

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



Document Prepared By LGAI Technological Center, S.A.

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Summary:

LGAI Technological Center, S.A. (hereafter referred to as “Applus+ LGAI”) has been commissioned by Goldchina Consultancy International Co., Ltd. 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” (UNFCCC Ref. No. 1344, VCS Ref. No. 400, hereafter referred to as “the project activity”) reported in the monitoring report /1/ during monitoring period 01/01/2012 to 31/12/2012.

The project activity has been validated by DET NORSKE VERITAS AS 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 http://www.vcsprojectdatabase.org/#!/project_details/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+ LGAI 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 /4/;
- Validation report No. 2007-0961 /4/, version 01, completed on 20/07/2007;
- Approved methodology, AM0029 /7/, version 01, dated 19/05/2006;
- VCS standards and guidance, 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+ LGAI confirms that the project is implemented in accordance with the registered CDM 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 monitoring plan in the registered CDM PDD /3/. 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+ LGAI confirms that the implementation of the project has resulted in 441,637 tCO₂e emission reductions during period 01/01/2012 to 31/12/2012.

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1 INTRODUCTION

1.1 Objective

LGAI Technological Center, S.A. has been commissioned by Goldchina Consultancy International Co., Ltd. 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” (UNFCCC Ref. No. 1344, VCS Ref. No. 400) reported in the Monitoring Report /1/ during monitoring period 01/01/2012 to 31/12/2012.

LGAI Technological Center, S.A. as the verification body of the project activity has been accredited as a DOE by UNFCCC and also meets the competence requirements as set out in ISO 14065:2007.

The objective of verification is to have an independent review and ex post determination by a Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the pre-registered CDM project activity during the monitoring period from the date when the project started to operate until the date when the project was actually registered as a CDM project activity by the CDM-EB. 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 01/01/2012 to 31/12/2012.

1.2 Scope and Criteria

The verification scope is defined as an independent and objective review of the registered CDM PDD and VCS Project Description (VCS-PD), the Project’s baseline study and Monitoring Report (MR) and other relevant documents. The information in these documents is reviewed against VCS Version 3 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 VCS-PD, CDM-PDD, 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
UNFCCC reference number	1344
VCS reference number	400
Project Participants	Zhejiang Provincial Energy Group Zhenhai natural Gas Power Generation Co., Ltd. (Project Owner, host country, P. R. China); Goldchina Consultancy International Co., Ltd. (VER Buyer, 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
Date of registration as CDM project	26/03/2008
Version of registered CDM PDD	Version 04.1, dated 03/03/2008
Monitoring period	01/01/2012 to 31/12/2012
First monitoring report	Version 01, dated 17/10/2016
Final monitoring report	Version 02, dated 05/12/2016
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 DET NORSKE VERITAS AS 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 http://www.vcsprojectdatabase.org/#!/project_details/400.

2 VERIFICATION PROCESS

2.1 Method and Criteria

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

Applus+ LGAI 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+ LGAI 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 section 2.1.1 of the report.

Assessment team

According to the sectoral scopes / technical area and experiences in the sectoral or national business environment, Applus+ LGAI has composed a project assessment team in accordance with the appointment rules in Applus+ LGAI. The composition of assessment team has to be approved by the Applus+ LGAI 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 (T)
- Technical Experts (E)

Name	Qualification	Coverage of scope	Coverage of Technical Area	Host country experience
<i>Meng (Simon) Shen</i>	<i>LA</i>	<i>Y (1.1)</i>	<i>Y</i>	<i>Y</i>
<i>Hanshen (Denny) Xue</i>	<i>LA in Train</i>		<i>Y</i>	<i>Y</i>

Technical Reviewer:

- Miquel SITJES CABANAS

Meng (Simon) Shen (Master Degree in Thermal Energy Engineering, Bachelor Degree in Environmental Engineering) is a Lead Auditor appointed by Applus+ LGAI 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+ LGAI, he had been worked for TÜV SÜD as a GHG Validator/Verifier and ISO 9001/14001 Lead Auditor for 3.5 years.

Hanshen (Denny) Xue (Master Degree in Environmental Engineering, Bachelor Degree in Thermal Engineering) is a lead auditor appointed by Applus+ LGAI 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+ LGAI, he has been worked for Shanghai Chuanji Investment and Management which is a CDM consultancy company as a project manager for CDM project development.

Miquel SITJES CABANAS (B. Sc. degree in Chemistry 1975, Universidad de Barcelona – Spain). He has 15 years of experience in a Spanish chemical group company specialized in the manufacturing of raw chemical products, where he worked as the Manager of Quality Control, Production Manager and Environmental Manager. He also worked in the Spanish pharmaceutical industry for 7 years as Quality, Manufacturing and Environmental Manager. He has been working in the Applus+ LGAI Technological Centre since 1999: he started working there as an auditor (quality, environment, CDM, VCS, greenhouse gas verification and others) and since 2006 he has been the Systems Certification Technical Manager.

2.2 Document Review

The VCS monitoring report /1/ version 01 dated 17/10/2016, version 02 dated 05/12/2016 and the emission reduction calculations spreadsheet /2/, were assessed as part of the verification. In addition the registered CDM PDD /3/ version 04.1 dated 03/03/2008 and VCS PD /4/ version 04.1 dated 03/03/2008 (the same as PDD) in particular the baseline estimations and the monitoring plan, and the registered CDM validation report /4/ version 01 dated 20/07/2007 for the project, as well as relevant documents, were reviewed. A detailed documents reviewed are listed in Annex 1 of the report.

2.3 Interviews

The key personnel interviewed are summarized in the table below:

Interviewed personnel	Function	Organization
Mr. Chen Yan	Vice GM	Zhejiang Southeast Electric Power Co., Ltd.
Mr. Li Yong	Chief	Zhejiang Southeast Electric Power Co., Ltd.
Mr. Guo Jian	Chief	Zhejiang Southeast Electric Power Co., Ltd.
Mr. Zheng Zhaoning	Technical Director	Goldchina Consultancy International Co., Ltd.
Mr. Zhang Wenbo	Villager	Zhenhai District
Ms. Yan Yueyin	Villager	Zhenhai District
Mr. Li Minghao	Villager	Zhenhai District

2.4 Site Inspections

The assessment team performed the on-site validation and verification on 21-22/11/2016. The interviewed personnel 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;
- 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.

2.5.1 Forward Action Requests

None FAR was raised during the verification process.

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 CDM PDD /3/ and validation report /4/ at UNFCCC website <http://cdm.unfccc.int/Projects/DB/DNV-CUK1189684459.76/view>, it was validated that the project has been registered as a CDM project on 26/03/2008 with reference No. 1344. Also after checking http://www.vcsprojectdatabase.org/#/project_details/400, it is confirmed that the project also registered as a VCS project. The project does not participate in the other emissions trading program.

During the period from 26/03/2008 to 25/03/2015, the project would claim for other CERs or VCUs, however CERs and VCUs would not been claimed together in the same period.

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

3.2 Methodology Deviations

Not applicable as not deviation for methodology.

3.3 Project Description Deviations

Not applicable as not deviation for project description.

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/ and VCS PD /4/ are in place and the PP has operated the project as per the registered CDM PDD /3/ and VCS PD /4/. 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 checking Power Purchase Agreement (PPA) /17/ signed by the project owner and power grid company. 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 technical parameters have been verified with the nameplates /10/ as well as the technical specification /9/ indicate PG9351FA type gas turbine, HF-9FA-285.4-9.87-566.5-3P(R) Steam generator, D10 Steam turbine and two 390H Power generators, the installed capacity being 397.8 MW each for a total of 795.6 MW, are used to generate electricity.

By comparing the actual ER claimed in this monitoring period with the estimate in the registered PDD, the actual emission reductions (441,637 tCO₂e) are lower than what is stated in the registered CDM PDD (i.e. 473,710 tCO₂e, re-calculated based on the annual ER from registered PD (937,067 tCO₂e) and updated Emission Factor and parameters used in this monitoring period) which the ER 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 Accuracy of GHG Emission Reduction and Removal Calculations

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

Data / Parameter:	FC _{Natural gas}
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Data unit:	m³/a																			
Description:	Net quantity of nature gas consumed in project activity in year ‘y’																			
Source of data used:	<u>Raw data source:</u> The parameter is continuously measured and monthly recorded 423,933.498 (Natural Gas Consumption Record /11/ and Natural Gas Sale Record /12/) <u>Method to obtain raw data:</u> 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 /11/. 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 /12/. Both Natural Gas Consumption Record /11/ and Natural Gas Sale Record /12/ would be compared monthly. Then the conservative value between the Natural Gas Consumption Record /11/ and Natural Gas Sale Record /12/ issued by the gas supply company would be used for ER calculation. All these have been confirmed by site visit.																			
Means of verification/Comments:	<u>Calibration:</u> The calibration information for flow meter is shown as below by verified the calibration certificates /15/: <table><tr><th>Title</th><th>Serial Number</th><th>Accuracy</th><th>Calibration Date</th></tr><tr><td rowspan="2">Gas Ultrasonic Flowmeter1</td><td rowspan="2">3315</td><td rowspan="2">1.0</td><td>13/12/2011</td></tr><tr><td>10/12/2012</td></tr><tr><td rowspan="2">Gas Ultrasonic Flowmeter2</td><td rowspan="2">3316</td><td rowspan="2">1.0</td><td>11/08/2011</td></tr><tr><td>08/08/2012</td></tr><tr><td rowspan="2">Gas Ultrasonic Flow meter at plant (Daniel)</td><td rowspan="2">05-520380</td><td rowspan="2">0.5</td><td>11/05/2011</td></tr><tr><td>10/05/2012</td></tr></table> The flow meter was calibrated by Zhejiang Province Institute of Metrology.	Title	Serial Number	Accuracy	Calibration Date	Gas Ultrasonic Flowmeter1	3315	1.0	13/12/2011	10/12/2012	Gas Ultrasonic Flowmeter2	3316	1.0	11/08/2011	08/08/2012	Gas Ultrasonic Flow meter at plant (Daniel)	05-520380	0.5	11/05/2011	10/05/2012
Title	Serial Number	Accuracy	Calibration Date																	
Gas Ultrasonic Flowmeter1	3315	1.0	13/12/2011																	
			10/12/2012																	
Gas Ultrasonic Flowmeter2	3316	1.0	11/08/2011																	
			08/08/2012																	
Gas Ultrasonic Flow meter at plant (Daniel)	05-520380	0.5	11/05/2011																	
			10/05/2012																	

	<u>Qualification/accreditation/authorization:</u> Zhejiang Province Institute of Metrology was accredited by General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China /16/ <u>Completeness of data:</u> Natural Gas Consumption Record /11/ issued by the project owner and Natural Gas Sale Record /12/ issued by the gas supply company has been verified and the data is complete and covering the whole monitoring period. <u>Verification of data:</u> As verified by the assessment team, the data provided in the Monitoring Report is consistent with the ER Calculation Spreadsheet /2/ by checking Natural Gas Consumption Record /11/ issued by the project owner and Natural Gas Sale Record /12/ issued by the gas supply company.
Cross-check	Natural Gas Consumption Record /11/ is crosscheck with Natural Gas Sale Record /12/, the conservative value would be used for calculation.

Data / Parameter:	EG _y
Data unit:	MWh
Description:	Net electricity delivered to the grid by the project activity in year 'y'.
Source of data used:	<u>Raw data source:</u> The parameter is continuously measured and monthly recorded 2,111,833.680 (MRR /13/ and ETN /14/) <u>Method to obtain raw data:</u> 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 Record (MRR /13/), and then send to the power grid company, after the confirmation of power grid company, the power grid company will issue ETNs /14/.

	Then the conservative value between the Monthly Reading Record /13/ and ETNs /14/ issued by the power grid company would be used for ER calculation. All these have been confirmed by site visit.			
Means of verification/Comments:	<u>Calibration:</u> The calibration information for 3 Main meters and 3 backup meters are shown as below by verified the calibration certificates /17/:			
	Title	Serial No.	Accuracy	Calibration date
	#01 main meter (old one)	206654285	0.2s	30/12/2011
	#01 main meter (new one)	211298525		14/03/2012
	#01 back-up meter (old one)	3060045528	0.2s	27/07/2011
	#01back-up meter (new one)	211298522		14/03/2012
	#11 main meter (old one)	206654297	0.2s	30/12/2011
	#11 main meter (new one)	211298518		05/03/2012
	#11 back-up meter (old one)	3060045525	0.2s	27/07/2011
	#11back-up meter (new one)	211298519		05/03/2012
	#12 main meter (old one)	206654288	0.2s	30/12/2011
	#12 main meter (new one)	211298528		14/03/2012
	#12 back-up meter (old one)	3060045521	0.2s	27/07/2011
	#12 back-up meter (new one)	211298527		14/03/2012
	The electricity meter was calibrated by Zhejiang Electricity Power Test and Research Institute.			
	After checking meter change record /19/, it is confirmed that for #11, the old meter was replaced on 05/03/2012; For #1 and #12, the old meter was replaced on 14/03/2012. Therefore, all meters are valid and well calibrated during this monitoring period.			
	<u>Qualification/accreditation/authorization:</u>			

	Zhejiang Electricity Power Test and Research Institute. was accredited by Zhejiang Province Bureau of Quality and Technical Supervision /18/ <u>Completeness of data:</u> MRR /13/ issued by the project owner and ETNs /14/ issued by the power grid company has been verified and the data is complete and covering the whole monitoring period. <u>Verification of data:</u> As verified by the assessment team, the data provided in the Monitoring Report is consistent with the ER Calculation Spreadsheet /2/ by checking MRR /13/ issued by the project owner and ETNs /14/ issued by the power grid company.
Cross-check	MRR /13/ is crosscheck with ETNs /14/, the conservative value would be used for calculation.

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'.
Source of data used:	<u>Raw data source:</u> The parameter is provided by Natural gas supplier 0.03422 (Fuel purchase agreement /20/) <u>Method to obtain raw data:</u> 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 /20/ issued by Natural gas supplier would be used for ER calculation. All these have been confirmed by site visit.
Means of verification/Comments:	<u>Calibration:</u> Not applicable

	<u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Fuel purchase agreement /20/ issued by Natural gas supplier has been verified and the data is complete and covering the whole monitoring period. <u>Verification of data:</u> As verified by the assessment team, the data provided in the Monitoring Report is consistent with the ER Calculation Spreadsheet /2/ by Fuel purchase agreement /20/ issued by Natural gas supplier.
Cross-check	Not applicable

Data / Parameter:	EF _{CO₂,natural gas}
Data unit:	tCO ₂ /TJ
Description:	The CO ₂ emission factor per unit of energy of nature gas in year 'y'
Source of data used:	<u>Raw data source:</u> Default Value from IPCC 2006 56.1 (IPCC 2006 /21/) <u>Method to obtain raw data:</u> Not applicable as Default Value from IPCC 2006 was used.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	OXID _{Natural gas}
Data unit:	%
Description:	Oxidation factor of nature gas used by the project plant
Source of data used:	<u>Raw data source:</u> Default Value from IPCC 2006 100 (IPCC 2006 /21/) <u>Method to obtain raw data:</u> Not applicable as Default Value from IPCC 2006 was used.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	FC _y
Data unit:	m ³
Description:	Net quantity of fuel other than consumed in project activity in year 'y'.
Source of data used:	<u>Raw data source:</u> 0 <u>Method to obtain raw data:</u> 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.

Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	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'.
Source of data used:	<u>Raw data source:</u> Not applicable as no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity. <u>Method to obtain raw data:</u> Not applicable as no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

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'
Source of data used:	<u>Raw data source:</u> Not applicable as no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity. <u>Method to obtain raw data:</u> 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.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	OXID _y
Data unit:	%
Description:	Oxidation factor of the fuel other than nature gas used by the project plant
Source of data used:	<u>Raw data source:</u> Not applicable as no other fuel than natural gas was used for electricity generation during this monitoring period for the project activity.

	<u>Method to obtain raw data:</u> 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.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	GWP _{CH4}
Data unit:	tCO ₂ /tCH ₄
Description:	Global Warming Potential for CH ₄
Source of data used:	<u>Raw data source:</u> 21 (IPCC 2006 /21/) <u>Method to obtain raw data:</u> Not applicable as Default Value from IPCC was used.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable

Cross-check	Not applicable
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Data / Parameter:	EF _{BM,y}
Data unit:	tCO ₂ /MWh
Description:	Build margin emission factor
Source of data used:	<u>Raw data source:</u> 0.5954 (Notification on 2015 baseline emission factors for regional power grids in China issued by China on 06/06/2016 /22/) <u>Method to obtain raw data:</u> It is confirmed that latest value available at the DNA website has been used for the calculation.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	BTCA
Data unit:	g/kWh
Description:	fuel consumption for best technology commercially available
Source of data used:	<u>Raw data source:</u> 292.3 (Notification on 2015 baseline emission factors for regional power grids in China issued by China on 06/06/2016 /22/) <u>Method to obtain raw data:</u>

	It is confirmed that latest value available at the DNA website has been used for the calculation.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	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
Source of data used:	<u>Raw data source:</u> 209,320 (Notification on 2015 baseline emission factors for regional power grids in China issued by China on 06/06/2016 /22/) <u>Method to obtain raw data:</u> It is confirmed that latest value available at the DNA website has been used for the calculation.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable

Cross-check	Not applicable
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Data / Parameter:	CAP _y
Data unit:	MW
Description:	Total installed capacity of various power in year y within the east china grid
Source of data used:	<u>Raw data source:</u> 250,151 (Notification on 2015 baseline emission factors for regional power grids in China issued by China on 06/06/2016 /22/) <u>Method to obtain raw data:</u> It is confirmed that latest value available at the DNA website has been used for the calculation.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	Fuel Energy Value
Data unit:	GJ/tSCE
Description:	Fuel energy value of Standard Coal Equivalent
Source of data used:	<u>Raw data source:</u> 29.27 (Notification on 2015 baseline emission factors for regional power grids in China issued by China on 06/06/2016 /22/) <u>Method to obtain raw data:</u>

	It is confirmed that latest value available at the DNA website has been used for the calculation.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	η_{BL}
Data unit:	%
Description:	Energy efficiency of the technology
Source of data used:	<u>Raw data source:</u> 42.0 (Notification on 2015 baseline emission factors for regional power grids in China issued by China on 06/06/2016 /22/) <u>Method to obtain raw data:</u> It is confirmed that latest value available at the DNA website has been used for the calculation.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	Not applicable

Data / Parameter:	OXID _r
Data unit:	
Description:	Oxidation rate of the fuel y
Source of data used:	<u>Raw data source:</u> Default value from IPCC /21/ <u>Method to obtain raw data:</u> It is confirmed that latest value available IPCC /21/ has been used for the calculation.
Means of verification/Comments:	<u>Calibration:</u> Not applicable <u>Qualification/accreditation/authorization:</u> Not applicable <u>Completeness of data:</u> Not applicable <u>Verification of data:</u> Not applicable
Cross-check	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	21	IPCC 2006 default
EF _{NG,upstream,CH4}	Emission factor for upstream fugitive methane emissions of natural gas	0.000296	IPCC 2006 default

4.3 Quality of Evidence to Determine GHG Emission Reductions and Removals

The monitoring has been carried out in accordance with the monitoring plan contained in the registered CDM PDD /3/.

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 contained in the registered CDM PDD. 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 4.2 of the report.

4.4 Non-Permanence Risk Analysis

Sufficient evidences covering the full monitoring period in the required frequency are available to verify the figures stated in the final monitoring report. The source of the evidences has been discussed above. 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.

The assessment team confirmed the completeness, accuracy and reliability of the evidences available during the monitoring period, thereby the determination of GHG emission reductions or removals are appropriate.

The responsibilities of data measurement, collection, verifying, archiving etc. have been clearly defined in the CDM Monitoring Procedure /8/. The data related to ER calculation as well as data monitoring, collection process etc. have been internally reviewed by the management of the CDM team regularly. The responsibility of each function is consistent with the monitoring plan in the registered CDM PDD /3/.

The members involved in the CDM team have been trained with the CDM monitoring related issues. During the site visit the assessment team interviewed some personnel of the training issues and considered that the personnel are competent. Personal certificates of the plant operation have also been checked by the assessment team.

The information flow of each parameter has been verified by the assessment team via interviewing with responsible personnel and checking with the CDM Monitoring Procedure /8/. The details of information flow of each parameter are described above.

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 CERs for this Project, whichever occurs later.

5 VERIFICATION CONCLUSION

Applus+ LGAI has been commissioned by Goldchina Consultancy International Co., Ltd. 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” (UNFCCC Ref. No. 1344, 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 CDM PDD /3/, version 04.1, dated 03/03/2008 and the VCS Project Description /4/ 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 CDM PDD and VCS PD;
- the monitoring plan in CDM PDD and VCS PD is as per the applied methodology;
- the monitoring complies with the monitoring plan in the registered CDM PDD and VCS 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 01/01/2012 to 31/12/2012 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 01/01/2012 to 31/12/2012. Verified GHG emission reductions or removals in the above reporting period:

Vintage period	Baseline emissions (tCO ₂ e)	Project emissions (tCO ₂ e)	Leakage (tCO ₂ e)	Emission Reductions (tCO ₂ e)
01/01/2012 to 31/12/2012	1,255,480	813,843	0	441,637
Total	1,255,480	813,843	0	441,637

APPENDIX 1: REFERENCE LIST

1. Monitoring report, Version 01, dated 17/10/2016; version 02, dated 05/12/2016
2. ER calculation spreadsheet
3. Registered CDM PDD, Version 04.1, dated 03/03/2008
4. VCS Project Description, Version 04.1 dated 03/03/2008
5. Validation report, No. 2007-0961, version 01, completed by DNV AS on 20/07/2007
6. VCS standard version 3.5, dated on 25/03/2015
7. Approved methodology AM0029, version 01, dated 19/05/2006
8. CDM Monitoring procedure
9. Technical specification of the equipment
10. Nameplate of the equipment
11. Natural Gas Consumption Record covering the monitoring period
12. Natural Gas Sale Record covering the monitoring period
13. Daily electricity meter reading records of meters covering the monitoring period
14. Electricity Transaction Notes covering the monitoring period
15. Calibration certificates of flow meters covering the whole monitoring period issued by Zhejiang Province Institute of Metrology
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
17. Calibration certificates of flow meters covering the whole monitoring period issued by Zhejiang Electricity Power Test and Research Institute
18. Accreditation certificate of Zhejiang Electricity Power Test and Research Institute issued by Zhejiang Province Bureau of Quality and Technical Supervision
19. Meter change record
20. Fuel purchase agreement covering the monitoring period
21. IPCC 2006
22. Notification on 2015 baseline emission factors for regional power grids in China issued by China on 06/06/2016

23. Power Purchase Agreement (PPA) signed by project owner and power grid company