VCS VERIFICATION/ CERTIFICATION REPORT

VOLUNTARY CARBON STANDARD 2007

CHINA GUANGDONG SHENZHEN QIANWAN LNG GENERATION PROJECT

Verification Period:
1 December 2006 to 30 September 2008

REPORT NO. 2008-1784
REVISION NO. 01

DET NORSKE VERITAS

VCS VERIFICATION/ CERTIFICATION REPORT

Date of first issue: 2009-09-21	Project No.: 63608030
Approved by: Michael Lehmann	Organisational unit: Climate Change Services
Client: Zhuhai Hunter Energy Resources Development Co., Ltd.	Client ref.: Mr. Wang Hui

DET NORSKE VERITAS
CERTIFICATION AS

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 945 748 931 MVA

Summary:
Det Norske Veritas Certification AS (DNV) has performed a verification of emission reductions reported from the 'China Guangdong Shenzhen Qianwan LNG generation project" in China, managed by Shenzhen Guangqian Electric Power Co., Ltd. for the period from 1 December 2006 to 30 September 2008.
In our opinion the GHG emissions reductions reported for the project in the monitoring report version 2 dated 12 October 2008 are fairly stated.
The GHG emission reductions were calculated correctly on the basis of the baseline and monitoring methodology provided in line with the Voluntary Carbon Standard 2007 (VCS 2007) in accordance to the eminent VCS Guidance for projects that are registered in two GHG programs. The project activity is registered as CDM project activity under the UNFCCC with the Registration Ref. No. 1915 and with the CDM crediting period of the project starting on 12 May 2009.
Det Norske Veritas Certification AS is able to verify that the emission reductions from the 'China Guangdong Shenzhen Qianwan LNG generation project', managed by Shenzhen Guangqian Electric Power Co., Ltd., during the period from 1 December 2006 to 30 September 2008 amount to 1 577 524 tonnes of CO_2 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. DNV can not guarantee the accuracy or correctness of this information. Hence, DNV cannot be held liable by any party for decisions made or not made based on this report.

Report No.: 2008-1784	Subject Group: Environment
Report title: China Guangdong Shenzhen Qianwan LNG generation project	
Work carried out by: Peng Huang,Tao Li, Zhi Ang(Walter) Tang	
Work verified by: Hendrik W. Brinks	

Date of this revision: 2009-09-21	Rev. No.: 01	Number of pages: 17

Indexing terms

Key words Climate Change Kyoto Protocol Validation Clean Development Mechanism	Service Area Verification-VCS Market Sector Process Industry

☒ No distribution without permission from the client or responsible organisational unit

☐ free distribution within DNV after 3 years

☐ Strictly confidential

☐ Unrestricted distribution

Table of Content *Page*

Abbreviations

BM	Build Margin
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CM	Combined Margin
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CSPG	China Southern Power Grid
DNV	Det Norske Veritas
EB	Executive Board
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
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

Zhuhai Hunter Energy Resources Development Co., Ltd has commissioned Det Norske Veritas Certification AS (DNV) to carry out the verification of emission reductions reported for the "China Guangdong Shenzhen Qianwan LNG generation project" for the period from 1 December 2006 to 30 September 2008. The report was carried out as per Voluntary Carbon Standard (VCS) version 2007 /33/. This report contains the findings from the verification and a statement for the verified emission reductions.

The project activity was registered as CDM project (UNFCCC reference number 1915) on 12 May 2009 with the CDM crediting period starting on 12 May 2009. The emission reductions occurring prior to the registration date are claimed as Voluntary Carbon Units (VCU) under VCS 2007 and in accordance to the VCS Guidance for projects that are registered in two GHG programs. These emission reductions can not be claimed as Certified Emission Reductions (CERs).

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.

A Certification Entity is defined as anis 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 China Guangdong Shenzhen Qianwan LNG generation project for the period 1 December 2006 to 30 September 2008.

1.2 Scope and Criteria

1.2.1 Scope of the verification

The scope of the verification is:

- Verify whether 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 2007, 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. 1915). This is in accordance with the "Policy announcement by VCS association" dated 19 March 2008 /37/. Hence, as the VCS recognizes the CDM as a GHG Programs 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-c-s.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 /30/, ISEA3000 (Revised) Assurance Engagements other than Audits or Reviews of Historical Financial Information and/or ISO/FDIS 14064-3 "Greenhouse gases – Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions and employed a risk-based approach.

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

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 is located in Dachan Island, Nanshan District, Shenzhen City, Guangdong Province of China. The project is a natural gas for power generation project activity with a rated output of 1 083.09 MW (3×361.03 MW) using natural gas as fuel. 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 CSPG under Grid Connection Agreement /9/, which is dominated by coal-fired power plants. The proposed project will not only meet the rising demand of electricity demand of CSPG, but also improve the peak load regulating capability of the grid.

Furthermore, the proposed project is expected to bring social, environmental and economic benefits, thus contributing to the sustainable development objectives of the Chinese government based on the approval issued by the National Development and Reform Commission /6/.

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 1 December 2006 to 30 September 2008. The project activity was registered as a CDM project on the 12 May 2009. The projects emission reductions are determined as 1 577 524 tCO_2.

Title of the project activity:	China Guangdong Shenzhen Qianwan LNG generation project
Location of the project activity:	Dachan Island, Nanshan District, Shenzhen City, Guangdong Province of China
Verification period:	1 December 2006 to 30 September 2008

1.4 Level of assurance

As the VCS 2007 only recognizes verified emission reductions, DNV has focused on providing a reasonable level of assurance that the emission reduction calculation methodology used is appropriate and correctly applied, and that emission reductions have been accurately monitored.

In accordance with the recommendation in the IETA/PCF Validation and Verification Manual /30/ DNV "discounts verified emission reductions or requests a discount of these by using conservative assumptions for uncertainties in emission reduction calculations that cannot be fully quantified or that cannot give a desired level of assurance". For verifying/certifying VCUs, the desired level of assurance was based on the combined quantitative assessment of the accuracy of monitoring project performance and the identification of material risks.

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 version 1.1, including the net electricity supplied by the project activity to CSPG multiplied by the grid emission factor and deduct the project emissions.

Verification Team:

The verification team consisted of the following personnel:

				Type of involvement					
Role/Qualification	***Last Name***	***First Name***	***Country***	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM Verifier/Technical team leader	Tang	Zhi Ang(Walter)	China	√		√	√		
GHG auditor	Huang	Peng	China	√	√	√			
GHG auditor	Li	Tao	China	√	√	√			
Technical reviewer	Brinks	Hendrik	Norway					√	

Duration of verification:

Preparation	:	23-25 August 2008
Site visit	:	29-31 August 2008
Desk interview	:	22 October 2008
Reporting	:	1 September 2008-21 September 2009

2.1 Review of Documentation

The monitoring report (version 1 dated 2 August 2008 and version 2 dated 12 October 2008) /1/, the monthly electricity generation receipts from Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd., on behalf of CSPG /23/ and the natural gas receipts from Guangdong Dapeng Natural Gas Development Co., Ltd /24/ were assessed as a part of the verification. In addition the report of Gross Calorific Value of natural gas provided by Guangdong Dapeng Natural Gas Development Co., Ltd /25/, the VCS Project Description (PD) /2/, the registered CDM-PDD /3/, in particular the baseline estimations and the monitoring plan contained in the CDM-PDD, the approved CDM baseline and monitoring methodology AM0029 version 1.1 of 19 May 2006, in the registered CDM PDD /3/ and the

validation report /4/ were also assessed.

2.2 Site Visits and desk interview

In the period of 29-31 August 2008, Mr. Huang Peng and Mr. Li Tao from DNV conducted a site visit at Shenzhen Guangqian Electric Power Co., Ltd.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 /16/ and natural gas flow meters /17/ were checked and found to be in order. The electricity generated is hourly measured, monthly recorded and the net electricity generation is cross checked by the receipt from Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd. /23/to be correct. The 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 /24/.

The persons interviewed during audit are listed in the reference section of this project /38/-/43/.

On 22 October 2008, DNV performed an interview with project stakeholders at DNV's Beijing office. During this desk interview, DNV verified the electricity purchase receipts of September 2008 issued by Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd., and the Electricity sale records September 2008 issued by Shenzhen Guangqian Electric Power Co., Ltd.. DNV also verified the natural gas sale receipts of September 2008 issued by Guangdong Dapeng Natural Gas Development Co., Ltd and the natural gas purchase records issued by Shenzhen Guangqian Electric Power Co., Ltd.

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 Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd., and cross checked using internal measurement records.
- The consumed NG was continuously monitored and assessed with sales receipts issued by Guangdong Dapeng 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 were 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	Calculated under the	tCO_2/m^3	Calculated	Annual

	coefficient	project activity			
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	gCE/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	At the beginning of the credit period
$OXID_{fuel}$	Oxidation rate of the fuel	IPCC2006	100%	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

A corrective action request (CAR) is issued, where:

i. The project does not meet requirements of the VCS 2007
ii. Non-conformities with the monitoring plan or methodology are found in monitoring and reporting, or if the evidence provided to prove conformity is insufficient;
iii. Mistakes have been made in applying assumptions, data or calculations of emission reductions which will impair the estimate of emission reductions;
iv. Issues identified in a FAR during validation to be verified during verification have not been resolved by the project participants.

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

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

DNV was able to verify that the GHG emission reductions reported for the "China Guangdong Shenzhen Qianwan LNG generation project" in the VCU monitoring report of 12 October 2008 are fairly stated.

No forward action requests (FAR) were identified.

3 VERIFICATION FINDINGS

This section summarises the findings from the verification of the emission reductions reported for the "China Guangdong Shenzhen Qianwan LNG generation project" for the period of 1 December 2006 to 30 September 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 Compliance with VCS requirements

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 are to be validated in order to confirm that the project design, as documented, is sound and reasonable and meets the applicable criteria.

The project design, its eligibility as CDM project activity and the correct application of the approved CDM baseline and monitoring methodology AM0029 (Version 1.1) were all already validated by DNV and the project was on 12 May 2009 registered as CDM project activity. 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 /4/.

The compliance with the requirements set out in the VCS2007 for project validation according to the Policy Announcement from the VCS Association of 19 March 2008 for projects that are registered in two GHG programs is discussed in Appendix A.

3.2.1 Eligible GHGs

The project activity contributes to reductions in the emissions of carbon dioxide (CO_2) by generating electricity using a renewable source natural gas, thus, displacing electricity generation based on fossil fuels in the CSPG. The reported GHG emission reductions from the project are 1 577 524 tCO_2 during the period 1 December 2006 to 30 September 2008.

3.2.2 Project Start Date and Emission Reduction Start Date

The starting date of the project activity and consequently emission reduction was 15 November 2006, coinciding with the start of operation of the plant.

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 Secondary Effects

Regarding secondary effects (leakage), through the negative result of calculation, leakage can be assumed to be zero /3/ /4/.

3.2.5 Impacts on sustainable development

The contribution to sustainable development in China was confirmed in the Letter of Approval considered during validation by DNV /38/.

3.3 Project Implementation

The project has been implemented as planned and prior to the CDM registration of the project activity. DNV has verified that three sets of gas-steam combined cycle for power generation units with the total rated output of 1083.09 MW as described in the registered PDD /3/ have been installed.

The electricity generated is supplied to CSPG under Grid Connection Agreement /8/ /9/.

Since the first set of power generation unit connecting to the grid start to generate electricity on 15 November 2006 as well as the last set of power generation unit on 16 May 2007, the generation details have been considered for the VCU project period of 1 December 2006 to 30 September 2008. This data has been verified with the generation details in the ”Power station daily running records” /21/ and the original records in the computer control system, and as verified by Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd., for receipts /23/. DNV was able to verify the start-up acceptance report /14/ and performance test report /15/ as well as letter on the checking and accepting completed installations of environmental protection of the proposed project /13/.

The meters test and certificate reports of the project have been verified and found to be in order /16/.

3.4 Completeness of Monitoring

The project design was previously assessed by the Designated Operational Entity (DOE) 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.

After comparing the monitoring plan with the methodology AM0029 version 1.1, it is DNV’s opinion that the application of the monitoring methodology is transparent and correct. The monitoring report reflects 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/.

3.5 Accuracy of emission reduction calculations

Total 8 electricity meters were installed at the power plant, each turbine were installed one main and one backup meter to measure the electricity supplied to the grid and self consumed at the same time, and other two meters were installed to measure the electricity consumption when all these 3 turbines were shutdown. The meters were installed by Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd. The ownership of the meter is Shenzhen Guangqian Electric Power Co., Ltd.on behalf of CSPG and Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd., is responsible for the maintenance. The permissible limit for the meter is 0.2% (0.2S) accuracy class. The responsible person from the Shenzhen Guangqian Electric Power Co., Ltd. records the data at 24:00 in the every day and the monthly readings are forwarded to Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd.,for verification at the start of every month. The Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd., 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 Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd.,and Shenzhen Guangqian Electric Power Co., Ltd. sign a document indicating the number of kWh indicated by the meter /23/. This document clearly indicates the net electricity exported and this again becomes the basis for emission reduction calculations.

The meter is jointly inspected and sealed on behalf of the parties and is not interfered with by either party except in the presence of the both parties 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 Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd. /8/. Test and calibration reports have been verified /16/. Calibrations have been carried out annually.

The gas flow meter was directly installed by the Guangdong Dapeng Natural Gas Development Co., Ltd, which can measure the natural gas consumed by the project activity. The ownership of the meter is Guangdong Dapeng Natural Gas Development Co., Ltd as well as the maintenance. The permissible limit for the meter is 1.0% (1.0S) accuracy class. The responsible person from the Guangdong Dapeng Natural Gas Development Co., Ltd records the data at 8:00 in the every day, which will be cross checked by the project owner. At the conclusion of each meter weekly reading an appointed representative of the Guangdong Dapeng Natural Gas Development Co., Ltd and the project owner sign a document indicating the quantity of the natural gas indicated by the meter /24/. This document clearly indicates the natural gas combusted by the project activity and this again becomes the basis for emission reduction calculations.

The gas flow meter is jointly inspected and sealed by the two parties and is not interfered with by either party except in the presence of the other party or its accredited representatives. The permissible limit for the flow meter is 1% accuracy class (in Nm^3). 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 /17/. The calibration intervals have been less than two years.

3.6 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 version 1.1 /31/, 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:

$$EF_{BL,CO2}(tCO_2 / MWh) = \frac{COEF_{BL}}{\eta_{BL}} * 3.6GJ / MWh$$

Based on the registered PDD and validation report, Option 1 (BM) was selected as the baseline emission factor and will be estimated *ex post* annually during the crediting period described in ACM0002 /32/:

Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y, alternatively the emission factor of the previous year (y-1) may be used. If the data is usually only available 18 months after the end of year y, the emission factor of the year proceeding the previous year (y-2) may be used. The same data vintage (y, y-1 or y-2) should be used throughout all crediting periods.

According to the Methodology and calculation steps described above, the baseline emission reductions can be *ex-post* calculated as follows:

- EF_{BM} = 0.6816 tCO_2/MWh
- EF_{OM} = 1.0608 tCO_2/MWh and hence $EF_{BL,CM} = 0.5 \times EF_{BL,BM} + 0.5 \times EF_{BL,OM}$ = 0.8712 tCO_2/MWh
- $EF_{BL,CO2}$: $COEF_{coal} \times PGCC\ BL(1 - r_{selfuse}) = 2.769 \times 0.312/(1-0.052) = 0.910$ tCO_2/MWh.

Then $EF = \min(EF_{BM}, EF_{CM}, EF_{BL,CO2,Option3})$ = 0.6816 tCO_2/MWh. The build margin (Option 1) is selected as the baseline emission factor.

Therefore, for the electricity generation in the monitoring report, the baseline emission factor (Option 1) BM is calculated to be 0.6816 tCO_2/MWh, which is derived from China Power Electric Power Yearbooks 2005 to 2007 /26/.

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

For the period 1 December 2006 to 30 September 2008, the total electricity generated is 5 506 655 MWh and the power self consumption by the project is 56 310 MWh. Thus the net amount of electricity is 5 450 345 MWh and the baseline emission of 3 714 955 tCO_2 based on the baseline emission factor 0.6816 tCO_2/MWh.

According to the mentioned above, the baseline emission reductions (BE_y) during the crediting period 1 December 2006 to 30 September 2008 totally was 3 714 955 tCO_2, which was verified by cross checking the receipts of Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd. and the records of the project owner /23/.

Period	Power Generated MWh	Power Consumed MWh	Net Power Supplied MWh	Load factor %	Emission Reductions tCO_2
1 Dec 06- 31 Dec 06	124 149	0	124 149	15.70%	84 620
1 Jan 07- 31 Dec 07	2 963 057	29 807	2 933 250	24.99%	1 999 303
Jan 08- 30 Sep 08	2 419 449	26 504	2 392 946	31.06%	1 631 032
Total	5 506 655	56 310	5 450 345		3 714 955

The load factor is lower than the 39% anticipated during validation, which is conservative in relation to additionality.

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 CO_2 emissions from electricity generation (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 Guangdong Dapeng Natural Gas Development Co., Ltd //25/ . According to the Energy Statistic Manual /27/, NCV = 0.9 * GCV.

IPCC 2006 default values for EF_{CO2} (56.1 tCO_2/TJ) of natural gas and for the oxidation rate (100%) of the natural gas are used.

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

The period from 1 December 2006 to 30 September 2008, the total LNG combusted is 771 455 tonnes' according to the mentioned above, the project emission (PE_y) during the crediting period 1 December 2006 to 30 September 2008 totally was 2 137 531 tCO_2, which was verified by cross checking the receipts of Guangdong Dapeng Natural Gas Development Co., Ltd and the records of the project owner /24/.

Period	$FC_{LNG,y}$ (tonne)	$NCV_{LNG,y}$ (GJ/tonne)	$EF_{CO2,Gas,y}$ (tCO_2/GJ)	$OXID_{Gas}$	PE_y (tCO_2e)
1 Dec 06- 31 Dec 06	18 564	49.39	0.0561	1	51 437
1 Jan 07- 31 Dec 07	412 242	49.39	0.0561	1	1 142 231
1 Jan 08- 30 Sep 08	340 649	49.39	0.0561	1	943 863
Total	**771 455**				**2 137 531**

3) Leakage (LEy):

Since LNG from Guangdong Dapeng Natural Gas Development Co., Ltd was used in the proposed project, upstream methane leakage emissions from natural gas were considered. The leakage from emissions occurring from fossil fuels used in the absence of the project activity was deducted in a conservative way. CO_2 emissions from liquefaction, transportation etc. of LNG was furthermore taken into account.

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. The leakage emissions are calculated. According to the methodology AM0029, when the total net leakage effects are negative, the project participants should assume LE = 0, i.e., no leakage has to be considered for the project activity

Period	$LE_{CH4,y}$ (tCO_2e)	$LE_{LNG,CO2,y}$ (tCO_2e)	LE_y (tCO_2e)
Dec 1st 06- Dec 31st 06	-7 096	5 501	-725 (0)
Jan 1st 07- Dec 31st 07	-175 757	122 164	-33 045 (0)
Jan 1st 08- Sep 30th 08	-160 870	82 782	-61 324 (0)
Total			0

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 1 577 524 tCO_2 reported for the period 1 December 2006 to 30 September 2008.

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

Period	Baseline Emission (tCO_2e)	Project Emission (tCO_2e)	Leakage (tCO_2e)	Emission Reduction (tCO_2e)
Dec 1st 06- Dec 31st 06	84 620	51 437	0	33 183
Jan 1st 07- Dec 31st 07	1 999 303	1 142 231	0	857 072
Jan 1st 08- Sep 30th 08	1 631 032	943 863	0	687 169
Total (tCO_2e)	3 714 955	2 137 531	0	1 577 424

Sufficient evidence was presented for the reported parameters.

3.7 Management System and Quality Assurance

Monitoring and reporting of electricity generation is part of normal operations of Shenzhen Guangqian Electric Power Co., Ltd.The quality of meter readings is assured through calibration of electricity meters /10/ and through cross checking of readings between the meter and the receipts.

4 CERTIFICATION STATEMENT

Det Norske Veritas Certification AS has performed a verification of the emission reductions reported for the "China Guangdong Shenzhen Qianwan LNG generation project" managed by Shenzhen Guangqian Electric Power Co., Ltd. for the period 1 December 2006 to 30 September 2008. *The project has been registered as CDM project activity (UNFCCC Registration Ref. No. 1915) with the CDM crediting period starting on 12 May 2009. The emission reductions occurring prior to the registration date are thus claimed as Voluntary Carbon Units (VCU) under the Voluntary Carbon Standard (VCS 2007) and in accordance with the VCS Guidance for projects that are registered in two GHG programs.*

Shenzhen Guangqian Electric Power Co., Ltd. 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 12 October 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 1.1 and the monitoring plan provided in the CDM-PDD.

Det Norske Veritas Certification AS is able to certify that the emission reductions from the 'China Guangdong Shenzhen Qianwan LNG generation project', managed by Shenzhen Guangqian Electric Power Co., Ltd. during the period 1 December 2006 to 30 September 2008 *amount to 1 577 524 tonnes of CO2 equivalent.*

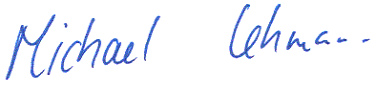
DNV does not assume any responsibility towards the issuance and utilization of the VCUs hereby verified and certified. Request for issuance of VCUs shall be made by the project proponent to an approved VCS Program Registry based on the requirements set out under the most recent version of the VCS Program 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, DNV cannot be held liable by any party for decisions made or not made based on this report.

Beijing, 21 September 2009

Peng Huang
GHG Auditor

Oslo, 21 September 2009



Michael Lehmann
Technical Director
Det Norske Veritas Certification AS

5 REFERENCES

Documents provided by the Project Participants that relate directly to the GHG components of the project.

/1/ Monitoring Report of China Guangdong Shenzhen Qianwan LNG generation project, version 1 dated 02 August 2008, version 2 dated 12 October 2008.

/2/ VSC PD of China Guangdong Shenzhen Qianwan LNG generation project: Clarification of clauses 1.12, 1.13, 1.14, 8.1 and 8.2.

/3/ PDD for China Guangdong Shenzhen Qianwan LNG generation project, Version 07 of 23 April 2009.

/4/ Validation Report for "China Guangdong Shenzhen Qianwan LNG generation project", Report No.: 2008-0169, version 03 of 11 May 2009, DNV.

/5/ Business License of the project owner issued by Shenzhen Administration for Industry and Commerce, Registered No.: 440301103073659.

/6/ Feasibility Study Report of the China Guangdong Shenzhen Qianwan LNG generation project, and project approval letter issued by National Development and Reform Commission dated 13 July 2004.

/7/ Environmental impacts assessment report of the China Guangdong Shenzhen Qianwan LNG generation project, and project approval letter issued by National Environment Protection Bureau dated 22 February 2002.

/8/ Power Purchase Agreement between Shenzhen Guangqian Electric Power Co., Ltd. and Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd. on behalf of CSPG, dated 24 October 2006

/9/ Grid Connection Agreement between Shenzhen Guangqian Electric Power Co., Ltd. and Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd. ,on behalf of CSPG dated 18 October 2006.

/10/ Natural Gas Purchase Agreement between Shenzhen Guangqian Electric Power Co., Ltd. and Guangdong Dapeng Natural Gas Development Co., Ltd, dated 30 April 2004.

/11/ Contract for Equipment Procurement under China Guangdong Shenzhen Qianwan LNG generation project.

/12/ Application of Grid Connection of Electricity Generation in November 2006.

/13/ Letter on the checking and accepting completed installations of environmental protection of the proposed project issued by the Ministry of Environmental Protection of China, dated 29 September 2007, Doc No.: [2007] 200

/14/ Start-up acceptance of the proposed project issued by Guangdong Yudean Group Co., Ltd, dated 30 September 2007.

/15/ Performance test report of the proposed project issued by Guangdong Electric Power Design Research Institute, dated 30 June 2008.

/16/ Calibration and certificate of main and back-up meters issued by Guangdong Electric

Power Test and Science Institute, dated 22 August 2005, 15 May 2007, 10 January 2008

/17/ Ultrasonic flow meters calibration reports and certificate of the proposed project issued by China National Station of Petroleum Flow Measurement, dated 27 July 2006, 26 July 2007, 26 July 2008.

/18/ The personnel training schedule and record for the proposed project,

/19/ Competence certificate of CDM personnel of the proposed project

/20/ CDM Project Management Manual issued by Shenzhen Guangqian Electric Power Co., Ltd. dated 11 January 2007.

/21/ Power station daily running records of the proposed project from December 2006 to September 2008

/22/ Emission Reduction calculation spreadsheet dated 12 October 2008

/23/ Electricity purchase receipts issued by Shenzhen Power Supply Bureau of Guangdong Power Grid Co., Ltd.
Electricity sale records issued by Shenzhen Guangqian Electric Power Co., Ltd.

/24/ Natural gas sale receipts issued by Guangdong Dapeng Natural Gas Development Co., Ltd
Natural gas purchase records issued by Shenzhen Guangqian Electric Power Co., Ltd.

/25/ The report of Gross Calorific Value for natural gas combusted from January 2007 to March 2008 issued by Guangdong Dapeng Natural Gas Development Co., Ltd

/26/ China Electric Power Yearbook, 2003~2007

/27/ Energy Statistics Manual, IEA publication, September 2004

/28/ 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

/29/ 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

Background documents related to the design and/or methodologies employed in the design or other reference documents.

/30/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. http://www.vvmanual.info

/31/ AM0029 - Approved methodology " baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas", version 01.1 of 19 May 2006

/32/ ACM0002 - Approved methodology "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 06, date 19 May 2006

/33/ Voluntary Carbon Standard 2007 (VCS 2007), 19 November 2007

/34/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003

/35/ The guidance for deviation in use of methodology AM0005 by several project activities in China by EB. http://cdm.unfccc.int/Projects/Deviations

/36/ 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

/37/ "Policy announcement by VCS association" dated 19 March 2008

/38/ Letter of Approval issued by China DNA, dated 13 December 2006.

/39/ The declaration letter from the project owner announce that all carbon credits for the period from 1 December 2006 to 30 September 2008 will only sell it once as VCS credits.

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

/40/ Mr. Wang Hui, General Manager, Zhuhai Hunter Energy Resources Development Co., Ltd

/41/ Mr. Shen Ying, Project Manager, Zhuhai Hunter Energy Resources Development Co., Ltd

/42/ Mr. Ye Shanpei, Vice General Manager, Shenzhen Guangqian Electric Power Co., Ltd.

/43/ Ms. Li Aiyu, Director of Production and Operation Division, Shenzhen Guangqian Electric Power Co., Ltd.

/44/ Mr. Liu Mingyuan, Project Manager, Shenzhen Guangqian Electric Power Co., Ltd.

/45/ Mr. Zhao Ruihong, Technical Director, Beijing MD Energy Technology Co,. Ltd

- – o0o –

APPENDIX A

ASSESSMENT 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 12 May 2009 with the Registration Ref. No.1915. 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 07, dated 23 April 2009), 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.

Clarification: As a new grid-connected nature gas power generation project, the proposed project will produce cleaner electricity using natural gas instead of coal and will generate GHG emission reductions by avoiding CO_2 emissions from electricity generation of fossil fuel fired power with larger emission factors. 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).

Clarification: The project is located in China and is developed and operated by Shenzhen Guangqian Electric Power Co., Ltd., 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 /39/.

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

Clarification: The proposed project is a registered CDM project, which does not fall into rejected projects under other GHG programs.

8.1 Proof of Title:

Clarification: 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/, FSR (Feasibility Study Report) approval /6/, EIA (Environmental Impacts Assessment Report) approval /7/ and PPA (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 VCUs once /39/.

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 12 May 2009 and the reference number is 1915, 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 12 May 2009 to 11 May 2016. 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 1 December 2006 to 30 September 2008 will be considered as VCUs under the VCS 2007.