



ZHEJIANG PROVINCIAL ENERGY GROUP ZHENHAI NATURAL GAS POWER GENERATION CO., LTD.'S NG POWER GENERATION PROJECT



Document Prepared By LGAI Technological Center, S.A. (Applus+ Certification)

Project Title	Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.'s NG Power Generation Project
Version	01.1
Report ID	A+SH_SYST_VCS_VER_3121

Report Title	Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.'s NG Power Generation Project
Client	Carbon Road Limited
Pages	34

Date of Issue	17/02/2022
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Work Carried Out By	Lead Auditor / Technical Expert: Denny Xue Technical Reviewer: Simon Shen

Summary:

LGAI Technological Center, S.A. (hereafter referred to as “Applus+ Certification”) has been commissioned by Carbon Road Limited to perform the verification of greenhouse gas emission reductions of the project activity “Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.’s NG Power Generation Project” (VCS Ref. No. 400, hereafter referred to as “the project activity”) reported in the monitoring report /1/ during monitoring period 26/03/2015 to 08/01/2017.

The project activity has been validated by DNV based on the CDM PDD /3/ version 04.1 dated 03/03/2008 and reported in the validation report No. 2007-0961 /4/, version 01, completed on 20/07/2007. The project activity was registered as a CDM project activity on 26/03/2008 which is available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1189684459.76/view>. The project was registered as a VCS project activity later which is available at <https://registry.verra.org/app/projectDetail/VCS/400>.

The project activity is a nature gas power generation project located in Zhenhai District, Ningbo City, Zhejiang Province, People’s Republic of China, which is to use nature gas resource for electricity generation. The installed capacity of the project activity is 795.6 MW, consisting of 2 sets of gas-steam combined cycle for power generation units with 397.8 MW each. In the absence of the project activity, the baseline alternative is the construction of the 600 MW coal-fired plant. Comparing with the coal-fired plant, the project activity leads to substantial greenhouse gas emission reductions due to the use of less carbon intensive fuel and the application of the much higher efficient power generation technology. The Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants East China Power Grid (ECPG). It’s estimated that the proposed project could achieve GHG emission reductions of 937,067 tCO₂e annually.

The purpose and scope of this verification is to ensure that reported emission reductions are complete and accurate in accordance with applicable VCS standards and relevant UNFCCC requirements in order to be certified. A desk review and a site visit have been conducted to verify the data submitted in the monitoring report /1/. Applus+ Certification confirms the following has been reviewed:

- Monitoring plan included in the registered CDM PDD /3/, version 04.1, dated 03/03/2008 (the final version PDD is for request for review, therefore the date of the PDD is later than the date of Validation report) and the VCS Project Description /3/
- Validation report No. 2007-0961 /4/, version 01, completed on 20/07/2007 by DNV;
- Approved methodology, AM0029 /7/, version 01, dated 19/05/2006;
- VCS standards version 4.1 and guidance version 4.0, as well as relevant UNFCCC requirements;
- All information and references relevant to the project activity's resulting in emission reductions.

During this verification, no finding was identified related to the monitoring, implementation or operations of the project activity in relation to relevant VCS standards, guidance and UNFCCC requirements and relevant host party criteria and the applied baseline and monitoring methodology etc.

Applus+ Certification confirms that the project is implemented in accordance with the registered PDD /3/. The monitoring plan complies with the applied methodology AM0029 /7/ version 01 and the monitoring has been carried out in accordance with the registered PDD. The monitoring system is in place and the emission reductions are calculated without material misstatements. The level of assurance of the verification is reasonable. Our opinion relates to the projects GHG emissions and the resulting GHG emission reductions reported and related to the valid and registered project baseline and monitoring and its associated documents. Based on the information reviewed and evaluated Applus+ Certification confirms that the implementation of the project has resulted in 498,369 tCO₂e emission reductions during period 26/03/2015 to 08/01/2017.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center, S.A. (Applus+ Certification) has been commissioned by Carbon Road Limited to perform the verification of greenhouse gas emission reductions of the project activity “Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.’s NG Power Generation Project” (VCS Ref. No. 400) reported in the Monitoring Report /1/ during monitoring period 26/03/2015 to 08/01/2017.

LGAI Technological Center, S.A. (Applus+ Certification) as the verification body of the project activity has been accredited as a DOE by UNFCCC and also meets the competence requirements as set out in ISO 14065:2013.

The objective of verification is to have an independent review and ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the registration of VCS project. Certification is the written assurance by the DOE that, during a specific time period, a proposed VCS project activity achieved the reductions in anthropogenic emissions by sources of GHGs as verified.

The objective of this verification/certification is to verify and certify emission reductions, reported for the “Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.’s NG Power Generation Project” in China for the period 26/03/2015 to 08/01/2017.

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the registered PD, the Project’s baseline study and Monitoring Report (MR) and other relevant documents. The information in these documents is reviewed against VCS Version 4.1 requirements, UNFCCC rules and associated interpretations.

The verification is not meant to provide any consulting towards the client. However, stated requests for forward actions and/or corrective actions may provide input for improvement of the Project monitoring towards reductions in the GHG emissions.

1.3 Level of Assurance

The verification report is based on the CDM-PDD, VCS-PD, the VCS Monitoring Report (MR), supporting evidences made available to the verifier and information collected through performing interviews and during the on-site assessment.

The verification conclusion is assured a reasonable level of assurance.

1.4 Summary Description of the Project

Project title	Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.'s NG Power Generation Project
VCS reference number	400
Project Participants	Zhejiang Provincial Energy Group Zhenhai natural Gas Power Generation Co., Ltd. (Project Owner, host country, P. R. China)
Location of the project	Zhenhai District, Ningbo City, Zhejiang Province, People's Republic of China Geographic coordinates: longitude 121°43' E and latitude 29°58' N
Project start date	Construction date: 09/05/2005 Operation start date for #1 Unit: 09/01/2007 Operation start date for #2 Unit: 28/07/2007
Version of VCS PD or CDM PDD	03/03/2008 (CDM PDD and VCS PD)
Monitoring period	26/03/2015 to 08/01/2017
First monitoring report	Version 01, dated 09/05/2021
Final monitoring report	Version 03, dated 17/02/2022
Applied Methodology/Version	AM0029, version 01, dated 19/05/2006
Scope/Technical Area	1/1.1

The project activity is a nature gas power generation project located in Zhenhai District, Ningbo City, Zhejiang Province, People's Republic of China, which is to use nature gas resource for electricity generation. The installed capacity of the project activity is 795.6 MW, consisting of 2 sets of gas-steam combined cycle for power generation units with 397.8 MW each. In the absence of the project activity, the baseline alternative is the construction of the 600 MW coal-fired plant. Comparing with the coal-fired plant, the project activity leads to substantial greenhouse gas emission reductions due to the use of less carbon intensive fuel and the application of the much higher efficient power generation technology. The Project can reduce GHG emissions by replacing the electricity generated by fossil fuel fired power plants East China Power Grid (ECPG). It's estimated that the proposed project could achieve GHG emission reductions of 937,067 tCO₂e annually.

The project activity has been validated by DNV based on the CDM PDD /3/ version 04.1 dated 03/03/2008 and reported in the validation report No. 2007-0961 /4/, version 01, completed on 20/07/2007. The project activity was registered as a CDM project activity on 26/03/2008 which is available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1189684459.76/view>. The project was registered as a VCS project activity later which is available at <https://registry.terra.org/app/projectDetail/VCS/400>.

2 VERIFICATION PROCESS

2.1 Method and Criteria

Verification was conducted using Applus+ Certification's procedures in line with the requirements specified in the VCS Standard version 4.1, CDM M&P, the latest version of the CDM Validation and Verification Standard, and relevant UNFCCC requirements and applying standard auditing techniques.

Applus+ Certification completed a strategic review and risk assessment of the 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 verified the implementation of the monitoring plan and the data presented in the Monitoring Report /1/ for the period in question. This involved a site visit and a desk review of the Monitoring Report. This Verification Report describes the findings of this assessment.

The information of the assessment team is included in below:

Assessment team

According to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ Certification has composed a project assessment team in accordance with the appointment rules in Applus+ Certification. The composition of assessment team has to be approved by the Applus+ Certification ensuring that the required skills are covered by the team. The four qualification levels for team members that are assigned by formal appointment rules as below:

- Leader Auditor (LA)
- Auditor (A)/ Auditor Trainee (AiT)

- Technical Reviewer (TR)
- Technical Experts (TE)

Name	Qualification	Coverage of scope	Coverage of Technical Area	Host country experience
<i>Denny Xue</i>	<i>LA/TE</i>	<i>Y (1.1)</i>	<i>Y</i>	<i>Y</i>
<i>Simon Shen</i>	<i>TR</i>	<i>Y (1.1)</i>	<i>Y</i>	<i>Y</i>

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

Simon Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ Certification for the GHG project assessment. He is based in Shanghai. He has several years of work experience in environmental protection field. Before he joined Applus+ Certification, he had been worked for TÜV SÜD as a GHG Validator/Assessment team and ISO 9001/14001 Lead Auditor for 3.5 years.

2.2 Document Review

The VCS monitoring report version 01 dated 09/05/2021, version 03 dated 17/02/2022 and the emission reduction calculations spreadsheet, were assessed as part of the verification. In addition, the registered PDD version 04.1 dated 03/03/2008 in particular the baseline estimations and the monitoring plan, the CDM validation report version 01 dated 20/07/2007, as well as relevant documents, were reviewed. A detailed document reviewed are listed in Appendix 1 of the report.

2.3 Interviews

The key personnel interviewed are summarized in the table below:

Interviewed personnel	Role	Organization	Subject
Mr. Li Yong	Work Staff	Zhejiang Provincial Energy Group Zhenhai natural Gas Power Generation Co., Ltd.	Operation of the project activity; Implementation of the monitor plan of the project activity; Data collection and data achievement; Calibration of meters and equipment maintenance.
Mr. Guo Jian	Chief	Zhejiang Provincial Energy Group Zhenhai natural Gas Power Generation Co., Ltd.	
Mr. Zhu Jun	Operator	Zhejiang Provincial Energy Group Zhenhai natural Gas Power Generation Co., Ltd.	
Dr. Zheng Zhaoning	Technical Director	Goldchina Consultancy International Co., Ltd.	Data collection and ER calculation.

2.4 Site Inspections

The assessment team performed the on-site verification (Zhenhai District, Ningbo City, Zhejiang Province, People's Republic of China) on 17–18/06/2021. The interviewed personnel and objective are listed in above table.

2.5 Resolution of Findings

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

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

- 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 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;

d) Issues identified in a FAR during validation to be verified during verification or previous verification(s) have not been resolved by the project participants.

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

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

There is no CARs and CLs raised for this monitoring period for the project.

2.5.1 Forward Action Requests

None FAR was raised during the verification process. Also there are no remaining from former validation and verification.

2.6 Eligibility for Validation Activities

Not applicable as LGAI Technological Center, S.A. holds the accreditation for the validation and verification for projects under scope 1.

3 VALIDATION FINDINGS

3.1 Participation under Other GHG Programs

Through reviewing the registered PDD /3/ and validation report /4/, it was validated that the project has been registered as a CDM project with reference No. 1344 first which is available at <http://cdm.unfccc.int/Projects/DB/DNV-CUK1189684459.76/view>. Then the project has been registered as VCS project which is available at <https://registry.terra.org/app/projectDetail/VCS/400>. The project does not participate in the other emissions trading program by checking public information on Internet, interviewing with project owner and statement issued by project owner.

During the period from 09/01/2007 to 08/01/2017 as the first VCS crediting period, the project would claim only for VCU or CERs. But VCUs and CERs will not be claimed in the same period. Also, for period 26/03/2008 to 31/12/2011 and 01/01/2013 to 25/03/2015, the project has applied for the issuance of CERs.

Therefore, Applus+ Certification consider the project is eligible to participate under the VCS Program as there is no double counting for the emission reduction during any period.

3.2 Methodology Deviations

Not applicable as no deviation for methodology.

3.3 Project Description Deviations

The project was registered under VCS standard 2007, according to VCS standard 2007, the crediting period of the project activity is 10 year and could be renewed twice, as the project started operation which is also the start date of the project was 09/01/2007, therefore the first crediting period for project under VCS should from 09/01/2007 to 08/01/2017.

Applus+ Certification consider the deviation is in line with the VCS requirement.

3.4 Grouped Project

Not applicable as not a grouped project.

4 VERIFICATION FINDINGS

4.1 Project Implementation Status

By means of on-site visit, the assessment team confirms that all physical features of the proposed CDM project activity proposed in the registered CDM PDD /3/ are in place and the PP has operated the project as per registered CDM PDD /3/. The installed capacity of the project is 795.6 MW, consisting of 2 sets of gas-steam combined cycle for power generation units with 397.8 MW each. The electricity generated is transmitted through 220kV switching stations then supplied to ECPG via Zhenjiang Power Grid confirmed by site visit. The project activity was expected to supply 2,525,250 MWh of electricity to the grid. The first unit of generator of project commissioned on 09/01/2007 and the second on 28/07/2007 was verified by site visit and former CDM verification report. There are no changes on the key equipment and technology since the validation of the project. No special event which would affect the monitoring of the project has been observed during the monitoring period.

The project would contribute to sustainable development in as below:

- (1) The project leads a reduction in greenhouse gas emissions compared to a business as usual approach, thereby benefit the global climate change;
- (2) The project reduces other pollutants (e.g. SO₂, NO_x, dust, etc) compared to a business as usual approach, thereby improve the local environment quality;
- (3) The project enhances the ability of peak regulation to the local grid and improves the electric quality of the local grid;
- (4) Promoting greatly the use of natural gas in a traditionally coal gas metropolitan city for better safety and environment;
- (5) Promoting the application of gas-fired combined cycle power generation technology widely in the East China Region;
- (6) The project creates the employment opportunities for the local people.

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

Equipment	Key Index		Type	Manufacture
Gas turbine	Rated Power	394.6 MW	PG9351FA	GE
Heat recovery steam generator	Outlet flow of high-pressure steam	285.4 t/h	HF-9FA-285.4/9.87-566.5-3P(R)	Ha'erbin Heat Recovery Boiler Plant

Steam turbine	Rated Speed	3,000 r/min	D10	Ha'erbin Steam Turbine Plant
Electricity generator	Rated Power	397.8 MW	390H	Ha'erbin Power Generator Plant
	Power factors	0.85		

By comparing the actual ER claimed in this monitoring period with the estimate in the registered PDD, the actual emission reductions (498,369 tCO₂e) are lower than what is stated in the registered PDD. However, considering the decreasing of BM, the estimated ER was re-calculated as 235,803 tCO₂e. Considering the 655 operation days, the actual estimated ER is 423,153 tCO₂e. Then actual emission reductions are 17.77% more than estimated ER. The assessment team find this is acceptable as:

From long view since the project put into operation, the actual emission reductions are 3,324,446 tCO₂e during the time 09/01/2007 to 08/01/2017 but the ex post estimated emission reductions are 6,185,819 tCO₂e, the actual emission reductions is only 53.74% of the ex post estimated emission reductions. For further analysis the additionality of the project, the comparison of the estimated electricity supplied to the grid in the registered PDD and the actual net electricity supplied to the grid in each monitoring period are listed here:

Monitoring Period	Days	Actual net electricity supplied to the grid (MWh)	Estimated electricity supplied to the grid (MWh)
09/01/2007- 25/03/2008	442	388,101.12	3,057,974
26/03/2008- 31/12/2008	282	293,690.32	1,951,015
01/01/2009- 31/12/2009	365	175,523.04	2,525,250
01/01/2010- 31/12/2010	365	1,269,043	2,525,250
01/01/2011- 30/06/2011	181	922,129.120	1,252,247
01/07/2011- 31/12/2011	184	1,396,991.20	1,273,003
01/01/2012- 31/12/2012	366	2,111,833.68	2,525,250
01/01/2013- 25/03/2015	814	3,917,164.240	5,631,653

26/03/2015- 08/01/2017	655	4,129,300.56	4,531,613
Total		12,491,942.60	25,273,255

The actual net electricity supplied to the grid during 09/01/2007 - 08/01/2017 are 12,491,943 MWh, 49.43% of designed annual electricity supplied to the grid.

Therefore, the assessment team confirmed the ER in this monitoring period is not overestimated.

The assessment team confirmed that there is no proposed or actual change to the project design during this monitoring period.

All required equipments and procedures are available and implemented in an appropriate manner.

All necessary monitoring instruments are installed. All required instruments including standby and operating procedures for the same have been implemented in an appropriate manner.

The project is completely operational and the same has been confirmed on-site. Neither mistakes nor malfunction on main meters have been observed during this monitoring period.

4.2 Safeguards

4.2.1 No Net Harm

By checking the EIA summary and conclusion provided in the registered PD and PDD, it is confirmed that natural gas power generation project is relatively green, and the impact caused by natural gas power generation on the surrounding ecosystem and residents, water, and atmosphere etc. is very little, there would be no net harm caused due to the project activity. Also, the EIA of the project are approved by the government.

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

4.2.2 Local Stakeholder Consultation

A survey was carried out through the information publication, distributing and collecting responses to questionnaires targeting on local residents, builders and members of the local authorities. The project owner introduced the proposed project, and then a survey was arranged through a one-page questionnaire, which was designed to be easily filled in. The opinions expressed by the stakeholders were recorded and are available on request.

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

Communications with Local stakeholders was being carried out at periodic intervals. There are no negative comments received for the project. By site visit and checking with the project owner, it is able to confirm the project has set up a grievance and appeal mechanism, a grievance book has been placed in the lobby of the office which is available to all stakeholder with all contact information. By checking grievance book and interview with project owner, it is confirmed that no negative comments received for the project.

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

4.3 AFOLU-Specific Safeguards

Not applicable as non-AFOLU project.

4.4 Accuracy of GHG Emission Reduction and Removal Calculations

The monitoring has been carried out in accordance with the monitoring plan contained in the registered PDD /3/. All parameters were monitored and determined as per the monitoring plan which is listed in below table:

Data / Parameter:	FC _{Natural gas}
Data unit:	m ³ /a
Description:	Net quantity of nature gas consumed in project activity in year 'y'
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	780,682,953.000
Source of data used:	Natural Gas Consumption Record /10/ and Natural Gas Sale Record /11/
Information flow:	At 24:00 of each day, the raw data of meter reading of fuel flow meter installed at project site are recorded by the project owner and form Natural Gas Consumption Record /10/. Meaning while, the gas supply company would monitor the readings of flow meter installed at the gas supply company and then issue Natural Gas Sale Record /11/. Both Natural Gas Consumption Record /10/ and Natural Gas Sale Record /11/ would be compared monthly. Then the conservative value between the Natural Gas Consumption Record /10/ and Natural Gas Sale Record /11/ issued by the gas supply company would be used for ER calculation. All these have been confirmed by site visit.
Monitoring method, frequency and equipments:	The parameter was measured continuously and recorded monthly by 3 flow meters installed at project site during the monitoring period verified by site visit. See below for the information of 3 flow meters verified by site visit and checking calibration certificates /15/:

	Meter	Serial Number	Accuracy	
	Gas Ultrasonic Flowmeter1	3315	1.0	
	Gas Ultrasonic Flowmeter2	3316	1.0	
	Gas Ultrasonic Flow meter at plant (Daniel)	05-520380	0.5	
	The serial number and accuracy have been confirmed by site visit.			
Calibration:	The calibration information are shown as below /15/:			
	Meter	Calibration date	Valid until	
	Gas Ultrasonic Flowmeter1	02/12/2014	01/12/2015	
		05/05/2015	04/05/2016	
		05/05/2016	04/05/2017	
	Gas Ultrasonic Flowmeter2	28/06/2014	27/06/2015	
		05/05/2015	04/05/2016	
		05/05/2016	04/05/2017	
	Gas Ultrasonic Flow meter at plant (Daniel)	28/06/2014	27/06/2015	
		05/05/2015	04/05/2016	
		05/05/2016	04/05/2017	
	The calibration was conducted by an accredited third party which is Zhejiang Province Institute of Metrology was accredited by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China /16/.			
	QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.		
	Means of verification:	Data of the parameter was verified by checking Natural Gas Consumption Record and Natural Gas Sale Record. All data is in line with Natural Gas Consumption Record and Natural Gas Sale Record;		
Information flow was verified by checking Natural Gas Consumption Record and Natural Gas Sale Record, and all information are consistent;				
Monitoring method was verified by site visit, checking calibration certificates, all monitoring method meets the description in the PDD;				

	Calibration was verified by checking calibration certificate and Accreditation certificate, all calibration of monitoring equipment meets the requirement indicated in the PDD.
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Data / Parameter:	EG _y																				
Data unit:	MWh																				
Description:	Net electricity delivered to the grid by the project activity in year ‘y’																				
Purpose of the data:	Calculation of baseline emissions																				
Parameter value:	4,129,300.560																				
Source of data used:	Monthly Reading Records (MRRs) /12/, ETN /13/ and Statement issued by power grid company /14/																				
Information flow:	At 24:00 of last day of every month, the raw data of meter reading of 3 main meters (bidirectional) installed at 3 transformer station of the project are recorded by the project owner and form Monthly Reading Records (MRRs /12/), and then send to the power grid company, after the confirmation of power grid company, the power grid company will issue ETNs /13/. For data of 26/03/2015 and 08/01/2017 are determined by Statement issued by power grid company /14/. Then the conservative value between the Monthly Reading Records /12/, ETNs /13/ issued by the power grid company and Statement issued by power grid company /14/ would be used for ER calculation. All these have been confirmed by site visit.																				
Monitoring method, frequency and equipments:	The parameter was measured continuously and recorded monthly by 3 main meters and 3 backup meters installed at project site during the monitoring period verified by site visit. See below for the information of 3 main meters and 3 backup meters verified by site visit and checking calibration certificates /15/: <table><tr><th>Title</th><th>Serial No.</th><th>Accuracy</th></tr><tr><td>#01 main meter</td><td>211298525</td><td>0.2s</td></tr><tr><td>#01 backup meter</td><td>211298522</td><td>0.2s</td></tr><tr><td>#11 main meter</td><td>211298518</td><td>0.2s</td></tr><tr><td>#11 backup meter</td><td>211298519</td><td>0.2s</td></tr><tr><td>#12 main meter</td><td>211298528</td><td>0.2s</td></tr></table>			Title	Serial No.	Accuracy	#01 main meter	211298525	0.2s	#01 backup meter	211298522	0.2s	#11 main meter	211298518	0.2s	#11 backup meter	211298519	0.2s	#12 main meter	211298528	0.2s
Title	Serial No.	Accuracy																			
#01 main meter	211298525	0.2s																			
#01 backup meter	211298522	0.2s																			
#11 main meter	211298518	0.2s																			
#11 backup meter	211298519	0.2s																			
#12 main meter	211298528	0.2s																			

	#12 backup meter	211298527	0.2s
	The serial number and accuracy have been confirmed by site visit.		
Calibration:	The calibration information are shown as below /15/:		
	Meter	Calibration date	Valid until
	#01 main meter	05/12/2014	04/12/2015
		03/12/2015	02/12/2016
		02/12/2016	01/12/2017
	#01 backup meter	22/01/2015	21/01/2016
		03/12/2015	02/12/2016
		02/12/2016	01/12/2017
	#11 main meter	05/12/2014	04/12/2015
		03/12/2015	02/12/2016
		02/12/2016	01/12/2017
	#11 backup meter	22/01/2015	21/01/2016
		03/12/2015	02/12/2016
		02/12/2016	01/12/2017
	#12 main meter	05/12/2014	04/12/2015
		03/12/2015	02/12/2016
		02/12/2016	01/12/2017
	#12 backup meter	22/01/2015	21/01/2016
		03/12/2015	02/12/2016
		02/12/2016	01/12/2017
	The calibration was conducted by an accredited third party which is Zhejiang Electricity Power Test and Research Institute was accredited by Zhejiang Province Bureau of Quality and Technical Supervision /16/.		
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.		
Means of verification:	Data of the parameter was verified by checking Monthly Reading Records (MRRs), ETN and Statement issued by power grid company. All data is in line with Monthly Reading Records (MRRs), ETN and Statement issued by power grid company; Information flow was verified by checking Monthly Reading Records (MRRs) and ETN, and all information are consistent; Monitoring method was verified by site visit, checking calibration certificates, all monitoring method meets the description in the PDD;		

	Calibration was verified by checking calibration certificate and Accreditation certificate, all calibration of monitoring equipment meets the requirement indicated in the PDD.
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Data / Parameter:	NCV _{Natural gas}
Data unit:	GJ/m ³
Description:	Net calorific value of nature gas consumed in the project plant in year 'y'
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	2015: 0.033969 (weighted average) 2016: 0.033540 (weighted average) 2017: 0.032953 (weighted average)
Source of data used:	Fuel purchase agreement /17/
Information flow:	Each time, the project owner purchase the natural gas from Natural gas supplier, Natural gas supplier would issue the Fuel purchase agreement in which Net calorific value and amount of natural gas would be included. The project would record such value and calculated this parameter based on weighted average method. The value from Fuel purchase agreement /17/ issued by Natural gas supplier would be used for ER calculation. All these have been confirmed by site visit.
Monitoring method, frequency and equipments:	Not applicable as data are sourced from Fuel purchase agreement provided by Natural gas supplier.
Calibration:	Not applicable as data are sourced from Fuel purchase agreement provided by Natural gas supplier.
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Data of the parameter was verified by checking Fuel purchase agreement. All data is in line with Fuel purchase agreement; Information flow was verified by checking Fuel purchase agreement, and all information are consistent;

Data / Parameter:	EF _{CO2,natural gas}
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Data unit:	tCO ₂ /TJ
Description:	The CO ₂ emission factor per unit of energy of nature gas in year 'y'
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	58.3
Source of data used:	IPCC 2006 /18/
Information flow:	Not applicable as Default Value from IPCC 2006 was used.
Monitoring method, frequency and equipments:	Not applicable as Default Value from IPCC 2006 was used.
Calibration:	Not applicable as Default Value from IPCC 2006 was used.
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	OXID _{Natural gas}
Data unit:	%
Description:	Oxidation factor of nature gas used by the project plant
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	100
Source of data used:	IPCC 2006 /18/
Information flow:	Not applicable as Default Value from IPCC 2006 was used.
Monitoring method, frequency and equipments:	Not applicable as Default Value from IPCC 2006 was used.
Calibration:	Not applicable as Default Value from IPCC 2006 was used.
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	FC _y
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Data unit:	MWh
Description:	Net quantity of fuel other than consumed in project activity in year 'y'
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	0
Source of data used:	After site visit, it is confirmed that no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity
Information flow:	Not applicable as no other fuels were used for the project activity
Monitoring method, frequency and equipments:	Not applicable as no other fuels were used for the project activity
Calibration:	Not applicable as no other fuels were used for the project activity
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	NCV _y
Data unit:	GJ/m ³
Description:	Net calorific value of fuel other than nature gas consumed in the project plant in year 'y'
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	Not applicable as no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity
Source of data used:	After site visit, it is confirmed that no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity
Information flow:	Not applicable as no other fuels were used for the project activity
Monitoring method, frequency and equipments:	Not applicable as no other fuels were used for the project activity
Calibration:	Not applicable as no other fuels were used for the project activity
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.

Means of verification:	Not applicable
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Data / Parameter:	EF _{CO2,y}
Data unit:	tCO ₂ /TJ
Description:	The CO ₂ emission factor of the fuel other than nature gas in year 'y'
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	Not applicable as no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity
Source of data used:	After site visit, it is confirmed that no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity
Information flow:	Not applicable as no other fuels were used for the project activity
Monitoring method, frequency and equipments:	Not applicable as no other fuels were used for the project activity
Calibration:	Not applicable as no other fuels were used for the project activity
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	OXID _y
Data unit:	%
Description:	Oxidation factor of the fuel other than nature gas used by the project plant
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	Not applicable as no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity
Source of data used:	After site visit, it is confirmed that no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity
Information flow:	Not applicable as no other fuels were used for the project activity
Monitoring method, frequency and equipments:	Not applicable as no other fuels were used for the project activity

Calibration:	Not applicable as no other fuels were used for the project activity
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	GWP _{CH4}
Data unit:	tCO ₂ /tCH ₄
Description:	Global Warming Potential for CH ₄
Purpose of the data:	Calculation of project emissions and leakages
Parameter value:	25
Source of data used:	IPCC AR5 /18/
Information flow:	Not applicable as Default Value from IPCC was used
Monitoring method, frequency and equipments:	Not applicable as Default Value from IPCC was used
Calibration:	Not applicable as Default Value from IPCC was used
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	EF _{BM,y}
Data unit:	tCO ₂ /MWh
Description:	Build margin emission factor
Purpose of the data:	Calculation of baseline emissions
Parameter value:	0.4923
Source of data used:	Notification on 2017 baseline emission factors for regional power grids in China issued by China on 20/12/2018 /19/ As the end of crediting period is 08/01/2017, Data in 2017 was used for ER calculation.
Information flow:	Not applicable

Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	BTCA
Data unit:	g/kWh
Description:	fuel consumption for best technology commercially available
Purpose of the data:	Calculation of baseline emissions
Parameter value:	290.7857 for coal fired power generation 232.3 for oil and natural gas power generation
Source of data used:	Notification on 2017 baseline emission factors for regional power grids in China issued by China on 20/12/2018 /19/ As the end of crediting period is 08/01/2017, Data in 2017 was used for ER calculation.
Information flow:	Not applicable
Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	CAP _{fire-y}
Data unit:	MW
Description:	installed capacity of fuel-fired power in year y within the east china grid
Purpose of the data:	Calculation of baseline emissions

Parameter value:	243,750
Source of data used:	Notification on 2017 baseline emission factors for regional power grids in China issued by China on 20/12/2018 /19/ As the end of crediting period is 08/01/2017, Data in 2017 was used for ER calculation.
Information flow:	Not applicable
Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	CAP _y
Data unit:	MW
Description:	Total installed capacity of various power in year y within the east china grid
Purpose of the data:	Calculation of baseline emissions
Parameter value:	300,680
Source of data used:	Notification on 2017 baseline emission factors for regional power grids in China issued by China on 20/12/2018 /19/ As the end of crediting period is 08/01/2017, Data in 2017 was used for ER calculation.
Information flow:	Not applicable
Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	Fuel Energy Value
Data unit:	GJ/tSCE
Description:	Fuel energy value of Standard Coal Equivalent
Purpose of the data:	Calculation of baseline emissions
Parameter value:	29.27
Source of data used:	Notification on 2017 baseline emission factors for regional power grids in China issued by China on 20/12/2018 /19/ As the end of crediting period is 08/01/2017, Data in 2017 was used for ER calculation.
Information flow:	Not applicable
Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	η_{BL}
Data unit:	%
Description:	Energy efficiency of the technology
Purpose of the data:	Calculation of baseline emissions
Parameter value:	42.27
Source of data used:	Notification on 2017 baseline emission factors for regional power grids in China issued by China on 20/12/2018 /19/ As the end of crediting period is 08/01/2017, Data in 2017 was used for ER calculation.
Information flow:	Not applicable

Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Data / Parameter:	OXID _f
Data unit:	/
Description:	Oxidation rate of the fuel y
Purpose of the data:	Calculation of baseline emissions
Parameter value:	1
Source of data used:	Default value from IPCC /18/
Information flow:	Not applicable
Monitoring method, frequency and equipments:	Not applicable
Calibration:	Not applicable
QA/QC procedure:	Data record will be archived for a period of 2 years after the crediting period to which the records pertain.
Means of verification:	Not applicable

Parameters available at validation stage:

Below data has been verified against the data sources and the PDD. For EF_{NG,upstream,CH₄}, although this is not listed in the PDD, but necessary for ER calculation. For the rest of parameters which is not verified are not used in the calculation of ER in this monitoring period.

Parameter title	Description	Data	Source
GWP _{CH₄}	Global Warming Potential for CH ₄	25	IPCC AR5 /18/ Updated as IPCC

EF _{NG,upstream,CH4}	Emission factor for upstream fugitive methane emissions of natural gas	0.000296	IPCC 2006 /18/
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4.5 Quality of Evidence to Determine GHG Emission Reductions and Removals

The monitoring has been carried out in accordance with the registered PDD /3/ dated 03/03/2008.

As a result of verification of the ER calculation process, the assessment team confirmed that all the parameters required for the determination of the emission reductions have been included in the MR Report and ER Calculation Spreadsheet /2/ and are consistent with the applied methodology AM0029 version 01 and the monitoring plan. The parameters are complete in this monitoring period.

After verifying the reported figures with the raw data sources, it's confirmed that the values of the parameters from the raw data sources are consistent with those quoted in the ER Calculation Spreadsheet and the MR Report. The verification process for the same has been clearly described above in section 4.4 of the report.

4.6 Non-Permanence Risk Analysis

Not applicable as a renewable project.

5 VERIFICATION CONCLUSION

Applus+ Certification has been commissioned by Carbon Road Limited to perform the verification of greenhouse gas emission reductions of the project activity “Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.’s NG Power Generation Project” (VCS Ref. No. 400).

The management of Zhejiang Provincial Energy Group Zhenhai natural Gas Power Generation Co., Ltd. is responsible for the preparation of the GHG emissions data and the reported GHG emissions reductions on the basis set out within the project’s Monitoring Plan in the registered PDD /3/ dated 03/03/2008.

Our verification approach was based on the requirements as defined under the applicable VCS standards and relevant UNFCCC requirements. Our approach is risk-based, drawing on an understanding of the risks associated with reporting GHG emissions data and the controls in place to mitigate these. The verification can confirm that:

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

In our opinion, the GHG emission reductions for “Zhejiang Provincial Energy Group Zhenhai Natural Gas Power Generation Co., Ltd.’s NG Power Generation Project” during the monitoring period 26/03/2015 to 08/01/2017 as reported in Monitoring Report, prepared on the basis of the project’s Monitoring Plan are fairly stated. Based on the information we have seen and evaluated, we confirm the following statement:

Verification period: From 26/03/2015 to 08/01/2017 (divided into 3 vintage periods). Verified GHG emission reductions or removals in the above reporting period:

Year	Baseline emissions or removals (tCO ₂ e)	Project emissions or removals (tCO ₂ e)	Leakage emissions (tCO ₂ e)	Net GHG emission reductions or removals (tCO ₂ e)
2015	801,647	645,662	0	155,985
2016	1,204,473	877,904	0	326,569
2017	26,733	10,918	0	15,815
Total	2,032,853	1,534,484	0	498,369

APPENDIX 1: REFERENCE LIST

1. Monitoring report, version 01, dated 09/05/2021; version 03, dated 17/02/2022
2. ER calculation spreadsheet
3. Registered CDM PDD, version 04.1, dated 03/03/2008;
4. Validation report, No. 2007-0961, version 01, completed by DNV AS on 20/07/2007;
VCS Verification report, completed on 05/12/2016 by Applus+ Certification;
5. VCS standard version 4.1, dated on 22/04/2021
6. Statement issued by project owner
7. Approved methodology AM0029, version 01, dated 19/05/2006
8. CDM Monitoring procedure
9. Nameplate of the equipment
10. Natural Gas Consumption Record covering the monitoring period
11. Natural Gas Sale Record covering the monitoring period
12. Daily and monthly electricity meter reading records of meters covering the monitoring period
13. Electricity Transaction Notes covering the monitoring period
14. Statement issued by Power Grid company
15. Calibration certificates of flow meters covering the whole monitoring period issued by Zhejiang Province Institute of Metrology

Calibration certificates of electricity meters covering the whole monitoring period issued by Zhejiang Electricity Power Test and Research Institute

- 16 Accreditation certificate of Zhejiang Province Institute of Metrology issued by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China

Accreditation certificate of Zhejiang Electricity Power Test and Research Institute issued by Zhejiang Province Bureau of Quality and Technical Supervision

- 17 Fuel purchase agreement covering the monitoring period

- 18 IPCC 2006

IPCC AR5

- 19 Notification on 2017 baseline emission factors for regional power grids in China issued by China on 20/12/2018

- 20 Power Purchase Agreement (PPA) signed by project owner and power grid company