reduction.
Monitoring equipment	Not applicable
Calibration	Not applicable
Measuring/reading/recording frequency:	Once every verification
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	Calculation of baseline reductions
Additional comments:	Not applicable
Means of verification:	Data of the parameter in the monitoring report have been verified through checking latest version national standard, i.e. Design standards for urban heating pipe networks CJJ/T34-2022 /18/, and all the data are consistent; Information flow was verified by checking latest version national standard, i.e. Design standards for urban heating pipe networks CJJ/T34-2022 /18/, and all information are consistent; Monitoring method was verified by site visit, checking latest version national standard, i.e. Design standards for urban heating pipe networks CJJ/T34-2022 /18/, all monitoring method meets the description in the registered GS4GG PDD; Calibration was not applicable for this parameter.

Relevant SDG Indicator	SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to implement adaptation, mitigation and technology transfer, and development actions.		
Data/parameter:	EC _{PJ,j,y} (EC _y)		
Unit	/		
Description	Electricity consumption for the year y in operating the geothermal heating system		
Measured/calculated/default	Measured		
Source of data	Electricity Meter Reading Records /19/		
Value(s) of monitored parameter	Period	EC _{PJ,j,y} (MWh)	
	01/04/2023-31/10/2023	0	
	01/11/2023-31/11/2023	2,630.33779	
	01/12/2023-31/12/2023	2,524.74886	
	01/01/2024-31/01/2024	2,522.86790	
	01/02/2024-29/02/2024	2,682.45439	
During site visit, checking equipment and interviewing with the project owner, it was verified the project only operated during winter heating season (November of 2023 till March of 2024) during this monitoring			

	period. The same has been confirmed through checking Research on Heating in Winter of Taishan Village published by Xinzheng Housing and Urban-Rural Development Bureau /13/. Therefore, value of this parameter in rest of this monitoring period other than November 2023 - March 2024 are 0.																																			
Information Flow	During site visit, it was verified 6 electricity meters have been installed at 6 heat substations (1 electricity meter for each heat substation). The data was continuously measured by these electricity meters and hourly recorded in Electricity Meter Reading Records /19/. The monitoring of this parameter was verified to be in compliance with registered GS4GG PDD /03/. Trough interviewing with the project owner during site visit, it was verified electricity consumption of the project activity is only part of the power consumption in public area of each sub-area. And the total power consumption fee in public area was paid by 4 local property management Companies, i.e. Henan Shangzhou property service Co., LTD, Henan Hongbao property service Co., LTD, Henan Tingrui property service Co., LTD and Zhengzhou Wanjia property service Co., LTD to local power grid company. By checking Electricity Transaction Agreements signed between the project owner and 4 local property management Companies, it was verified electricity fee of the project activity was paid by the project owner to local property management Companies, and finally to local power grid company. Each of the 4 local property management Companies have issued individual Electricity Receipts for the project activity /20/. Data recorded in Electricity Meter Reading Records /19/ have been crosschecked with that in Electricity Receipts /20/, and verified to be consistent. Besides, by checking monitoring reports and verification reports of previous monitoring periods /12/, it was verified the electricity consumption during this monitoring period (12,978.08MWh) was comparable with that of previous monitoring period, i.e. 13,160.08 MWh. Data in Electricity Meter Reading Records /19/ and Electricity Receipts /20/ have been sent to the Consultant for reporting of GHG emission reduction.																																			
Monitoring equipment	Electricity meters, which have been confirmed through site visit.																																			
Calibration	By checking the Calibration Certification of electricity meters /22/, the calibration information are verified by the assessment team and shown as below: <table><tr><th>Serial number</th><th>Accuracy Class</th><th>Model</th><th>Calibration date</th><th>Validity date</th></tr><tr><td>111520042063</td><td>0.5S</td><td>DDS606 15(60)A</td><td>24/10/2020</td><td>23/10/2025</td></tr><tr><td>111520042064</td><td>0.5S</td><td>DDS606 15(60)A</td><td>24/10/2020</td><td>23/10/2025</td></tr><tr><td>111520042065</td><td>0.5S</td><td>DDS606 15(60)A</td><td>24/10/2020</td><td>23/10/2025</td></tr><tr><td>111520042066</td><td>0.5S</td><td>DDS606 15(60)A</td><td>25/10/2020</td><td>24/10/2025</td></tr><tr><td>111520042067</td><td>0.5S</td><td>DDS606 15(60)A</td><td>25/10/2020</td><td>24/10/2025</td></tr><tr><td>111520042068</td><td>0.5S</td><td>DDS606 15(60)A</td><td>25/10/2020</td><td>24/10/2025</td></tr></table>	Serial number	Accuracy Class	Model	Calibration date	Validity date	111520042063	0.5S	DDS606 15(60)A	24/10/2020	23/10/2025	111520042064	0.5S	DDS606 15(60)A	24/10/2020	23/10/2025	111520042065	0.5S	DDS606 15(60)A	24/10/2020	23/10/2025	111520042066	0.5S	DDS606 15(60)A	25/10/2020	24/10/2025	111520042067	0.5S	DDS606 15(60)A	25/10/2020	24/10/2025	111520042068	0.5S	DDS606 15(60)A	25/10/2020	24/10/2025
Serial number	Accuracy Class	Model	Calibration date	Validity date																																
111520042063	0.5S	DDS606 15(60)A	24/10/2020	23/10/2025																																
111520042064	0.5S	DDS606 15(60)A	24/10/2020	23/10/2025																																
111520042065	0.5S	DDS606 15(60)A	24/10/2020	23/10/2025																																
111520042066	0.5S	DDS606 15(60)A	25/10/2020	24/10/2025																																
111520042067	0.5S	DDS606 15(60)A	25/10/2020	24/10/2025																																
111520042068	0.5S	DDS606 15(60)A	25/10/2020	24/10/2025																																

	The calibration was conducted by Shenzhen Zhongdian Metrology and Testing Technology Co., Ltd., which is accredited by China National Accreditation Service for Conformity Assessment /24/, valid from 13/02/2020 to 20/11/2023. By checking Verification Regulation of Electrical Meters for Measuring Alternating-current Electrical Energy (JJG 596-2012) /25/, it was verified the calibration frequency of electricity meters with accuracy of 0.5S should be no longer than 6 years. Therefore, it was verified the calibration frequency is in compliance with JJG 596-2012.
Measuring/reading/recording frequency:	continuously measured and monthly recorded
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Data in the Electricity Meter Reading Records /19/ have been crosschecked with that in the Electricity Receipts /20/. The conservative value between Electricity Meter Reading Records /19/ and Electricity Receipts /20/ was used to calculate emission reductions. Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	Calculation of project reductions
Additional comments:	Not applicable
Means of verification:	Data of the parameter in the monitoring report have been verified through checking Electricity Meter Reading Records /19/ and Electricity Receipts /20/, and the data in the MR is in line with the data source; Information flow was verified by checking Electricity Meter Reading Records /19/ and Electricity Receipts /20/, and all information are consistent; Monitoring method was verified by checking monitoring instruments during site visit, checking calibration certificates, all monitoring method meets the description in the registered GS4GG PDD; Calibration was verified by checking calibration certificate and accreditation of calibration party, all calibration of monitoring equipment meets the requirement indicated in the registered GS4GG PDD /03/ and national standard /25/.

Relevant SDG Indicator	SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to implement adaptation, mitigation and technology transfer, and development actions.
Data/parameter:	$EF_{EL,j,y} (EF_{grid,CM,y})$
Unit	tCO ₂ /MWh
Description	Combined margin emission factor for the grid in year y
Measured/calculated/default	Default value
Source of data	2023 China regional power grid baseline emission factors for Emission reduction projects issued by China DNA on 08/07/2024 /26/
Value(s) of monitored parameter	0.57335

Information Flow	As per registered GS4GG PDD /03/, this parameter should be monitored as per Tool 07 Tool to calculate the emission factor for an electricity system (Version 07.0). As per the Tool 07 Tool to calculate the emission factor for an electricity system (Version 07.0), $EF_{EL,j,y}$ ($EF_{grid,CM,y}$) is calculated via equation "$EF_{grid,OM,y} * 0.5 + EF_{grid,BM,y} * 0.5$". And $EF_{grid,OM,y}$ and $EF_{grid,BM,y}$ could be monitored annually expost. By checking latest version baseline emission factors issued by Chinese government, i.e. 2023 China regional power grid baseline emission factors for Emission reduction projects /26/, it was verified $EF_{grid,OM,y} = 0.8771$ tCO₂/MWh while $EF_{grid,BM,y} = 0.2696$ tCO₂/MWh for Central China Regional Power Grid (CCPG) where the project activity connected to. Latest version baseline emission factors have been used to calculate the project emissions, which is verified to be in compliance with registered GS4GG PDD /04/. The data in 2023 China regional power grid baseline emission factors for Emission reduction projects /26/ have been sent to the Consultant for reporting of GHG emission reduction.
Monitoring equipment	Not applicable
Calibration	Not applicable
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	Calculation of baseline reductions
Additional comments:	Not applicable
Means of verification:	Data of the parameter in the monitoring report have been verified through checking latest version baseline emission factors issued by Chinese government, i.e. 2023 China regional power grid baseline emission factors for Emission reduction projects /26/, and all the data are consistent; Information flow was verified by checking latest version baseline emission factors issued by Chinese government, i.e. 2023 China regional power grid baseline emission factors for Emission reduction projects /26/, and all information are consistent; Monitoring method was verified by site visit, checking latest version baseline emission factors issued by Chinese government, i.e. 2023 China regional power grid baseline emission factors for Emission reduction projects /26/, all monitoring method meets the description in the registered GS4GG PDD; Calibration was not applicable for this parameter.
Relevant SDG Indicator	SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to implement adaptation, mitigation and technology transfer, and development actions.
Data/parameter:	$TDL_{j,y}$

Unit	/
Description	Average technical transmission and distribution losses for providing electricity to source j in year y
Measured/calculated/default	Default value
Source of data	Methodological tool Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0) /11/
Value(s) of monitored parameter	20%
Information Flow	The most recent figure was followed up by the project owner annually. However, the data from the relevant year of the monitoring period and the most recent years not older than 5 years is absent. Therefore, the default value from latest version methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 03.0, was adopted to calculate the project emissions. By checking monitoring reports and verification reports of previous monitoring periods /12/, it was verified the same value has been applied in previous monitoring period. The data in Methodological tool Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0) /11/ have been sent to the Consultant for reporting of GHG emission reduction.
Monitoring equipment	Not applicable
Calibration	Not applicable
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	Calculation of project reductions
Additional comments:	Not applicable
Means of verification:	Data of the parameter in the monitoring report have been verified through checking latest version methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 03.0 /11/, and all the data are consistent; Information flow was verified by checking latest version methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 03.0 /11/, and all information are consistent; Monitoring method was verified by site visit, checking latest version methodological tool "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" version 03.0 /11/, all monitoring method meets the description in the registered GS4GG PDD; Calibration was not applicable for this parameter.

Relevant SDG Indicator	SDG 7 – Affordable and Clean Energy SDG indicator 7.2.1 - Renewable energy share in the total final energy consumption. SDG 13 – Climate Action SDG indicator 13.3.2 - Number of countries that have communicated the strengthening of institutional, systemic and individual capacitybuilding to implement adaptation, mitigation and technology transfer, and development actions.			
Data/parameter:	A _m			
Unit	m ²			
Description	Net heating area for construction type m			
Measured/calculated/default	Measured			
Source of data	Heating Supply Agreements /28/			
Value(s) of monitored parameter	Sub-areas	Heat Substations	Residential	Commercial
	No.4 Village Group	1# TS4G	255,272.8	0.00
		2# TS4G	509,349.84	0.00
	Zhengrongfu	3# TSZR	720,582.43	0.00
	Taishan Villa	4# TSTS	0.00	94,236.26
		5# TSTS	425,598.73	0.00
	Wangdong Community	6# TSWD	548,928.53	0.00
	Total		2,459,732.33	94,236.26
Information Flow	This parameter was yearly measured by 4 local property management Companies, i.e. Henan Shangzhou property service Co., LTD, Henan Hongbao property service Co., LTD, Henan Tingrui property service Co., LTD and Zhengzhou Wanjia property service Co., LTD and recorded in Heating Supply Agreements /28/. The monitoring of this parameter is in compliance with the registered GS4GG PDD /03/. By checking Certificates of Enterprise Investment Project of the project activity issued by Xinzheng Development and Reform Commission /30/, it was verified the net heating area should be about 770,000m² in No.4 Village Group, about 730,400m² in Zhengrongfu, about 525,000m² in Taishan Villa, and about 550,000m² in Wangdong Community. Considering all the communities covered by the project are newly built, some of the local residents haven't moved in yet (no heat demand yet) during this monitoring period, the assessment team verified the net heating area of 4 sub-areas, i.e. No.4 Village Group, Zhengrongfu, Taishan Villa, and Wangdong Community are reasonable. Besides, the total net heating area during this monitoring period was comparable with that of previous monitoring period, i.e. 2,441,477.26 m² for residential buildings and 93,676.08 m² for commercial buildings /8/. Data in Heating Supply Agreements /28/ have been sent to the Consultant for reporting of GHG emission reduction.			
Monitoring equipment	Not applicable			
Calibration	Not applicable			
Measuring/reading/recording frequency:	Yearly			
Calculation method (if applicable):	Not applicable			

QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	Calculation of baseline reductions
Additional comments:	Not applicable
Means of verification:	Data of the parameter was verified by checking Heating Supply Agreements /28/ and Certificates of Enterprise Investment Project of the project activity issued by Xinzheng Development and Reform Commission /30/, and the data in the MR is in line with the data source; Information flow was verified by checking Heating Supply Agreements /28/, and all information are consistent; Monitoring method was verified by site visit, checking Heating Supply Agreements /28/, all monitoring method meets the description in the registered GS4GG PDD; Calibration was not applicable for this parameter.

Parameters Fixed ex-ante:

Below data has been verified against the data sources and the registered GS4GG PDD /03/.

SDG Indicator	Data and parameter	Unit	Value applied	Assessment Opinion
13 Emissions Reductions	$EF_{CO_2,i}$	tCO ₂ /TJ	87.3	As per registered GS4GG PDD /03/, default values of coking coal at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol.2 (Energy) of 2006 IPCC Guidelines on National GHG Inventories was applied for the project activity, which is conservative and is in compliance with the applied methodology AM0072 (Version 03.0).
	$\eta_{BL,i}$	/	85%	As per registered GS4GG PDD /03/, default baseline efficiency of new coal fired boiler from Table 4 of AM0072 (Version 03.0) was applied for this parameter.
	$Loss_{i,y}^{BL}$	TJ/yr	0	As per registered GS4GG PDD /03/, a conservative value of 0% from paragraph 66 option 1 of AM0072 (Version 03.0) was applied for this parameter.
	Subscript i	/	Coal fired boilers in boiler houses, supplying several buildings through a heat distribution network	As per registered GS4GG PDD /03/, heat supply system using coal-fired boilers is identified as the baseline scenario of the proposed project activity. Therefore, value of this parameter is reasonable.
	Subscript j	/	Geothermal wells number j = 1 to 22	As per registered GS4GG PDD /03/, total of 22 geothermal wells including 11 production wells and 11 re-injection wells were involved in the boundary of the project activity, which is derived from FSR /29/ and verified as actual during site visit.
	Subscript m	/	Residential and commercial	As per registered GS4GG PDD /03/, the space heating construction type of the project activity only involves residential and commercial space heat, which is derived from FSR /29/ and verified as

				actual during site visit.
	Subscript k	/	Sub-station number k=1 to 6	As per registered GS4GG PDD /03/, total of 6 sub-stations were involved in the boundary of the project activity, which is derived from FSR /29/ and verified as actual during site visit.
	Loss ^{PJ} _y	TJ/yr	10%	As per registered GS4GG PDD /03/, a 10% was applied for this parameter, which is sourced from "Onar Water Source Heat Pump Instruction Manual" and is in compliance with the applied methodology AM0072 (Version 03.0).
	W _i	/	1	As per registered GS4GG PDD /03/, baseline scenario of the project is "Coal fired boilers in boiler houses, supplying several buildings through a heat distribution network". Via checking Research on Heating in Winter of Taishan Village published by Xinzheng Housing and Urban-Rural Development Bureau /13/, it is confirmed that all the heating in winter of residential buildings and commercial buildings were supplied by coal fired boilers in Taishan Village. Therefore, it was verified only one technology would be used in local area under baseline scenario and value of this parameter is determined to be 1, which is in compliance with the applied methodology AM0072 (Version 03.0).
	H _{ff}	TJ	0	As per registered GS4GG PDD (Version 04 dated 26/09/2021) /03/, No fossil fuel boilers used to meet the heat demand of the project heating network. The same has been verified during site inspection. Therefore, value of this parameter is determined to be 0.

3.5 SDG Outcomes Monitoring

In the registered GS4GG PDD (Version 04 dated 26/09/2021) /03/, 2 data/parameters are chosen for the monitoring of SDG 8 (please refer to section 3.4 of this report for assessment of the rest 8 parameters for SDG 7 and 13). Besides, no safeguard principle monitoring parameters have been identified in registered GS4GG PDD (Version 04 dated 26/09/2021) /03/. The verification of the data/parameters for SDG 8 required by the monitoring plan is provided as follows:

Relevant SDG Indicator	SDG 8 - Decent Work and Economic Growth 8.5.2 Unemployment rate, by sex, age and persons with disabilities
Data/parameter:	Number of males and females employed by the project
Unit	/
Description	Jobs created for both men and women
Measured/calculated/default	Not applicable

Source of data	Record keeping book /32/
Value(s) of monitored parameter	10 employment opportunities, including 5 female and 5 male have been provided.
Monitoring equipment	Not applicable
Measuring/reading/recording frequency:	Once each verification
Calculation method (if applicable):	Not applicable
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Purpose of data:	SDG claim
Additional comments:	Not applicable
Means of verification:	By checking Record keeping book /32/ and Labor Contracts /36/, it is confirmed 10 employment opportunities, including 5 female and 5 male have been provided, which is in compliance with registered GS4GG PDD /03/. Besides, the same amount of employment opportunities have been provided during previous monitoring period /12/.

Relevant SDG Indicator	SDG 8 - Decent Work and Economic Growth 8.5.2 Unemployment rate, by sex, age and persons with disabilities		
Data/parameter:	Average monthly salary		
Unit	RMB/person		
Description	This parameter states the payment conditions of the people employed within the project. Equal pay for work of equal value regardless of gender.		
Measured/calculated/default	Not applicable		
Source of data	Record keeping book /32/		
Value(s) of monitored parameter		vintage	Average salary
		2023	4,400
		2024	5,000
Monitoring equipment	Not applicable		
Measuring/reading/recording frequency:	Annually		
Calculation method (if applicable):	Not applicable		
QA/QC procedures:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.		
Purpose of data:	SDG claim		
Additional comments:	Not applicable		
Means of verification:	By checking Record keeping book /32/, Payment roll /34/ and Labor Contract /36/, it is confirmed the average monthly salary of staff provided by the project owner was 4,400 RMB/person in year 2023 and 5,000 RMB/person in year 2024 (4,550 RMB/person for this monitoring period		

	which calculated via equation: $(4,400 \times 9 + 5,000 \times 3) / 12 = 4,550$ RMB/person), which are much higher than lowest salary level of Xinzheng City, i.e. 2,100 RMB/person indicated in "Notice on Adjusting the Minimum Wage Standard of Henan Province" /33/ issued by People's Government of Henan Province on 27/12/2023. Therefore, the assessment team deemed the project activity contributes to employment in local area. Besides, the average monthly salary provided was higher than that of previous monitoring period, i.e. 4,100 RMB/person.
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During the site visit, it was able to confirm that a grievance expression book /27/ with contact information was provided in Taishan village by the project owner for grievance mechanism and continues inputs, also by checking the comment book and staff in charge of Telephone access and internet Internet/email access; it was able to confirm there are no comments received during the monitoring period surely legal disputes / pending judicial processes detected.

Applus+ Certification checked all registries including VCS (<http://www.vcsprojectdatabase.org/>) /38/ and CDM (<https://cdm.unfccc.int/Projects/projsearch.html>) /39/, there are no double counting for this monitor period for the project as the project only registered under Gold Standard. Besides, a no double counting declaration /31/ has been provided by the project owner and verified by the assessment team.

In Summary, it is Applus+ Certification's opinion that the monitoring of the project owner regarding to sustainability is in line with requirement of the GS4GG Principles and Requirements Version 1.2.

3.6 Assessment of Data and Calculation of Greenhouse Gas Emission Reductions

As a result of verification of the ER calculation process, the assessment team confirmed that all the parameters required for the determination of the emission reductions have been included in the Monitoring report (version 03 dated 28/08/2024) /01/, ER calculation spreadsheet, which are consistent with the applied GS Methodology "AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0)" /09/ and the monitoring plan contained in the registered GS4GG PDD (Version 04 dated 26/09/2021) /03/. The parameters are complete in this monitoring period.

After verifying the reported figures with the raw data sources, it's confirmed that the values of the parameters from the raw data sources are consistent with those quoted in the Monitoring Report (version 03 dated 28/08/2024) /01/ and ER calculation spreadsheet /02/. The verification process for the same has been clearly described in section 3.4 of this report. See below for the detailed data:

Baseline emissions:

$$BE_y = \sum_i (HS_{i,y}^{BL}) \times EF_{CO_2,i} / \eta_{BL,i}$$

Where:

- BE_y = The baseline emissions from heat displaced by the project activity during the year y (t CO₂e/yr).
- $EF_{CO_2,i}$ = The CO₂ emission factor per unit of energy of the fuel of technology i that would have been used in the baseline heating technology in (t CO₂/TJ). Where several fuel types are used in the boiler, use the fuel type with the lowest CO₂ emission factor.
- $\eta_{BL,i}$ = The net thermal efficiency of the heating technology i using fossil fuel that would have been used in the absence of the project activity.

$HS_{i,y}^{BL}$ = The net output of heat generated by the baseline heat supply system using the technology i measured at the end point of the heat facility, during the year y (TJ/yr).

$$HS_{i,y}^{BL} = w_i \times (HS_y - Loss_y^{PJ} + Loss_y^{BL})$$

Where:

$HS_{i,y}^{BL}$ = The net output of heat generated by the baseline heat supply system using the technology i measured at the end point of the heat facility, during the year y (TJ/yr).

w_i = Assign weights for heat generated by technology i. As per section B.4 of this PDD, the baseline scenario of the project is 3(i) "Coal fired boilers in boiler houses, supplying several buildings through a heat distribution network". Only one technology will be used.

HS_y = Net quantity of heat supplied by the geothermal heat resource(s) in the project activity, during the year y (TJ/yr).

$Loss_y^{PJ}$ = The net distribution losses of the geothermal heat supply system during the year y (TJ/yr).

$Loss_y^{BL}$ = The net distribution losses of the heat supply system, in the absence of project activity, during the year y (TJ/yr).

$$HS_y = \min \{H_{CAP}, HS_{y,estimated}\}$$

$$H_{CAP} = (\sum_m A_m \times HI_m \times T_j) \times CF + Loss_y^{PJ} - H_{ff}$$

Where:

H_{CAP} = The net quantity of heat supplied by the geothermal heat resource(s) in the project activity, during the year y (TJ).

A_m = Net heating area for construction type m (m^2).

HI_m = Heating index for construction type m (GW/m^2).

T_j = Number of hours per year heat utilization at well j.

CF = Conversion factor from GWh to TJ (3.6).

$Loss_y^{PJ}$ = Heat distribution losses from substation k to space heating areas (To be determined in Sub-step 2.b of AM0072).

H_{ff} = Heat supplied by fossil fuel boiler; in case a boiler is used to meet the heat demand of network.

$$HS_{y,estimated} = \sum_j (Q_{j,d,y} \times T_j \times CF)$$

Where:

$HS_{y,estimated}$ = Estimated quantity of heat supplied by the geothermal heat resource(s) in the project activity, during the year y (TJ)

$Q_{j,d,y}$ = Heat supplied at the downstream of heat exchanger (upstream of which is connected with water supply from the geothermal well j) (GW).

T_j = Number of hours per year heat utilization at well j.

CF = Conversion factor from GWh to TJ (3.6).

$$Q_{j,d,y} = \frac{FR_{j,d,y} \times \Delta t_{j,d,y} \times 4.18}{3.6} \times 10^{-9}$$

Where:

$FR_{j,d,y}$ = Average flow rate at the downstream of heat exchanger (upstream of which is connected with water supply from the geothermal well j) in year y (kg/hr).

$\Delta t_{j,d,y}$ = Heat supplied at the downstream of heat exchanger (upstream of which is connected with water supply from the geothermal well j) ($^{\circ}\text{C}$).

Based on parameters justified in section 3.4 and equations above, it is confirmed that BE_y was calculated to be:

Date	H _{cap} (TJ)	HS _{y,estimated} (TJ)	HS _y (TJ)	Loss ^{PJ} _y (TJ)	Loss ^{BL} _y (TJ)	HS ^{BL} _{i,y} (TJ)	EF _{CO2,i} (tCO ₂ /TJ)	η _{BL,i}	BE _y (tCO _{2e} /yr)
	A	B	C=min(A,B)	D	E	F	G	H	I=F*G/H
01/04/2023-31/10/2023	0	0	0	0	0	0	87.3	85%	0
01/11/2023-31/11/2023	323.65	307.91	307.91	29.42	0	278.48			28,601
01/12/2023-31/12/2023	334.44	317.69	317.69	30.40	0	287.29			29,506
01/01/2024-31/01/2024	334.96	319.17	319.17	30.45	0	288.72			29,653
01/02/2024-29/02/2024	312.87	296.99	296.99	28.44	0	268.55			27,581
01/03/2024-31/03/2024	335.48	320.61	320.61	30.50	0	290.11			29,796
01/04/2023-31/12/2023	658.10	625.60	625.60	59.83	0	565.77			58,107
01/01/2024-31/03/2024	983.31	936.77	936.77	89.39	0	847.38			87,030
01/04/2023-31/03/2024	1,641.41	1,562.37	1,562.37	149.22	0	1,413.15			145,137

Project emissions:

$$PE_y = PE_{FE,y} + PE_{EC,y} + PE_{FF,y}$$

Where:

- PE_y = Project emissions during the year y (t CO₂e/yr).
 $PE_{FE,y}$ = Fugitive emissions of carbon dioxide and methane due to release of non-condensable gases from geothermal resources (t CO₂e/yr).
 $PE_{EC,y}$ = Project emissions from additional electricity consumption as a result of the project activity (t CO₂e/yr).
 $PE_{FF,y}$ = Project emissions from fossil fuel consumed as a direct result of the operations of the project activity (t CO₂e/yr).

Via site inspection and checking FSR /29/, the geothermal system of the project is designed to operate by extracting geothermal water at approximately 75°C, which is considered to be a low-temperature system. As per paragraph 84 of AM0072 (Version 03.0), fugitive emissions from low temperature geothermal system is considered negligible. Therefore, $PE_{FE,y} = 0$ tCO₂.

Via site inspection, interviewing with the project owner, and checking monitoring reports and verification reports of previous monitoring periods, it was verified no fossil fuel was used to operate the geothermal facilities. Therefore, $PE_{FF,y} = 0$ tCO₂.

Therefore, $PE_y = PE_{EC,y}$

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

Where:

- $PE_{EC,y}$ = Project emissions from electricity consumption in year y (t CO₂/yr).
 $EC_{PJ,j,y}$ = Quantity of electricity consumed by the project electricity consumption source j in year y (MWh/yr).
 $EF_{EL,j,y}$ = Emission factor for electricity generation for source j in year y (t CO₂/MWh).
 $TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y.

Based on parameters justified in section 3.4 and equations above, it is confirmed that $PE_{EC,y}$ was calculated to be:

Date	$EC_{PJ,j,y}$ (kWh)	$EC_{PJ,j,y}$ (MWh)	$EF_{EL,j,y}$ (tCO ₂ /MWh)	(1+TDL _{j,y})	$PE_{EC,y}$ (tCO ₂ e/yr)
01/04/2023-31/10/2023	0	0	0.57335	1.2	0
01/11/2023-31/11/2023	2,617,675.38	2,617.67538	0.57335	1.2	1,802
01/12/2023-31/12/2023	2,630,337.79	2,630.33779	0.57335	1.2	1,810
01/01/2024-31/01/2024	2,524,748.86	2,524.74886	0.57335	1.2	1,738
01/02/2024-29/02/2024	2,522,867.90	2,522.86790	0.57335	1.2	1,736
01/03/2024-31/03/2024	2,682,454.39	2,682.45439	0.57335	1.2	1,846

01/04/2023-31/12/2023	5,248,013.17	5,248.01317	0.57335	1.2	3,612
01/01/2024-31/03/2024	7,730,071.15	7,730.07115	0.57335	1.2	5,320
01/04/2023-31/03/2024	12,978,084.32	12,978.08432	0.57335	1.2	8,932

Therefore, project emissions PE_y were calculated to be:

Parameter	Monitoring period	
	01/04/2023-31/12/2023	01/01/2024-31/03/2024
$PE_{FE,y}$ (tCO ₂)	0	0
$PE_{FF,y}$ (tCO ₂)	0	0
$PE_{EC,y}$ (tCO ₂)	3,612	5,320
PE_y (tCO₂)	3,612	5,320

Leakage:

As per registered GS4GG PDD /03/, no leakage emissions have been identified for the project activity. Therefore, $LE_y=0$ tCO₂.

Emission reductions:

Parameter	Monitoring period	
	01/04/2023-31/12/2023	01/01/2024-31/03/2024
BE_y (tCO ₂)	58,107	87,030
PE_y (tCO ₂)	3,612	5,320
LE_y (tCO ₂)	0	0
ER_y (tCO₂)	54,495	81,710

The calculation tool, i.e. the ER calculation spreadsheet /02/ clearly and transparently describes the calculation of emission reductions. The ER calculation spreadsheet /02/ is indicated with the issuing date and revision number. The assessment team re-produced the calculation process and confirmed that the methods and formulae used to obtain the baseline, project and leakage emissions are appropriate. The calculation has been done in accordance with the methods and formulae described in the registered monitoring plan and applicable methodology.

The reported data have been cross-checked against other sources available as explained above in section 3.4 of the report.

The assessment team confirms that all the assumptions, emission factors and default values (ex-ante values) from PDD have been correctly justified. All the emission factors and default values are explicitly mentioned in the monitoring report /01/.

Comparison achieved SDG Impacts with estimated value in approved PDD:

The verification team has checked if the MR includes a comparison of actual values of the monitoring period with the estimations in the registered GS4GG PDD /03/ for each SDG impact. Conclusion is as below table.

Item	Indicator	Values estimated in ex ante calculation of registered documents	Actual values achieved during this monitoring period
SDG 13	GHG emission reductions	143,987 tCO ₂	136,205 tCO ₂

SDG 7	Net heating area for construction type m (A_m)	2,480.907 thousand m^2 for residential buildings and 94.516 thousand m^2 for commercial buildings	2,459,732.33 m^2 for residential buildings and 94,236.26 m^2 for commercial buildings
SDG 8	Number of males and females employed by the project	10 jobs created including 5 males and 5 females	10 jobs created including 5 males and 5 females
	Average monthly salary	3,500 RMB/Person	4,550 RMB/Person

For SDG 13, it was mentioned in the registered GS4GG PDD /03/, "The annual average CO₂ emission reductions are estimated as 143,987 tCO₂e". In the MR, the SDG impact achieved was: 143,987 tCO₂ emission reductions achieved during this monitoring period from 01/04/2023 to 31/03/2024.

The assessment team confirmed that the actual CO₂ emission reductions was 5.40% less than that estimated. Via interviewing the project owner during site visit, checking Heating Supply Agreement /28/, it was verified the difference was due to less heating area during this monitoring period. Besides, by checking Operation record of the geothermal based space heating system /14/, it was verified the different inlet and outlet temperatures/ flow rate of the heat exchangers, continuous heating hours may also impact CO₂ emission reductions. Therefore, the assessment team deemed the difference between actual and estimated CO₂ emission reductions is reasonable.

For SDG 7, it was mentioned in the registered GS4GG PDD /03/, "The heating area for residential buildings are 2,480.907 thousand m^2 and 94.516 thousand m^2 for commercial buildings". In the MR, the SDG impact achieved was: net heating area of 2,459,732.33 m^2 for residential buildings and 94,236.26 m^2 for commercial buildings achieved during this monitoring period from 01/04/2023 to 31/03/2024.

The assessment team confirmed that the actual CO₂ emission reductions was 5.40% less than that estimated, and the actual net heating area was 0.85% less than that estimated for residential buildings and 0.29% less than that estimated for commercial buildings. During site visit, it was verified all the communities covered by the project are newly built, some of the local residents haven't moved in yet (no heat demand yet) during this monitoring period. Therefore, the assessment team deemed the difference between actual and estimated heating area is reasonable.

For SDG 8, it was mentioned in the registered GS4GG PDD /03/, "10 jobs are created including 5 males and 5 females. Average monthly salary is 3,500 RMB/person with equal salaries for men and women in the same post". In the MR, the SDG impact achieved was: 10 jobs created including 5 males and 5 females with average monthly salary of 4,550 RMB/Person during this monitoring period from 01/04/2023 to 31/03/2024.

The assessment team confirmed that the project offered same amount of job opportunities for male and female during this monitoring period as compared with that estimated. As verified, the monthly salary provided during this monitoring period was higher than that estimated in the registered GS4GG PDD /03/ and much higher than lowest salary level of Xinzhen City, i.e. 2,100 RMB/person indicated in "Notice on Adjusting the Minimum Wage Standard of Henan Province" /33/ issued by People's Government of Henan Province on 27/12/2023. Therefore, the assessment team deemed the difference between actual and estimated job opportunities and monthly salary is reasonable.

3.7 Management and Operational System

The responsibilities of data measurement, collection, verifying, archiving etc. have been clearly defined in the Project Operation Manual. The data related to ER calculation as well as data monitoring, collection process etc. have been internally reviewed by the management of the Monitoring team regularly. The responsibility of each function is consistent with the monitoring plan in the registered PDD.

- Mr. Liu Yue, Project Director is responsible for supervising the whole issues in the project activity;
- Mr. Zhang Xiaodong (O&M Manager) is responsible for data collection, verifying and archiving;
- Mr. Chen Qishan and Ms. Wang Yuanyuan (O&M Manager) is responsible for collating records and management of verification materials;
- Ms. Sun Qiao from the Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. is responsible for preparing the Monitoring Report and ER calculation.

The information flow of each parameter has been verified by the assessment team via interviewing with responsible personnel and checking with the Project Operation Manual.

It's verified during site visit the monitoring procedure as well as the internal quality management and control procedures are stipulated in the Project Operation Manual. The procedure are issued and approved by the top management. The monitoring personnel have been interviewed by the assessment team and it's confirmed that the monitoring is implemented as per the procedure. Also, the training record /35/ has been checked by the assessment team and it is confirmed that the monitoring personnel are get sufficient train to perform the monitoring.

All the data and documents, either hard copies or electric copies, will be kept for two years after the end of the last crediting period or the last issuance of GS VERs for this Project, whichever occurs later.

4. SUMMARY OF FINDINGS

Type:	☐ CAR	☒ CL/CR	☐ FAR	Number:	#1																																																								
Raised by:	Doris Dai																																																												
Description of the audit finding				Date:	30/04/2024																																																								
As per registered GS4GG PDD, the project activity involves the construction and operation of geothermal system with a total heating load of 116.84 MW which can supply geothermal heat to 2,480.907 thousand m² of residential buildings and 94.516 thousand m² of commercial buildings. However, during this monitoring period, since all the communities covered by the project are newly built, some of the local residents haven't moved in yet (no heat demand yet), so the actual geothermal heat was supplied to 2,459,732.33 m² of residential buildings and 94,236.26 m² of commercial buildings with a total heating load of 115.87 MW. Please include a table to compare the designed heating load and actual heating load respectively for 6 heat substations.																																																													
Project Participant's response				Date:	08/05/2024																																																								
The table to compare the designed heating load and actual heating load respectively for 6 heat substations has been added into section B.1 of MR (version 02), the details are as follows: <table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th rowspan="2">Sub-area</th> <th rowspan="2">Heat substation</th> <th colspan="2">Approved PDD</th> <th colspan="2">This monitoring period</th> </tr> <tr> <th>Heat load (MW)</th> <th>Heating area (thousand m³)</th> <th>Heat load (MW)</th> <th>Heating area (thousand m³)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td rowspan="2">No.4 Village Group</td> <td>1# TS4G</td> <td>11.55</td> <td>256.6</td> <td>11.49</td> <td>255.2728</td> </tr> <tr> <td>2# TS4G</td> <td>23.11</td> <td>513.4</td> <td>22.92</td> <td>509.34984</td> </tr> <tr> <td>2</td> <td>Zhengrongfu</td> <td>3# TSZR</td> <td>32.86</td> <td>730.4</td> <td>32.43</td> <td>720.58243</td> </tr> <tr> <td rowspan="2">3</td> <td rowspan="2">Taishan Village</td> <td>4# TSTS</td> <td>5.2</td> <td>Commercial buildings 94.516</td> <td>5.18</td> <td>Commercial buildings 94.24</td> </tr> <tr> <td>5# TSTS</td> <td>19.37</td> <td>Residential buildings 430.507</td> <td>19.15</td> <td>Residential buildings 425.59873</td> </tr> <tr> <td>4</td> <td>Wangdong Community</td> <td>6# TSWD</td> <td>24.75</td> <td>550</td> <td>24.70</td> <td>548.92853</td> </tr> <tr> <td colspan="2">Total</td> <td>6</td> <td>116.84</td> <td>Residential buildings 2,480.907 Commercial buildings 94.516</td> <td>115.87</td> <td>Residential buildings 2,459.73233 Commercial buildings 94.23626</td> </tr> </tbody> </table>						No.	Sub-area	Heat substation	Approved PDD		This monitoring period		Heat load (MW)	Heating area (thousand m ³)	Heat load (MW)	Heating area (thousand m ³)	1	No.4 Village Group	1# TS4G	11.55	256.6	11.49	255.2728	2# TS4G	23.11	513.4	22.92	509.34984	2	Zhengrongfu	3# TSZR	32.86	730.4	32.43	720.58243	3	Taishan Village	4# TSTS	5.2	Commercial buildings 94.516	5.18	Commercial buildings 94.24	5# TSTS	19.37	Residential buildings 430.507	19.15	Residential buildings 425.59873	4	Wangdong Community	6# TSWD	24.75	550	24.70	548.92853	Total		6	116.84	Residential buildings 2,480.907 Commercial buildings 94.516	115.87	Residential buildings 2,459.73233 Commercial buildings 94.23626
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Documentation provided as evidence by Project Participant																																																													
Heat supply contract and updated MR																																																													
Auditor's assessment comment				Date:	08/05/2024																																																								
A table comparing the designed heating load and actual heating load respectively for 6 heat substations has been included in the updated MR and verified by the assessment team through checking registered GS4GG PDD and Heating Supply Agreement. Considering all the communities covered by the project are newly built, some of the local residents haven't moved in yet (no heat demand yet) during this monitoring period, the assessment team verified the net heating area of 4 sub-areas, i.e. No.4 Village Group, Zhengrongfu, Taishan Villa, and Wangdong Community are reasonable.																																																													
Conclusion by Lead Auditor				Date:	08/05/2024																																																								

CL 01 was closed.			
Type:	☒ CAR	☐ CL/CR	☐ FAR
Number:	#1		
Raised by:	Doris Dai		
Description of the audit finding	Date:	30/04/2024	
As per Verification Regulation of Heat Meters (JJG 225-2001), it was verified the calibration frequency of heat meters should be no longer than 3 years. However, it was mentioned in the MR that the calibration validity of ultrasonic calorimeters is 5 years. Please provide calibrate certification of ultrasonic calorimeters which can satisfy requirement of JJG 225-2001 and can fully cover this monitoring period.			
Project Participant's response	Date:	08/05/2024	
This project started construction in May-2020 and start date of fully operation in November-2020. All the 22 ultrasonic calorimeters were calibrated during test run period (24/10/2020-31/10/2020) by qualified organizations, i.e. Tianjin Institute of Metrology Supervision and Testing. According to the calibration certificate issued by Tianjin Institute of Metrology Supervision and Testing, the calibration is valid for 5 years. However, in order to ensure the accuracy of the Ultrasonic calorimeters, the Ultrasonic calorimeters were calibrated again in October-2023. The calibration information has been described in Section D.2 of MR (version 02) and the calibration certificates have been provided.			
Documentation provided as evidence by Project Participant			
Calibration certificates dated October-2023 and updated MR			
Auditor's assessment comment	Date:	08/05/2024	
The Calibration Certificates of ultrasonic calorimeters dated in October 2023 have been provided. The calibration frequency was verified to be in compliance with Verification Regulation of Heat Meters (JJG 225-2001).			
Conclusion by Lead Auditor	Date:	08/05/2024	
CAR 01 was closed.			

5. REFERENCE

LIST OF DOCUMENTS	
S. No.	Document/Evidence/Reference/Web link, Version, Date
01	GS4GG Monitoring Report Version 01, 15/04/2024 GS4GG Monitoring Report Version 02, 08/05/2024 GS4GG Monitoring Report Version 03, 28/08/2024
02	ER calculation Spreadsheet
03	Registered GS4GG PDD, version 04 dated 26/09/2021
04	The final validation report for registration of the GS4GG project activity finished by CTI Certification, version 2.0 dated 28/09/2021
05	GS4GG Principles and Requirements Version 1.2
06	Community Service Activity Requirements Version 1.2
07	GHG emission reduction & sequestration product requirements version 2.1
08	Site visit and remote audit requirements version 2.0
09	AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0)
10	Tool 07 Tool to calculate the emission factor for an electricity system (Version 07.0)
11	Tool of Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation (Version 03.0)
12	The monitoring reports and corresponding verification report for previous crediting periods
13	Research on Heating in Winter of Taishan Village issued by Xinzheng Housing and Urban-Rural Development Bureau on 20/03/2020
14	Operation record of the geothermal based space heating system covering this monitoring period
15	Statement from Local Expert mentioning the temperature difference of end users in local communities should be in the range of 10 - 15°C
16	Verification Regulation of Heat Meters (JJG 225-2001) https://www.zixin.com.cn/doc/194861.html
17	Statement from Local Expert mentioning the average flow rate of heat exchanger of the project is about 850m³/h
18	Design standards for urban heating pipe networks CJJ/T34-2022 issued by Ministry of Housing and Urban-Rural Development of P.R.China on 29/04/2022 https://www.mohurd.gov.cn/gongkai/zhengce/zhengcefilelib/202207/20220704_767030.html
19	Electricity Meter Reading Records covering this monitoring period
20	Electricity Receipts issued by 4 local property management Companies, i.e. Henan Shangzhou property service Co., LTD, Henan Hongbao property service Co., LTD, Henan Tingrui property service Co., LTD and Zhengzhou Wanjia property service Co., LTD covering this monitoring period
21	Calibration Certification of ultrasonic calorimeters covering this monitoring period
22	Calibration Certification of electricity meters covering this monitoring period
23	Qualification Certificate of Tianjin Academy of Metrology Supervision and Testing Science issued by China National Accreditation Service for Conformity Assessment, valid from 31/01/2019 to 30/01/2025

24	Qualification Certificate of Shenzhen Zhongdian Metrology and Testing Technology Co., Ltd issued by China National Accreditation Service for Conformity Assessment, valid from 13/02/2020 to 20/11/2023.
25	Verification Regulation of Electrical Meters for Measuring Alternating-current Electrical Energy (JJG 596-2012) https://www.doc88.com/p-58247034251654.html
26	2023 China regional power grid baseline emission factors for Emission reduction projects issued by China DNA on 08-Jul-2024 https://ccer.cets.org.cn/notice/noticeDetail?bulletinInfoId=1259913708889575424
27	Photo of the grievance expression book in Taishan village
28	Heating Supply Agreement for 2023-2024 winter season signed between the project owner and 4 local property management Companies, i.e. Henan Shangzhou property service Co., LTD, Henan Hongbao property service Co., LTD, Henan Tingrui property service Co., LTD, and Zhengzhou Wanjia property service Co., LTD respectively on 28/09/2023, 27/09/2023, 22/09/2023 and 21/09/2023.
29	Feasibility Study Report (FSR) completed by China Machinery Tenth Institute International Engineering Co., Ltd. in March 2020.
30	Certificates of Enterprise Investment Project of the project activity issued by Xinzheng Development and Reform Commission on 14/04/2020
31	Declaration about no double counting of GHG emission reductions issued by the project owner on 20/11/2023
32	Record keeping book covering this monitoring period
33	"Notice on Adjusting the Minimum Wage Standard of Henan Province" issued by People's Government of Henan Province on 27/12/2023 https://fgw.henan.gov.cn/2024/01-05/2880296.html
34	Payment roll covering this monitoring period
35	Training records covering this monitoring period
36	Labor Contracts of employees
37	Operation logbook
38	VCS (http://www.vcsprojectdatabase.org/)
39	CDM (https://cdm.unfccc.int/Projects/projsearch.html)

6. **VERIFICATION STATEMENT**

Applus+ Certification has been engaged by Profit Carbon Environmental Energy Technology (Shanghai) Co., Ltd. to perform the 4th periodical verification of the Taishan Geothermal Central Heating System (GS Ref. No. 11167).

The management of Zhengzhou Onar Heating Co., Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project's Monitoring Plan in the registered GS4GG PDD (Version 04 dated 26/09/2021), and the applied methodology AM0072 Fossil Fuel Displacement by Geothermal Resources for Space Heating (Version 03.0).

Our verification approach was based on the requirements as defined under the Kyoto Protocol, Marrakesh accord, as well as those defined by the Gold Standard. 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 operated as planned and described in the registered GS4GG PDD /03/ for 1st crediting period;
- the monitoring plan is as per the applied methodology;
- the monitoring in Monitoring Report is as per the registered GS4GG PDD /03/ for 1st crediting period;
- the development and maintenance of records and reporting procedures are in accordance with the registered monitoring plan;
- the equipment being essential for generating emission reduction is reliably and is calibrated appropriately;
- the monitoring system is in place and generates GHG emission reductions data;
- the GHG emission reductions are calculated without material misstatements.

In our opinion, the GHG emission reductions (GS VERs) for Taishan Geothermal Central Heating System for the monitoring period 01/04/2023 to 31/03/2024 as reported in Monitoring Report, prepared on the basis of the project's Monitoring Plan are fairly stated.

Based on the information we have seen and evaluated, we confirm the following statement:

Reporting period: From 01/04/2023 to 31/03/2024

Verified emissions (GS VERs) in the above reporting period:

Emission reductions in 2023	54,495 tCO ₂ equivalents
Emission reductions in 2024	81,710 tCO ₂ equivalents
Emission reductions	136,205 tCO ₂ equivalents

SDG	Net Benefit
SDG 13 Climate Action	136,205 tCO ₂
SDG 7 Affordable and Clean Energy	2,459,732.33 m ² for residential buildings and 94,236.26 m ² for commercial buildings
SDG 8 Decent Work and Economic Growth	10 jobs created including 5 males and 5 females with average monthly salary of 4,550 RMB/Person

Date: 30/08/2024
Lead Auditor: Doris Dai
Auditor / Tech. Expert: Doris Dai
Tech. Reviewer: Simon Shen

Approver (*Applus+ Certification VVB Technical Manager*)
 Mr. Agustín Calle de Miguel

ASSESSMENT TEAM	
Team Leader Doris Dai	Technical Reviewer: Simon Shen
Signature: Doris Dai	Signature: Meng SHEN.
Approver: Mr. Agustín Calle de Miguel	
Signature: 	