



VCS VERIFICATION REPORT

VOLUNTARY CARBON STANDARD 2007



“XIAOSHAN POWER PLANT’S NG POWER GENERATION PROJECT OF ZHEJIANG SOUTHEAST ELECTRIC POWER CO., LTD”

Verification Period
28 June 2007 to 25 March 2008

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DET NORSKE VERITAS



VCS VERIFICATION REPORT

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Client: China Carbon Technology Co., Ltd.	Client ref.: Mr. Zhang Yanlong

Summary:

Det Norske Veritas Certification AS (DNV) has performed a verification of emission reductions reported from the 'Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd', managed by Zhejiang Southeast Electric Power Co., Ltd. for the period 28 June 2007 to 25 March 2008. The project activity is registered as a CDM project activity under the UNFCCC with the Registration Ref. No. 1343 with the crediting period starting from 26 March 2008. However, since the project was already in operation prior to the registration of the project, the project developer has claimed the emission reductions that occurred prior to the registration of project. Considering the above mentioned fact, these emission reductions (period 28 June 2007 to 25 March 2008) can not be claimed as Certified Emission Reductions (CERs). The emission reductions have, thus, been claimed as Voluntary Carbon Units (VCU) under the Voluntary Carbon Standard (VCS) 2007.1. This is in accordance to the eminent VCS Guidance for projects that are registered in two GHG programs.

In our opinion the GHG emissions reductions reported for the project in the monitoring report dated 16 September 2008 are fairly stated.

Hence Det Norske Veritas Certification AS is able to verify that the emission reductions from the 'Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd', managed by Zhejiang Provincial Power Company, during the period 28 June 2007 to 25 March 2008 amount to 64 364 tonnes of CO₂ equivalent. DNV does not assume any responsibility towards the issuance and utilization of VCU hereby verified and certified. Request for issuance of VCU shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program Guidelines clause on VCS Registration. The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. Det Norske Veritas Certification AS can not guarantee the accuracy or correctness of this information. Hence, Det Norske Veritas Certification AS cannot be held liable by any party for decisions made or not made based on this report.

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**Abbreviations**

BM	Build Margin
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CM	Combined Margin
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
EB	Executive Board
ECPG	East China Power Grid
EIA	Environmental Impacts Assessment report
FSR	Feasibility Study Report
GCV	Gross calorific value
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IETA	International Emissions Trading Association
IPCC	Intergovernmental Panel on Climate Change
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
NCV	Net calorific value
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PD	VCS Project Description
PDD	CDM Project Design Document
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention for Climate Change
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Units



1 INTRODUCTION

China Carbon Technology Co., Ltd. has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification of emission reductions generated by the “Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd” for the period 28 June 2007 to 25 March 2008. The verification was carried out as per Voluntary Carbon Standard (VCS) version 2007.1 /32/. This report contains the findings from the verification and a statement for the verified emission reductions.

1.1 Objective

Verification of “pre-registration” emission reductions from a project activity is the independent review and *ex-post* determination by a Verification Entity or Designated Operational Entity (DOE) of the monitored reductions in GHG emissions that have occurred as a result of the implementation of an already registered CDM project activity during the 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 Executive Board (EB) and thus the start date of the CDM project activity.

Certification is the written assurance by a Certification Entity that, during a specific period in time, a project activity achieved the emission reductions as verified. According to the Validation and Verification Manual /29/ and criteria of the Voluntary Carbon Standard /32/, the Certification Entity is defined as an entity which has been accredited as a DOE by the CDM Executive Board for the particular scope into which the project falls or has been accredited as an approved Certification Entity by the VCS Steering Committee. DNV is an accredited DOE for the particular scope into which the project falls.

The objective of this verification was to verify and certify the emissions reductions reported for the “Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd for the period 28 June 2007 to 25 March 2008.

1.2 Scope and Criteria

1.2.1 Scope of the verification

The scope of the verification is:

- Verify whether the reductions generated by the project are in line with the Voluntary Carbon Standard Verification Protocol and the information provided by the project participants contains all the necessary information to evidence the project’s compliance with all criteria in the Voluntary Carbon Standard.
- Verify that the project was implemented as described in the Project Design Document (PDD) during the verification period.



- Confirm that the monitoring system was implemented and fully functional to generate voluntary emission reductions (VCU^{*}) without any double counting during the whole verification period.
- By checking the monitoring records and the emissions reduction calculation, express a conclusion whether reported data are accurate, complete, consistent, and transparent, with a reasonable level of assurance and free of material error or misstatement.
- Validation of VCS requirements not covered by the CDM validation.

According to the VCS, the verification also includes an independent third party assessment of the project design. In particular, the project baseline, monitoring plan and the project compliance with relevant applicable protocols and criteria (i.e. UNFCCC, VCS, host Party and others) are to be validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable criteria.

However, since the project under consideration is already registered under VCS approved GHG program i.e. CDM, it has been assumed by DNV that the project design, project baseline, monitoring plan and additionality of the project has already been validated and subsequently accepted by UNFCCC (ref No. 1343). This is in accordance with the “Policy announcement by VCS association” dated 19 March 2008 /27/. Hence the validation scope for the period under consideration (28 June 2007 to 25 March 2008) will focus mainly on specific requirements for the projects that apply for registration under two GHG programs. This is in line with the above mentioned policy announcement.

As the VCS recognizes the CDM as a GHG Program that meets its VCU Verification Criteria, this verification report thus only addresses VCS specific and unique criteria in terms of project design, applicability to the adopted methodology and additionality that have not been so far addressed in the validation report as per CDM requirements.

1.2.2 Validation Criteria for VCS requirements not covered by the CDM validation

As the project has already been validated under the CDM, a further validation shall be completed only for 1.12, 1.13, 1.14, 8.1 and 8.2 clause of the VCS project description template (<http://v-cs.org/docs/VCS%20PD.doc>) as required by the current VCS 2007 “Policy Announcement from the VCS Association - Further Guidance for Projects that are Registered in Two GHG Programs”. This validation was completed as part of the current VCU verification (refer to Appendix A).

1.2.3 Verification Criteria

The verification team has focused on the identification of significant reporting risks and verifying the mitigation measures for these risks based on the recommendations in the Validation and Verification Manual /29/, ISEA3000 (Revised) Assurance Engagements other than Audits or Reviews of Historical Financial Information and/or ISO/FDIS 14064-3 “Greenhouse gases – Part

^{*} As per VCS, Verified Emission Reductions (VERs) are considered to be VCUs only after successful registration in an approved VCU Registry.



3: Specification with guidance for the validation and verification of greenhouse gas assertions and employed a risk-based approach.

According to the requirements and guidance of VCS 2007, the criteria of this verification include the relevant applicable rules and steps for CER verification under the CDM excluding the following:

- The public availability of the VER/VCS Monitoring Report;
- The public availability the Verification Report and VCU Certification Statement.

1.3 VCS Project Description

The project activity of Xiaoshan Power Plant is located in the Xiaoshan District, Hangzhou City, Zhejiang Province of China and generates power using less intensive fossil fuel of natural gas and exports to the Eastern China Power Grid (ECPG) under grid connection agreement /9/. The project has an installed capacity of 806 MW and comprises of two generating stations. The details of the turbines and generators with respect to their numbers, type and model have been verified to be as per details provided in the registered CDM PDD /3/.

The electricity generated is supplied to ECPG which is dominated by coal-fired power plants. The proposed project will not only meet the rising demand of electricity of ECPG, but also improve the peak load regulating capability of the grid.

The current VCS verification of the project activity for the pre-registration period (commissioning of the project till date of registration of the project) accounts for emission reductions generated by the proposed project from 28 June 2007 to 25 March 2008. The project activity was registered as a CDM project on 26 March 2008. The projects emission reductions are determined as 64 364 tCO₂.

Title of the project activity	Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd
Location of the project activity	Xiaoshan District, Hangzhou City, Zhejiang Province of China
Verification period	28 June 2007 to 25 March 2008

1.4 Level of assurance

The level of assurance of the verification report is reasonable assurance engagements. Based on the process and procedures conducted, the GHG assertion

- is materially correct and is a fair representation of the GHG data and information, and
- is prepared in accordance with the related International Standard on GHG quantification, monitoring and reporting, or to relevant national standards or practices.



2 VERIFICATION METHODOLOGY

The verification of the emission reductions has assessed all factors and issues that constitute the basis for emission reductions from the project according to the applicable consolidated CDM methodology AM0029, including the net electricity supplied by the project activity to ECPG multiplied by the grid emission factor and deduct the project emissions.

Verification Team:

The verification team consisted of the following personnel:

Role/Qualification	Last Name	First Name	Country	Type of involvement					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM Verifier/technical team leader	Ramachandran	Ramesh	India			√			
GHG auditor / Project manager	Huang	Peng	China	√	√	√			
GHG auditor	Lin	Wu	China	√	√	√			
GHG auditor	Tang	Zhi Ang (Walter)	China				√		
Technical reviewer	Chandrashekhara	Kumaraswamy	India					√	
Sector expert/ Methodology expert	Raman	Kakaraparthi Venkata	India						√

Duration of verification:

Preparation : 14-16 July 2008
 Site visit : 17-18 July 2008
 Reporting & QA : 12 September 2008-13 October 2009

2.1 Review of Documentation

The following documents were assessed as a part of the verification audit:

1. Registered PDD Version 3.1 of 3 March 2008 /3/;
2. VCS Monitoring report version 2 dated 16 September 2008 /1/.
3. Additional background documents related to the PDD /6//7/;



4. Approved Methodology AM0029 version 01 of 19 May 2006 30;
5. Validation Report, version 01 of 21 July 2007 /4/;
6. Business License of the project owner, available from 22 April 2004 /6/;
7. Power Purchase Agreement between Zhejiang Provincial Power Company and Zhejiang Provincial Power Company on behalf of ECPG, dated 11 September 2007/8/;
8. Grid Connection Agreement between Zhejiang Provincial Power Company and Zhejiang Provincial Power Company on behalf of ECPG, dated 30 March 2007/9/;
9. Natural Gas Purchase Agreement between Zhejiang Provincial Power Company and Zhejiang Provincial Natural Gas Development Co., Ltd, dated 17 February 2007/10/;
10. Power station daily running records of the project from June 2007 to March 2008/18/;
11. Emission Reduction calculation spreadsheet-2007, Emission Reduction calculation spreadsheet-2008/19/.
12. The monthly electricity generation receipts from Zhejiang Provincial Power Company on behalf of ECPG /20/
13. The natural gas receipts from Zhejiang Provincial Natural Gas Development Co., Ltd /21/
14. the report of Net Calorific Value of natural gas provided by Zhejiang Provincial Natural Gas Development Co., Ltd /22/.

2.2 Site Visits

From 17 to 18 July 2008, Mr. Huang Peng and Mr. Lin Wu from DNV conducted a site visit. During this visit, DNV verified the actual implementation of the project as described in the monitoring report /1/ and the registered CDM PDD /3/. This included confirming the operational stages of the project with physical and documented evidence.

The calibration records of the electricity meters /13/ and natural gas flow meters /14/ were checked and found to be in order. The electricity generated is continuously measured, monthly recorded and the net electricity generation is cross checked by the receipt from Zhejiang Provincial Power Company /20/ to be correct. Quantity of natural gas combusted is monitored through the ultrasonic flow meters both by the project owner and natural gas supplier for cross check, which is recorded daily by the computer system /21/.

The persons interviewed during audit are listed in the reference section of this project /39/-/42/

2.3 Assessment

The analysis of documentation, interviews and site visit allowed the assessment of the following processes and assumptions (including QA/QC related issues):

The electricity generated, consumed and exported to the grid is continuously monitored. The amount of electricity exported to the grid was assessed with electricity sales receipts issued by Zhejiang Provincial Power Company and cross checked using internal measurement records.

The consumed NG was continuously monitored and assessed with sales receipts issued by Zhejiang Provincial Natural Gas Development Co., Ltd and cross checked using internal measurement records.



The quantity of electric energy exported to the grid is multiplied by the grid emission factor defined *ex-post* according to the methodology.

The constants and data used for ER calculation is described as follows:

Data/Parameter	Description	Source of data	Unit	Measurement methods	Recording frequency
OXID	Oxidation factor	IPCC	-	Estimated	Annual
EF _{CO₂,y}	Emission factor for natural gas	Local/Regional/Global (IPCC)	tCO ₂ /GJ	Estimated	Annual
COEF _y	CO ₂ emission coefficient	Calculated under the project activity	tCO ₂ / m ³	Calculated	Annual
PE _y	Project emission	Calculated under the project activity	tCO ₂ /a	Calculated	Annual
GWP _{CH₄}	Global Warming Potential for CH ₄	IPCC	-	Estimated	Annual
BTCA	Fuel consumption for best technology commercially available	China DNA	g/kWh	Estimated	Annual
CAP _{fired-y}	Installed capacity of fuel-fired power in year y with in the East China Grid	China Electric Power Yearbook	MW	Estimated	Annual
CAP _y	Total installed capacity of various power in year y with in the East China Grid	China Electric Power Yearbook	MW	Estimated	Annual
Fuel Energy Value	Fuel Energy Value of Standard Coal Equivalent	Chinese National Standard	GJ/tSCE	Estimated	At the beginning of the credit period
η _{BL}	Energy efficiency of the technology	Chinese DNA	%	Estimated	Annual
OXID _{fuel}	Oxidation rate of the fuel	IPCC	-	Estimated	At the beginning of the credit period

The verification of reported data and information was carried out by means of:

- Checking individual internal measuring records for electricity generation;
- Confirmation of the correct compilation of emission reduction calculation spreadsheets (values included in the spreadsheet were individually checked against the records listed above);
- Verifying the effectiveness of the data quality assurance and control;
- Confirmation that the registered CDM project activity meets the additional VCS 2007 requirements.

2.4 Report of Findings

Findings established during the verification may be that:



- i) the verification is not able to obtain sufficient evidence for the reported emission reductions or part of the reported emission reductions. In this case these emission reductions shall not be verified and certified;
- ii) the verification has identified material misstatements in the reported emission reductions.

While aiming to resolve any outstanding issues which needed be clarified about the project design, findings established during the verification can either be seen as a non-fulfilment of the VCU Verification Criteria or where a risk to the fulfilment of project objectives is identified. Emission reductions with material misstatements shall be discounted based on the verifiers' *ex-post* determination of the achieved emission reductions.

Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results requiring adjustments of the VERs/VCUs monitoring report;
- ii) applicable methodological specific requirements have not been met.

A request for clarification (CL) may be used where additional information is needed to fully clarify an issue.

A forward action request (FAR) should be issued, where:

- i) the actual project monitoring and reporting practices requires attention and /or adjustment for the next consecutive verification period, or
- ii) an adjustment of the MP is recommended.

In the context of FARs, risks have been identified, which may endanger the delivery of high quality emissions reductions in the future, i.e. by deviations from standard procedures as defined by the MP. As a consequence, such aspects should receive a special focus during the next consecutive verification. A FAR may originate from lack of data sustaining claimed emission reductions.

DNV was able to verify that the GHG emission reductions reported for the "Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd" in the VCU monitoring report of 16 September 2008 are fairly stated.

No forward action request (FAR) was identified for the future verification of Voluntary Emission Reductions (VERs) under the Voluntary Carbon Standard (VCS) 2007.



3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the “Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd” for the period of 28 June 2007 to 25 March 2008.

3.1 Remaining issues, including any material discrepancy, from previous validation

Based on the validation report, the verification team identified no missing steps, open issues or material discrepancy. As per VCS 2007, clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS PD are in detail verified in Annex 1.

3.2 Project Implementation

The project has been implemented as planned and prior to the CDM registration of the project activity. DNV has verified that two sets of gas-steam combined cycle for power generation units with the total rated output of 806 MW as described in the registered PDD /3/ have been installed, with each unit including a gas turbine, heat recovery steam generator, steam turbine and generator.

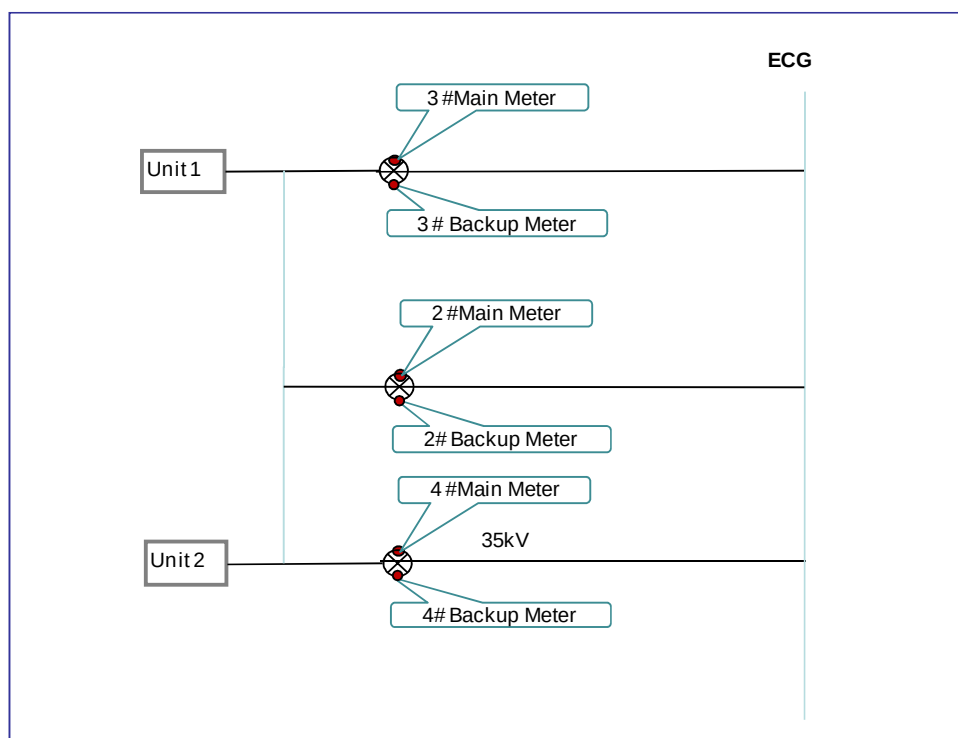
The technology for the Project is sourced from Germany (Siemens V94.3A) which essentially comprises of the following:

- Siemens make V94.3A type gas turbine;
- Heat recovery steam generator – NG-V94.3A-R, supplied by Hangzhou Heat Recovery Boiler Plant;
- Steam turbine, supplied by Siemens, H30-25-25,E30-25-2-1×10;
- Electricity generator (capacity 403MW), THDF108/53, supplied by Siemens

The electricity generated is supplied to ECPG under PPA /8/ and Grid Connection Agreement /9/.

Since the power generation unit connected to the grid started to generate electricity from 28 June 2007, the generation details have been considered for the VER project period starting from 28 June 2007 to 25 March 2008. This data has been verified with the generation details from the “Power station daily running records” /18/ and the original records in the computer control system, and as verified by the Zhejiang Provincial Power Company for receipts /20/. DNV was able to verify the start-up acceptance report /12/ as well.

The electricity meters have been installed in the project site which are bidirectional types with 0.2S accuracy as described in the registered PDD. There are six electricity meters used for electricity monitoring. Here into, one main and backup electricity meters are equipped for each set of power generation unit, and remaining two electricity meters act as main and backup suitable for an emergency, in case of two sets of power generation units come under the cessation of operations. The line diagrams for the meters are described in the figure below. The electricity meters test and certificate reports have been verified and found to be in order /13/.



Two ultrasonic gas flow meters (main and backup) have been installed at the natural gas supply station located nearby the project site. The accuracy of meters is 0.16% which is more precise than the value of 1% indicated in the registered PDD. Another ultrasonic gas flow meter has been equipped at the project end with the accuracy 0.5% which is consistent with the value indicated in the registered PDD. The test and certificate reports have been verified and found to be in place /14/.

3.2.1 Eligible GHGs

The project activity contributes to reductions in the emissions of carbon dioxide (CO₂) by generating electricity using natural gas, thus, displacing electricity generation based on fossil fuels in the ECPG. The reported GHG emission reductions from the project are 64 364 tCO₂ for the period 28 June 2007 to 25 March 2008.

3.2.2 Project Start Date and Emission Reduction Start Date

The starting date of the project activity and consequently emission reduction was 28 December 2005 which is coinciding with the start date of the plant construction. While the emission reductions starting date of the project is 28 June 2007 which is coinciding with the start date of the monitoring period.

3.2.3 Public Funding and Grants

The validation of the CDM project activity did not reveal any information that indicated that the project received any public funding.



3.2.4 Project Boundary/GHG Assessment Boundary

The project boundary for the project activity is defined as the project site and all power plants connected physically to the baseline grid.

3.2.5 Baseline Determination

As the project design was previously assessed by the Designated Operational Entity (DOE) DNV as part of the CDM validation phase (in particular the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria) and as the project was registered by the CDM EB as a eligible CDM project activity, it is thus confirmed that:

- 1) The project correctly applies the following simplified baseline and monitoring methodologies for AM0029 (version 01) "Baseline methodology for grid-connected electricity generating plants using natural gas" and "Monitoring methodology for grid connected generation plants using non-renewable and Less GHG Intensive Fuel.
- 2) The baseline and monitoring methodologies above have been correctly applied and the assumptions made for the selected baseline scenario are sound.

Detailed information regarding baseline determination is available at:

- 1) Registered PDD Version 3.1 of 03 March 2008 /3/
- 2) Validation Report, version 01 of 21 July 2007 /4/

3.2.6 Project Additionality

As the project design was previously assessed by the DNV as part of the CDM validation phase (in particular the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria) and as the project was registered by the CDM EB as a eligible CDM project activity, it is thus confirmed that the project is not a likely baseline scenario, and that emission reductions resulting from the project are additional.

Detailed information regarding project additionality is available at:

- 1) Registered PDD Version 3.1 of 3 March 2008 /3/
- 2) Validation Report, version 01 of 21 July 2007 /4/

3.2.7 GHG Emission

The spatial extent of the project boundary includes the project site and all power plants connected physically to the baseline grid as defined in ACM0002, i.e. ECPG. Emission sources and gases included in the project boundary are project emissions, baseline emissions and leakage /3/ /4/.

As the project design was previously assessed by the DNV as part of the CDM validation phase (in particular the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria) and as the project was registered by the CDM EB as a eligible CDM project activity, it is thus confirmed that the approach for determining project emission, baseline emission and leakage are appropriate and in accordance with the selected baseline and monitoring methodologies.



3.2.8 Secondary Effects

Regarding secondary effects (leakage), leakage was assumed to be zero in the periods it was negative from 28 June 2007 to 25 March 2008 /3/ /4/.

3.2.9 Impacts on sustainable development

The contribution to sustainable development in China was confirmed in the letter of approval considered during validation by DNV /37/.

3.3 Completeness of Monitoring

As the project design was previously assessed by the DNV as part of the CDM validation phase (in particular in terms of the project's baseline, the monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria) and as the project was registered by the CDM EB as a eligible CDM project activity, it is DNV's opinion that the application of the monitoring methodology is transparent.

The reporting procedures reflect the content of the monitoring plan. The monitoring mechanism is effective and reliable.

The monitoring indicator, i.e., the net electricity generation and quality of natural gas combusted, have been monitored with calibrated energy meters as described in the monitoring plan of the registered CDM PDD /3/ and monitoring report /1/.

3.4 Accuracy of emission reduction calculations

As described in section 3.2, six electricity meters (including main and backup meters), which can measure the electricity supplied to the grid and self consumed at the same time, are installed by Zhejiang Provincial Power Company . The ownership of the meters is Zhejiang Provincial Power Company on behalf of ECPG and Zhejiang Provincial Power Company is responsible for the maintenance. The permissible limit for the meter is 0.2S accuracy class. The responsible person from the Zhejiang Provincial Power Company records the data at 24:00 every day, and the monthly readings are forwarded at the start of every month to Zhejiang Provincial Power Company for verification. The Zhejiang Provincial Power Company will monitor and verify the operating status and data through tele-monitoring system. At the conclusion of each meter monthly reading an appointed representative of the Zhejiang Provincial Power Company and Zhejiang Provincial Power Company sign a document indicating the number of kWh indicated by the meter /20/. This document clearly indicates the net electricity exported and this again becomes the basis for emission reduction calculations.

The meters are jointly inspected and sealed on behalf of the parties and are not interfered with by either party except in the presence of the other party or its accredited representatives. The general conditions set out for metering, recording, meter readings, meter inspections, test & checking and communication are as per the PPA (power purchase agreement) with Zhejiang Provincial Power Company /8/. Test and calibration reports have been verified /13/.

Two gas flow meters (including main and backup meters) were directly installed at the project site by the Zhejiang Provincial Natural Gas Development Co., Ltd, which measures the natural gas consumed by the project activity. The ownership of the meters is Zhejiang Provincial Natural Gas Development Co., Ltd as well as the maintenance. The permissible limit for the meters is



0.16% accuracy class. The responsible person from the Zhejiang Provincial Natural Gas Development Co., Ltd records the data at 8:00 every day, which will be cross checked by the project owner. At the conclusion of each meter weekly reading an appointed representative of the Zhejiang Provincial Natural Gas Development Co., Ltd and the project owner sign a document indicating the quantity of the natural gas indicated by the meter /21/. This document clearly indicates the natural gas combusted by the project activity and this again becomes the basis for emission reduction calculations. Another gas flow meter was equipped at the project end by the Zhejiang Provincial Power Company , and values from this meter would be recorded and used for internal verification.

The gas flow meters are jointly inspected and sealed on behalf of the parties and are not interfered with by either party except in the presence of the other party or its accredited representatives. The general conditions set out for metering, recording, meter readings, meter inspections, test & checking and communication are as per the natural gas purchase agreement /10/. Test and calibration reports have been verified /14/.

3.5 Quality of evidence to determine emission reductions

The emission reductions ER_y by the project activity during the crediting period is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (LE_y), as follows:

1) Baseline emissions (BE_y):

Baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor (EF_y in tCO_2/MWh) times the electricity supplied by the project activity to the grid (EG_y in MWh).

As per the methodology AM0029 /30/, the lowest emission factor among the following three options shall be used:

Option 1: The build margin, calculated according to ACM0002; and

Option 2: The combined margin, calculated according to ACM0002, using a 50/50 OM/BM weight.

Option 3: The emission factor of the technology (and fuel) identified as the most likely baseline scenario under "Identification of the baseline scenario" above, and calculated as follows:

$$EF_{BL,CO_2}(tCO_2 / MWh) = \frac{COEF_{BL}}{\eta_{BL}} * 3.6GJ / MWh$$

The lowest one from these 3 options will be selected as the emission factor use to calculate the Baseline emissions,

Since the data required to calculate the emission factor for year y is usually published later than 18 months after the end of year y in China, the generation of electricity in the year 2007 shall in this case be multiplied with the emission factor based on data from the year 2005 (y-2) and the generation of electricity in the year 2008 shall be multiplied with the emission factor based on data from the year 2006 (y-2). It is following the tool to calculate the emission factor for an electric system, version 1.1 dated 19 October 2007 /36/.

According to the monitoring report, the baseline emission factor was calculated as per the options mentioned above. The result is as follows:



Option	Baseline CO ₂ emission factor (tCO ₂ e/MWh)	
	2007	2008
Option 1 (BM)	0.8672	0.8154
Option 2 (CM)	0.9046	0.8847
Option 3 (Likely technology)	0.9506	0.9135

Therefore, for the electricity generation in year 2007, the baseline emission factor (Option 1) BM is calculated to be 0.8672 tCO₂/MWh, which is derived from China Power Electric Power Yearbooks 2004 to 2006 and the data is based on the year 2005/23/; For the electricity generation in year 2008, the baseline emission factor (Option 1) BM is calculated to be 0.8154 tCO₂/MWh, which is derived from China Power Electric Power Yearbooks 2005 to 2007 and the data is based on the year 2006/23/.

For the Option 2, i.e. the combined margin was calculated according to ACM0002, using a 50/50 OM/BM weight.

For the year of 2007, CM was calculated to be 0.9046 tCO₂/MWh, based on the data available in the China Power Electric Power Yearbooks 2004 to 2006 /23/and China Energy statistical Yearbooks 2004 to 2006.

For the year of 2008, CM was calculated to be 0.8847 tCO₂/MWh, based on the data available in the China Power Electric Power Yearbooks 2005 to 2007 and China Energy statistical Yearbooks 2005 to 2007/28/.

For the Option 3: According to the baseline emission factor of China Grids issued by Chinese DNA /25/, for the 600MW sub-critical coal-fired power plant, the most efficiency level of the best technology commercially available in the year of 2005 is 35.82%, so the $EF_{BL,CO_2,2007}$ is about 0.9506 tCO₂/MWh. For the year of 2006, according to the baseline emission factor of China Grids issued by Chinese DNA /26/, in China the efficiency level of the 600MW sub-critical coal-fired power plant is 37.28%, and the $EF_{BL,CO_2,2008}$ is calculated to be 0.9135 tCO₂/MWh.

The GHG calculations are complete and transparent, and their accuracy has been verified.

For the period 28 June 2007 to 31 December 2007, the total electricity generated is 151 291.80 MWh and the power self consumed by the project is 2 560.80MWh. Thus the net amount of electricity is 148 731MWh and the claimed emission reductions of 128 980 tCO₂ based on the baseline emission factor 0.8672 tCO₂/MWh in year 2007.

For the period 1 January 2008 to 25 March 2008, the total electricity generated is 22 110MWh and the power self consumed by the project is 1 440.12MWh. Thus the net amount of electricity is 20 669.88MWh and the claimed emission reductions of 16 854tCO₂ based on the baseline emission factor 0.8154 tCO₂/MWh in year 2008.



According addressed above, the baseline emission reductions (BE_y) during the crediting period 28 June 2007 to 25 March 2008 totally was 145 834 tCO₂, which was verified by cross checking the receipts of Zhejiang Provincial Power Company and the records of the project owner /20/.

2) Project emissions (PE_y):

During the on-site visit, DNV was able to verify that there are no fuels consumed in the proposed project other than natural gas to generate electricity. The CO₂ emissions from NG consumption (PE_y) are calculated as follows:

$$PE_y = \sum_f FC_{f,y} * COEF_{f,y}$$

The net calorific value (NCV) of the natural gas was derived from the reports of Gross Calorific Value (GCV) for natural gas combusted issued by Zhejiang Provincial Natural Gas Development Co., Ltd /22/. According to the energy statistic manual /24/, 1 NCV=0.9*GCV.

IPCC 2006 default values for EF_{CO_2} (56.1t CO/TJ) of natural gas and for the oxidation rate (100%) of the natural gas are used.

The calculations are complete and transparent, and their accuracy has been verified.

For the period 28 June 2007 to 31 December 2007, the total natural gas combusted is 36 409 898m³/1/and thus the project emission is 67 286tCO₂.

For the period 1 January 2008 to 25 March 2008, the total natural gas combusted is 7 663 713m³/1/and thus the project emission is 14 184 tCO₂.

According to the mentioned above, the project emission (PE_y) during the crediting period 28 June 2007 to 25 March 2008 totally was 81 470 tCO₂/MWh, the quantity of NG consumption was verified by cross checking the receipts of Zhejiang Provincial Natural Gas Development Co., Ltd and the records of the project owner /21/.

3) Leakage (LE_y):

Since no LNG will be used in the proposed project, the leakage emissions result from natural gas will only be considered. Therefore, the fugitive upstream CH₄ emissions are taken into account as leakage emissions.

According to the methodology AM0029, the leakage emission should multiply the quantity of natural gas consumed by the project in year y with an emission factor for fugitive CH₄ emission from natural gas consumption and subtract the emission occurring from fossil fuels used in the absence of the project activity.

DNV was able to verify the analysis and calculation of the leakage emission in the monitoring report /1/, and confirm that the calculations are complete and transparent.

At the conclusion of the leakage emission calculation, the leakage emission is to be -11 356 tCO₂ totally, which involve the leakage emission in 2007 and 2008. According to the methodology AM0029, when the total net leakage effects are negative, the project participants should assume $LE_y = 0$, i.e., hence, no leakage has to be considered for the project activity

4) Emission reductions (ER_y):

$$ER_y = BE_y - PE_y - LE_y = BE_y - PE_y$$



Thus the claimed emission reductions ER_y of 64 364tCO₂ reported for the period 28 June 2007 to 25 March 2008 is deemed correct.

The energy generated, natural gas consumption and emission reductions claimed for the proposed period were as shown in the following table:

Period	Power Generated MWh	Power Consumed MWh	Net Power Supplied MWh	Baseline Emission tCO ₂	Natural Gas Consumed m ³	Project Emission tCO ₂	Leakage Emission tCO ₂	Emission Reductions tCO ₂
28/06/2007 to 31/12/2007	151 291.80	2 560.80	148 731	128 980	36 409 898	67 286	0	61 694
1/1/2008 to 25/03/2008	22 110	1 440.12	20 669.88	16 854	7 663 713	14 184	0	2 670
Total	173 401.80	4 000.92	169 400.88	145 834	44 073 611	81 470	0	64 364

Sufficient evidence was presented for the reported parameters.

3.6 Management System and Quality Assurance

The responsibility and authority for registration, monitoring, measurement and reporting activities and QA/QC have been in place as described in the registered PDD /3/. Necessary procedures related to data handling, quality assurance and training of monitoring personnel have been appropriately implemented as described in the CDM project management manual /17/.

There exists a CDM department in charge of the whole monitoring process, which is led by a CDM project director and includes a CDM manager as well as a monitoring team. The CDM project director takes charge of the management of the CDM project and takes responsibility for Chinese DNA and stakeholders. The CDM manager is responsible for the operation and management of the CDM project, including data collection, CER calculation and cooperation with external. The CDM monitoring teams take charge of the regular monitoring work, including monitoring, aggregation and storage of raw data and the calibration and maintenance of the measurement equipments.

The accuracy class of electricity meters is 0.2S, which have been tested and calibrated annually by a third party-Zhejiang Electric Power Test and Research Institute /13/ according to the national standard JJG596-1999. Two ultrasonic gas flow meters installed at the natural gas supply station with the accuracy of 0.16% and another ultrasonic gas flow meter equipped at the project end with the accuracy of 0.5% also have been calibrated /14/.

The internal audit and management review mechanism have been established and implemented well. The values firstly are gathered by CDM monitoring teams and submitted to the production department for initial audit, and then provided to CDM manager for further review. Subsequently, the consultant China Carbon Technology Co., Ltd. will assist to complete the final check and preparation for the verification.

One control centre has been established from where all electronic data would be remotely monitored and recorded. All original information has been stored by electronically and hardcopy. The relevant documents will be kept for at least two years after the end of the crediting period.



The site visit confirmed that the management system for the CDM project is in place, such as the management structure of the CDM project, the CDM operation manual, and the competence criteria of CDM personnel involved in the project.



4 VERIFICATION STATEMENT

Det Norske Veritas Certification AS has performed a verification of the voluntary emission reductions reported for the “Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd” managed by Zhejiang Provincial Power Company for the period 28 June 2007 to 25 March 2008. The project has been registered as CDM project activity (UNFCCC Registration Ref. No. 1343).

Zhejiang Provincial Power Company is responsible for the collection of data in accordance with the validated monitoring plan and the reporting of GHG emissions reductions from the project.

It is DNV’s responsibility to express an independent verification statement on the reported GHG emission reductions from the project.

In DNV’s opinion the GHG emissions reductions reported for the project in the monitoring report of 16 September 2008 are fairly stated and the project design meets all VCU Verification Criteria.

The GHG emission reductions were calculated correctly on the basis of the baseline and monitoring methodology AM0029 version 01 and the monitoring plan provided in the PDD. The emission reductions are claimed as Voluntary Carbon Units (VCU) under the Voluntary Carbon Standard (VCS).

Det Norske Veritas Certification AS is able to verify that the emission reductions from the ‘Xiaoshan Power Plant’s NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd’, managed by Zhejiang Provincial Power Company during the period 28 June 2007 to 25 March 2008 amount to 64 364 tonnes of CO₂ equivalent.

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

The verification of reported emission reductions is based on the information made available to us and the engagement conditions detailed in this report. DNV cannot guarantee the accuracy or correctness of this information. Hence, Det Norske Veritas Certification AS cannot be held liable by any party for decisions made or not made based on this report.

Beijing, 13 October 2009

Peng Huang
GHG Auditor
Climate Change Services

Oslo, 13 October 2009

Hendrik W. Brinks
Technical Director for CDM
Climate Change Services



5 REFERENCES

Category 1 Documents:

Documents provided by the project participants that relate directly to the GHG components of the project. These have been used as direct sources of evidence for the initial verification conclusions, and are usually further checked through interviews with key personnel.

- /1/ Monitoring Report of Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd, version 2 dated 16 September 2008.
- /2/ VSC PD of Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd: Clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2
- /3/ CDM PDD for Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd, Version 3.1 of 3 March 2008
- /4/ Validation Report for "Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd", Report No.:2007-0960, version 01 of 21 July 2007, DNV
- /5/ Business License of the project owner issued by Hangzhou Administration for Industry and Commerce, available from 22 April 2004
- /6/ Zhejiang Power Design Institute, Feasibility Study Report of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd, and project approval letter issued by National Development and Reform Commission, [2005] No. 345
- /7/ Southwest Electric Power Institute Environmental impacts assessment report of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd, and project approval letter issued by National Environment Protection Bureau 26 November 2003.
- /8/ Power Purchase Agreement between Zhejiang Provincial Power Company and Zhejiang Provincial Power Company on behalf of ECPG, dated 11 September 2007.
- /9/ Grid Connection Agreement between Zhejiang Provincial Power Company and Zhejiang Provincial Power Company on behalf of ECPG, dated 30 March 2007.
- /10/ Natural Gas Purchase Agreement between Zhejiang Provincial Power Company and Zhejiang Provincial Natural Gas Development Co., Ltd, dated 17 February 2007.
- /11/ Electricity tariff issued by Price Bureau of Zhejiang Province, dated 31 December 2005, Doc No.: [2006] 01
- /12/ Start-up acceptance of the proposed project issued by Zhejiang Provincial Energy Group Co., Ltd, dated 23 June 2008, Doc No.: [2008]23
- /13/ Calibration and certificate of main and back-up meters issued by Zhejiang Electric Power Test and Research Institute, dated 27 February 2007 and 27 February 2008
- /14/ Ultrasonic flow meters calibration report and certificate of the project issued by



manufacturer of Pigsar, dated 10 July 2006 According to the *Verification Regulation of the Ultrasonic Flowmeters (JJG1030-2007)* which is issued by General Administration of Quality Supervision, Inspection and Quarantine of P.R.C., the test period for Ultrasonic Flowmeter is two years.

- /15/ The personnel training schedule and record for the proposed project from September 2004 to November 2007.
- /16/ Competence certificate of the operation personnel of the proposed project dated May 2006
- /17/ CDM Project Management Manual issued by Zhejiang Provincial Power Company , dated 11 July 2008,
- /18/ Power station daily running records of the proposed project from June 2007 to March 2008
- /19/ Emission Reduction calculation spreadsheet-2007
Emission Reduction calculation spreadsheet-2008
- /20/ Electricity purchase receipts issued by Zhejiang Provincial Power Company
Electricity sale records issued by Zhejiang Provincial Power Company
- /21/ Natural gas sale receipts issued by Zhejiang Provincial Natural Gas Development Co., Ltd
Natural gas purchase records issued by Zhejiang Provincial Power Company
- /22/ The report of Net Calorific Value for natural gas combusted issued by Zhejiang Provincial Natural Gas Development Co., Ltd from June 2007 to March 2008
- /23/ China Electric Power Yearbook, 2003~2007
- /24/ Energy Statistics Manual, IEA publication, September 2004
- /25/ China NDRC, the emission factor calculation for each power grid of China, published on 9 August 2007, NDRC official website:
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf>
- /26/ China NDRC, the emission factor calculation for each power grid of China, published on 18 July 2008, NDRC official website:
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/200887164119674.pdf>
- /27/ “Policy announcement by VCS association” dated 19 March 2008
- /28/ China Energy statistical Yearbooks, 2003~2007

Category 2 Documents:

Background documents related to the design and/or methodologies employed in the design or other reference documents. Where applicable, Category 2 documents have been used to cross-check project assumptions and confirm the validity of information given in the Category 1 documents and in verification interviews.

- /29/ International Emission Trading Association (IETA) & the World Bank’s Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /30/ AM0029 - Approved methodology “ baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas”, version 01 of 19 May 2006



- /31/ ACM0002 - Approved methodology "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 06, date 19 May 2006
- /32/ Voluntary Carbon Standard (VCS) version 2007.1. webpage: http://www.v-c-s.org/docs/Voluntary%20Carbon%20Standard%202007_1.pdf
- /33/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003
- /34/ The guidance for deviation in use of methodology AM0005 by several project activities in China by EB. <http://cdm.unfccc.int/Projects/Deviations>
- /35/ The statistics by State Electricity Regulatory Commission (SERC) on newly built thermal plants in 10th "Five-Year Plan" period 2000-2005, and NDRC official website <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2006/20061215144747182.pdf>
- /36/ CDM Executive Board: Tool to calculate the emission factor for an electricity system, version 1.1 of 19 October 19 2007.
- /37/ DNA of China, Host country approval letter, 17 January 2007.
- /38/ The declaration letter from the project owner announces that all carbon credits for the period from 28 June 2007 to 25 March 2008 will only sell it once as VCS credits.

Persons interviewed:

Persons interviewed during the initial verification, or persons contributed with other information that are not included in the documents listed above.

- /39/ Ms. Huang Jinfeng, project manager, China Carbon Technology Co., Ltd.
- /40/ Mr. Yang Jiaming, technical engineering, China Carbon Technology Co., Ltd.
- /41/ Mr. Feng Ougen, vice director of the Plant, Zhejiang Provincial Power Company
- /42/ Ms. Guo Juanhua, Engineering, Zhejiang Provincial Power Company
- /43/ Mr. Yuan Weizhong, chief engineering, Zhejiang Provincial Power Company
- /44/ Mr. Yang Xuanzhong, director of comprehensive management division, Zhejiang Provincial Power Company
- /45/ Mr. Wang Jianqiao, director of Natural Gas Power Generation Engineering Department, Zhejiang Provincial Power Company
- /46/ Mr. Gaoguofeng, fuel engineering, Zhejiang Provincial Power Company
- /47/ Ms. Ding Kaihong, measurement engineering, Zhejiang Provincial Power Company

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Annex 1

Clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS PD

The proposed project has been registered as a CDM project on 26 March 2008 with the Registration Ref. No.1343. As the VCS came into force on 19 November 2007, this monitoring period shall be verified against the VCS 2007 in terms of the VCS 2007. This clarification is annexed to cover all the requirements set out in the VCS 2007 for project validation together with the validated PDD (version 3.1, dated 3 March 2008), according to the Policy Announcement from the VCS Association.

(<http://www.v-c-s.org/documents.html>)

Clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2 of the VCS PD are as follows:

1.12 Demonstration to confirm that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

As a new grid-connected nature gas power generation project, the proposed project will produce clean electricity using nature gas and will generate GHG emission reductions by avoiding CO₂ emissions from electricity generation of fossil fuel fired power. Operation of this project can reduce GHG emissions. It is confirmed that the project was not implemented to create GHG emissions primarily for the purpose of its subsequent removal or destruction.

1.13 Demonstration that the project has not created another form of environmental credit (for example renewable energy certificates).

The project is located in China and is developed and operated by Zhejiang Provincial Power Company , which is a Chinese Investment Enterprise. There is no other environmental credit (for example renewable energy certificate) which has or will be produced by or obtained for the project/38/.

1.14 Project rejected under other GHG programs (if applicable):

The proposed project is a registered CDM project, which doesn't fall into rejected projects under other GHG programs.

8.1 Proof of Title:

Evidence of proof of title has been demonstrated via documentation proving ownership of the plant and equipment through the on-site visit. The owner has also obtained all relevant permits for to the proposed project including a Business License /5/, feasibility study report approval /6/, EIA (Environmental Impacts Assessment Report) approval /7/ and power purchase Agreement /8/. The project's design and implementation has been carried out in compliance with all relevant and national legislation in China. The declaration letter from the project owner, has been obtained. It has been confirmed that the project owner will not apply for other VERs (VER+, GS etc.) and that all credits are transferred to the buyer. It also has been confirmed that the buyer will only sell the VCU's once /38/.



8.2 Projects that reduce GHG emissions from activities that participate in an emissions trading program (if applicable):

The proposed project has been registered as a CDM project on 26 March 2008 and the reference number is 1343, for which a renewable crediting period of 3×7 years will be used under the CDM GHG Program and the first crediting period is from 26 March 2008 to 25 March 2015. Therefore, GHG emission reductions generated by the proposed project during the CDM crediting period will be verified as unique CERs during the CDM crediting period. Only GHG emission reductions achieved from 28 June 2007 to 25 March 2008 will be considered as VCUs under the VCS 2007.