VALIDATION REPORT

"CHINA GUANGDONG SHENZHEN QIANWAN LNG GENERATION PROJECT" IN CHINA

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VALIDATION REPORT

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Country: China
Methodology: AM0029
Version: 01
GHG reducing Measure/Technology: Natural Gas for power generation
ER estimate: 1 035 685 tCO_2e / year
Size
☒ Large Scale
☐ Small Scale
Validation Phases:
☒ Desk Review
☒ Follow up interviews
☒ Resolution of outstanding issues
Validation Status
☐ Corrective Actions Requested
☐ Clarifications Requested
☒ Full Approval and submission for registration
☐ Rejected

In summary, it is DNV's opinion that the "China Guangdong Shenzhen Qianwan LNG Generation Project", as described in the PDD of version 07 dated 23 April 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AM0029, version 1.1. DNV thus requests the registration of the project as a CDM project activity.

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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CSPG	China Southern Power Grid
DNV	Det Norske Veritas
DNA	Designated National Authority
EIA	Environmental Impact Assessment
EPB	Environmental Protection Bureau
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MP	Monitoring Plan
NCV	Net Calorific Value
NDRC	National Development and Reform Commission
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
SCE	Standard coal equivalent

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VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the "China Guangdong Shenzhen Qianwan LNG Generation Project" in China. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.

The host Party is China and the Annex I Party is Japan. Both Paties fulfil the participation criteria and have approved the project and authorized the project participants. The DNA of China confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology AM0029 "Methodology for Grid Connected Electricity Generation Plants using Natural Gas", version 01.1.

By generating electricity using natural gas, the project activity displaces fossil fuel intensive grid electricity, thereby resulting in reductions of CO_2 emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It has been demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 1 035 685 *tCO_2e per year over the selected 7-year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.*

The monitoring plan will give opportunity for real measurements of achieved emission reductions. The monitoring methodology AM0029 has been correctly applied. Adequate training and monitoring procedures have been implemented.

In summary, it is DNV's opinion that the "China Guangdong Shenzhen Qianwan LNG Generation Project" in China, as described in the PDD of version 07 dated 23 April 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the simplified baseline and monitoring methodology AM0029, version 01.1. DNV thus requests the registration of the project as a CDM project activity.

2 INTRODUCTION

Upper Horn Investments Ltd. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the "China Guangdong Shenzhen Qianwan LNG Generation Project" in China (hereafter called "the project"). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

2.1 Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AM0029. The validation team has, based on the recommendations in the Validation and Verification Manual employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

3 METHODOLOGY

The validation consisted of the following three phases:

I a desk review of the project design documents

II follow-up interviews with project stakeholders

III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Desk Review of the Project Design Documentation

The following table outlines the documentation reviewed during the validation:

/1/ Project Design Document for China Guangdong Shenzhen Qianwan LNG Generation Project, Version 01 on 10 September 2006 and version 07 on 23 April 2009

/2/ Letter of Approval issued by DNA of China on 13 December 2006.

/3/ Letter of Approval issued by DNA of Japan on 7 December 2007.

/4/ CDM Executive Board, Baseline and monitoring methodology AM0029, *Methodology for Grid Connected Electricity Generation Plants using Natural Gas*, version 01.1

/5/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF), *Validation and Verification Manual*. http://www.ieta.org/ieta/www/pages/index.php?IdSiteTree=1146

/6/ Feasibility Study Report of the project in July 2003 by Guangdong Electric Power Design Institute and the approval letter by the National Development and Reform Commission of 13 July 2004.

/7/ Environmental Impact Assessments of the project in 2001, and the approval letters by The State Environmental Protection Administration (SEPA) on 22 February 2002.

/8/ CDM Executive Board, Baseline and monitoring methodology ACM0002, Consolidated methodology for grid-connected electricity generation from renewable sources, Version 06, 19 May 2006

/9/ 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/web/NewsInfo.asp?NewsId=2184

/10/ Chinese DNA's guidance for the determination of grid boundaries and emission factors, http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf

/11/ China Electric Power Yearbook 2002, 2003, 2004, 2005, 2006 and 2007

/12/ China Energy Statistical Yearbook 2004, 2005 and 2006

/13/ 2006 IPCC Guidelines for National Greenhouse Gas Inventories

/14/ CDM Executive Board, Guidance for request for deviation titled "Application of AM0005 and AMS-I.D in China" (http://cdm.unfccc.int/Projects/Deviations)

/15/ China NDRC, 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

/16/ China Electrical Power Press, Design reference cost index for thermal power transmit electricity and transformer electricity projects (2004), , in April 2005

/17/ State Power Corporation of China. *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*. Beijing: China Electric Power Press, 2003

/18/ CDM Executive Board: Tool for the demonstration and assessment of additionality, version 04.

/19/ LNG Sales and Purchase Contract of 30 April 2004

/20/ Revision of the Financial Assessment (FA) by Guangdong Electric Power Design Institute in May 2004

/21/ Construction Permit issued on 14 December 2004

/22/ "Case Study of Clean Development Mechanism Project of Zhuhai Power Plant Project Phase II", Energy Research Institute of the NDRC & Global Climate Change Institute, Tsinghua University, November 2003.

/23/ Agreement on Financial Assessment on Qianwan LNG Power Plant with Guangdong Electric Power Design Institute dated February 17, 2004.

/24/ Directorate Decision of Shenzhen Guangqian Electric Power Co., Ltd. for CDM application dated 28 May 2004

/25/ Notice of the Price of Natural Gas from Guangdong Dapeng Company issued by Bureau of Commodity Price of Guangdong Province [Yuejia 2007 Doc No.190].

/26/ Peaking capacity analysis in Guangdong Grid. Hao CHEN, Zhanying LI. Guangdong Electric Power. Apr 2001. Vol.14 No.2, pp 6-8

/27/ Power source characteristics of project "Power from west to east" and its influences on Guangdong power system. Zhigang CHEN, Qingyi HUANG. Guangdong Electric Power. Apr 2002. Vol 15, No 2. pp 9-12.

/28/ Minutes from the Environmental Development & Carbon Credit Meeting held in Zhuhai on 20 August 2002

/29/ Minutes from Yudean Group and Zhuhai Electric Power Company meeting held in February 2003

/30/ Contract for Gas Turbine Combined Cycle Power Generation Project Qianwan LNG Power Plant (Contract No. 03JP01GTA10IXC0007) between Yudean Group and Mitsubishi Heavy Industries, Ltd., Mitsubishi Corporation and Dong Fang Steam Turbine Works, signed in March 2003

/31/ Notification of executing the price linkage between fuel and feed-in tariff in China Southern Power Grid issued by NDRC on 22 April 2005.

/32/ The confirm letter issued by Guangdong provincial Development and Reform Commission for FSR and FA submission

/33/ Meeting minutes in May 2005 by project owner for the information that the CDM

application from an India natural gas project was approved by the Indian government

/34/ Notice of Shenzhen Qianwan LNG Project Building up CDM Work Group by project owner in October 2005

/35/ Directorate Decision by project owner dated 3 June 2006 for starting the CDM application process for the project

/36/ CDM consulting agreement was signed between the project owner and Tsinghua University on 19 July 2006

/37/ Power Purchasing Agreement (PPA) signed by the project owner and Guangdong Power Grid Company on October 2006.

/38/ ERPA (certified Emission Reductions Purchase Agreement) for the project signed between the project owner and Mitsui on 26 June 2008

/39/ Completion of settlement audit report of the project issued by Guangzhou Zhiheng Construction cost of the Advisory Co., Ltd. on 22 October 2007

/40/ "Certificate of the Average Electricity Tariff from Year 1999 to Year 2003 in Guangdong Province" issued by Guangdong Power Grid Company in November 2008

/41/ Other two NG power generation projects in CSPG applying as CDM projects

Hengmen NG-fired Power Generation Project http://cdm.unfccc.int/Projects/Validation/DB/WN0RNX1NYQJ20C7RB3XGGGS6WMO8AK/view.html

2×180MW Natural Gas Fired Cogeneration Project in Guangzhou Nansha Thermal Power Plant

http://cdm.unfccc.int/Projects/Validation/DB/MFTYH8KY7UWPRYN9Y2N3PEORG21UTE/view.html

/42/ National feed-in tariff policy in relation to the fuel price increase issued by NDRC in December 2004

http://www.ndrc.gov.cn/zcfb/zcfbtz/zcfbtz2004/t20080710_223762.htm

/43/ Indices of Purchasing Prices of Raw Materials, Fuels and Power and Product Price Index (Electricity tariff) of Guangdong Province from 2004 to 2006

http://www.gdstats.gov.cn/tjsj/wjzs/default.htm

/44/ Indices of Purchasing Prices of Raw Materials, Fuels and Power and Product Price Index (Electricity tariff) of China from 2004 to 2006

http://www.stats.gov.cn

/45/ Operation date of 600 MW units national competition in 2006

http://www.cec.org.cn/hyxx/check.asp

/46/ "Notice of electricity price of oil-fire power plants floating with price of fuel oil" issued by Guangdong Province Price Supervision Bureau in July 2003

/47/ Performance Guarantee from Mitsubishi Corporation issued on 18 August 2004 based on receipt of the project owner's notice of the contract validity

/48/ Contract Law of P. R. China (approved in the second meeting of the 9th National

People's Congress which held in March 15, 1999)

/49/ Introduction of Guangdong Electric Power Design Institute http://www.gedi.com.cn/index.asp

/50/ Price change of fuel and raw materials from 2002 to 2008 http://okokok.com.cn/Htmls/GenCharts/080215/7037.html).

3.2 Follow-up Interviews with Project Stakeholders

	Date	Name	Organization	Topic
/51/	2006-10-20 To 2006-10-24	Mr. Wang	Shenzhen Guangqian Electric Power Co. Ltd.	– Project background information – Project technology, operation, maintenance and monitoring capability – Project additionality – Project financial structure – Project monitoring and management plan – Project approval status – Stakeholder consultation process
/52/	2006-10-20	Wang Hui Sheng Ying	Upper Horn Investments Ltd.	– Project design document – Baseline determination – Emission reductions calculation – Project additionality

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

VALIDATION REPORT

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for the "China Guangdong Shenzhen Qianwan LNG Generation Project" is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of CDM criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

i) mistakes have been made with a direct influence on project results;
ii) CDM and/or methodology specific requirements have not been met; or
iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

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

VALIDATION REPORT

Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities		
Requirement	***Reference***	***Conclusion***
The requirements the project must meet.	*Gives reference to the legislation or agreement where the requirement is found.*	*This is either acceptable based on evidence provided (**OK**), a **Corrective Action Request (CAR)** of risk or non-compliance with stated requirements or a request for **Clarification (CL)** where further clarifications are needed.*

Validation Protocol Table 2: Requirement checklist				
Checklist Question	***Reference***	***Means of verification (MoV)***	***Comment***	***Draft and/or Final Conclusion***
The various requirements in Table 2 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the large-scale PDD template, version 03 - in effect as of: 28 July 2006. Each section is then further sub-divided.	*Gives reference to documents where the answer to the checklist question or item is found.*	*Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.*	*The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.*	*This is either acceptable based on evidence provided (**OK**), or a **corrective action request (CAR)** due to non-compliance with the checklist question (See below). A request for clarification (CL) is used when the validation team has identified a need for further clarification.*

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests			
Draft report clarifications and corrective action requests	***Ref. to checklist question in table 2***	***Summary of project owner response***	***Validation conclusion***
If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.	*Reference to the checklist question number in Table 2 where the CAR or CL is explained.*	*The responses given by the project participants during the communications with the validation team should be summarised in this section.*	*This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".*

Figure 1 Validation protocol tables

3.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

Role/Qualification	Last Name	First Name	Country
Team Leader/ GHG Auditor	Tang	Zhiang (Walter)	China
CDM Validator	Tang	Wilson	China
CDM Validator	A	Sequoia (Qingxing)	China
Sector Expert	Brinks	Hendrik	Norway
Technical Reviewer (applicant)	Kakaraparthi	Venkata Raman	India
Technical Reviewer	Lehmann	Michael	Norway

The qualification of each individual validation team member is detailed in Appendix B to this report.

4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.
The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation (version 07 of 23 April 2009).

4.1 Participation Requirements

The project participants are Shenzhen Guangqian Electric Power Co. Limited from the host Party China and Mitsui & Co Limited from the Annex I Party Japan. Both the participating Parties fulfil all the requirements. The DNA of China has issued the Letter of Approval (LoA) /2/ on 13 December 2006, authorizing Shenzhen Guangqian Electric Power Co., Ltd. as a project participant and also confirming that the project assists in achieving sustainable development. The DNA of the Japan has also issued a LoA /3/ on 7 December 2007.

The validation did not reveal any information indicating that the project can be seen as a diversion of official development assistance (ODA) funding towards China.

4.2 Project Design

The project activity of "China Guangdong Shenzhen Qianwan LNG Generation Project" is a power generation project using liquid natural gas. The project has an installed capacity of 1083 MW (3 X 361.03 MW). Power will be generated in the three combined cycle gas turbines which will be sourced locally. The project system consists of gas and steam turbines (Dongfang Steam turbines works), waste heat recovery boilers (from Hangzhou boiler group) and generators. The project activity is expected to generate 3700 GWh of energy per annum at a plant load factor of 39% /6/. The annual net electricity generation is 3611GWh. The electricity generated will be fed in the China Southern Power grid (CSPG).

It is confirmed that the proposed project activity fulfils the Chinese domestic regulations and policy of promoting sustainable development. The project is in line with host-country specific CDM requirements and the confirmation thereof by the DNA of China was issued on 13 December 2006.

The project activity's start date is 18 August 2004 (equipment purchase contract effective date), which is the earliest date of the main equipment contract, the LNG Sales and Purchase Contract and PPA comes into force (refer to the description in section 4.4). The first unit of project activity started commissioning on 30 December 2006. The project selects a renewable crediting period of seven years, starting on 1 June 2009. The designed operation life of the project is 20 years /6/.

The project's power generation will replace the power generated by the existing power plants and likely capacity additions in the CSPG resulting in an estimated emission reduction of 1 035 685 tCO_2 annually.

4.3 Baseline Determination

The project applies the approved consolidated baseline methodology AM0029, *Methodology for Grid Connected Electricity Generation Plants using Natural Gas* /4/, version 01.1.

According to the methodology AM0029, the methodology is applicable under the following conditions:

1) The project activity is the construction and operation of a new natural gas fired grid-connected electricity generation plant
2) The geographical/ physical boundaries of the baseline grid can be clearly identified and information pertaining to the grid and estimating baseline emissions is publicly available.
3) Natural gas is sufficiently available in the region or country, e.g. future natural gas based power capacity additions, comparable in size to the project activity, are not constrained by the use of natural gas in the project activity.

DNV validated the applicability of the methodology as follows:

1) Based on FSR and the approval for FSR (approved 13 July 2004) /6/, the project activity is the construction and operation of a new natural gas fired grid connected electricity generation plant and no other fuel besides natural gas is used in the Project. Therefore, the Project meets the applicability requirement of the methodology AM0029.
2) The electricity generated will be supplied to the China Southern Power Grid, of which the geographic and system boundaries could be clearly defined, which is mentioned in Notification on Determining Baseline Emission Factor of China's Grid issued by China's DNA on 9 August 2007 (http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=1889) and used to estimate baseline emissions is publicly available. Therefore, the Project meets this applicability requirement of the methodology AM0029.
3) As per the Clarification on applicability criteria of AM0029 v1.1

(AM_CLA_0091 by Meth Panel) states the following:

"as indicated in the footnote to the applicability condition in question, this condition is required to ensure the project activity does not displace natural gas that would otherwise be used elsewhere in an economy of the country or region, thus leading to possible leakage. Notwithstanding where the natural gas is imported from, this applicability condition is to be implemented by demonstrating, through monitoring, that the full demand of natural gas by the project activity is dedicatedly met with imported gas, and where dedicated imports is not the case, the monitoring should show that satisfying the project activity's demand for natural gas will not lead to a shortages in supplies of the gas to other projects within the country".

In other words, the project is applicable to the methodology AM0029 v1.1 by demonstrating that the full demand of the natural gas by the proposed project is dedicatedly met with imported gas. DNV is able to verify that the project is subject to the methodology applicability criteria clarified by Meth Panel as following:

The full demand of natural gas by the proposed project is dedicatedly met and supplied under the long-term take or pay contract signed by Guangdong Dapeng LNG company, by which the liquefied natural gas is imported from Australia, from which 3.7 million tons of LNG per year will be provided for 25 years. Guangdong Dapeng LNG company has also signed take-or-pay long-term contracts for fuel supply over 25 years with all of the consumers. The LNG consumed by the project is about 13.7% of total LNG supply.

As above statement, the consumption of natural gas by the proposed project will not constrain future natural gas capacity additions as required by the methodology AM0029 v1.1 and the applicability of the methodology is met suitably.

1. Identify plausible baseline scenarios.

The following alternatives are identified,

- Natural Gas power generation using combined cycle gas turbine (CCGT) without CDM.
- Natural Gas power generation using single gas turbine technology
- Light Oil based power plants using CCGT
- Coal based power plant with Sub-critical boilers
- Coal based power plant with Supercritical boilers
- Wind farm
- Solar power plants
- Biomass based power plants
- Nuclear power
- Hydro power
- Import electricity from other grid

Natural gas power generation using single gas turbine technology is not plausible because it is not widely used in CSPG due to the lower thermal efficiency than that of the CCGT.[1] Wind, solar, biomass or nuclear power are not plausible because they will not deliver outputs and services for peak load. Hydropower is not plausible because it can not deliver outputs and services comparable to the project activity with full-year peak regulation capacity /26/. Import electricity from other grid is not plausible because it can not deliver outputs and services comparable to the project activity with full-year peak regulation capacity /27/. Hence, the following four alternatives are realistic and credible baseline alternatives:

- Natural Gas /CCGT
- Light Oil /CCGT
- Coal /Sub critical
- Coal /Supercritical

2. Identify the economically most attractive baseline scenario alternative.

The economically most attractive baseline scenario alternative is identified using the levelised cost as a financial indicator. Based on the data from the *Design reference cost index for thermal power transmit electricity and transformer electricity projects (2004)* /16/, a 600 MW subcritical coal-fired power plant has the lowest levelised cost of 0.2173 RMB/kWh. Hence, a 600 MW subcritical coal-fired power plant is selected as the most likely baseline scenario.

According to AM0029, the baseline alternatives should include all possible realistic and credible alternatives that provide outputs or services comparable with the proposed project, these alternatives need not consist solely of power plants of the same capacity, load factor and operational characteristics.

After having excluded the alternatives not providing peak load, or not in compliance with all applicable legal and regulatory requirements, five options for the plausible baseline scenarios are selected and confirmed in the PDD for the financial comparison of the baseline alternatives according to step I of identification of the baseline scenarios of the methodology. They are respectively the proposed project without CDM, 600 MW super-critical plant, 600 MW sub-critical plant, 300 MW sub-critical plant and 180 MW oil-fired CCGT.

The economic comparison was carried out according to the requirements of AM0029 v1.1. The

[1] http://www.china5e.com/gasturbine/introduction.php

600 MW Sub Critical Plant with lowest levelized cost was identified as the baseline scenario as follows:

The economically most attractive baseline scenario alternative is identified using levelised cost as a financial indicator. The basic levelized cost methodology is based on "Projected Costs of Generation Electricity" published by IEA for the calculation of the financial indicators.

The data and parameters (except the power generation coal consumption of 600 MW coal-fired sub-critical, the power generation coal consumption of 180 MW oil-fired CCGT and the fuel expenditures for different technologies) for financial analysis are taken from "Design reference cost index for thermal power transmit electricity and transformer electricity projects (2004)" issued in April 2005 by China Electrical Power Press based on 2004 data, (China Electrical Power Press, Design reference cost index for thermal power transmit electricity and transformer electricity projects (2004) in April 2005) /16/. The power generation coal consumption of 600 MW coal-fired sub-critical is taken from "Operation date of 600 MW units national competition in 2006" /45/ and the power generation coal consumption of 180 MW Oil fired CCGT is taken from "Notice of electricity price of oil-fire power plants floating with price of fuel oil" issued by Guangdong Province Price Supervision Bureau/46/.

The fuel expenditures for different technology for financial analysis are taken from the following sources: the expenditure of coal is sourced from "National Economic Operation Analysis of Coal Enterprises from January 2004 to May 2004"; the expenditure of natural gas is calculated by Guangdong Electric Power Design Institute based on LNG sales and purchase contract /19/, which is stated in FA by Guangdong Electric Power Design Institute (Revision of the Financial Assessment (FA) by Guangdong Electric Power Design Institute in May 2004) /20/; the expenditure of fuel oil is sourced from "Notice of electricity price of oil-fire power plants floating with price of fuel oil" issued by the Guangdong Province Price Supervision Bureau. The input parameters used in the financial analysis of the proposed project can thus be considered information provided by an independent and recognized source.

DNV has compared the input parameters for the levelized cost analysis included in the PDD with the parameters stated in the "Design reference cost index for thermal power transmit electricity and transformer electricity projects (2004)" and other relevant documents mentioned above and was able to confirm that the values applied are consistent with the value stated in above documents.

The levelized costs for:

a. The proposed project without CDM is 0.4324 RMB/kWh (with load factor 39.95%)
b. 600 MW super-critical plant is 0.2195 RMB/kWh (with load factor 57.08%)
c. 600 MW sub-critical plant is 0.2173 RMB/kWh (with load factor 57.08%)
d. 300 MW sub-critical plant is 0.2427 RMB/kWh (with load factor 57.08%)
e. 180 MW oil-fired CCGT is 0.6366 RMB/kWh (with load factor 39.95%)

The 600 MW sub-critical plant has the lowest levelized cost of 0.2173 RMB/kWh, taken as the most attractive baseline scenario alternative.
DNV has also verified the levelized cost calculations using the same load factor (39.95%) for all alternatives. The results are as follow:

a. The proposed project without CDM is 0.4324 RMB/kWh (with load factor 39.95%)
b. 600 MW super-critical plant is 0.2821 RMB/kWh (with load factor 39.95%)
c. 600 MW sub-critical plant is 0.2778 RMB/kWh (with load factor 39.95%)

d. 300 MW sub-critical plant is 0.3122 RMB/kWh (with load factor 39.95%)
e. 180 MW oil-fired CCGT is 0.6366 RMB/kWh (with load factor 39.95%)

The results above shows that even when using the same load factor for all alternative the 600 MW sub-critical plant alternative still has the lowest levelized cost (0.2778 RMB/kWh). Therefore it is reasonable to assume this alternative as the most attractive baseline scenario alternative.

To further demonstrate the financial attractiveness of the 600 MW sub-critical plant is robust to reasonable variations in the critical assumptions for the alternatives (i.e. fuel cost and the load factor), a sensitivity analysis has been conducted by the project participants in the PDD. The conclusion is that the construction of a 600 MW Sub Critical Plant is identified as the most likely baseline scenario.

The efficiency is only related with the fuel consumption. Hence, the project participants uses specific fuel consumption for sensitivity analysis instead of the efficiency. Because it is hard to predict the value for which the levelized costs crosses for the different alternatives in the sensitivity analysis, the fluctuation of ±10% for the fuel consumption and load factor is used in the sensitivity analysis for the levelized cost of the project generally. However, to be conservative, even if the fluctuation of ±50% for the fuel consumption and load factor is used in the sensitivity analysis, 600 MW sub critical power plant still remains to have the lowest levelized cost. For fuel consumption and load factor, they are the average values for all of power plants in China and unlikely to fluctuate to such a large degree (±50%). The calculation spreadsheet provided by PP is verified by DNV.

Operational hours and load factor are proportional and operational hours have been used instead of load factor in the sensitivity analysis.

In conclusion, the levelized cost analysis is robust to reasonable variations in the critical assumptions for the alternatives (i.e. operational hours, efficiency, and the load factor)

Hence, the construction of a coal-fired power plant is identified as the baseline scenario.

The spatial extent of the project boundary includes the project site and the electricity system considered comprises all power plants connected physically to the baseline grid in the CSPG in accordance with ACM0002.

Emission sources and gases included in the project boundary are:

	GHGs involved	***Description***
Baseline emissions	CO_2	*CO_2 from power generation in baseline, main emission source.*
Project emissions	CO_2	*On site fuel combustion due to the project activity.*
Leakage	CH_4	*Fugitive CH_4 emissions associated with fuel extraction, processing, liquefaction, transportation, regasification and distribution of natural gas used in the project plant and fossil fuels used in the grid in the absence of the project activity.*

4.4 Additionality

The additionality of the project, as required by AM0029 version 01.1, is demonstrated by applying the "Tool for demonstration and assessment of additionality" version 4 /18/.

The timeline of the proposed project activity has been provided as follows:

August 2002: The project owner attended the Carbon Credit Conference held in Zhuhai City and became familiar with the concept of CDM, which is evidenced by the Minutes from the Environmental Development & Carbon Credit Meeting held in Zhuhai on 20 August 2002 /28/.

February 2003: The project owner agreed to authorize Tsinghua University and Energy Research Institute NDRC to start a "Case Study of Clean Development Mechanism Project of Zhuhai Natural Gas Power Plant Project Phase II". The case study took into account the economic potential influence of CDM, which is evidenced by the Minutes from Yudean Group and Zhuhai Electric Power Company meeting held in February 2003 /29/.

March 2003: The Yudean Group, the parent company of Shenzhen Guangqian Electric Power Co., Ltd., signed the main equipment contract with Mitsubishi Heavy Industries, Ltd., Mitsubishi Corporation and Dong Fang Steam Turbine Works. The conditions for the contract to become effective were as follow:

a) Getting the project FSR approval from NDRC (National Development and Reform Commission)

b) Provision of the Performance Guarantee by the Equipment supplied upon the project owner's notification of the contract validity.

DNV has verified the Contract for Gas Turbine Combined Cycle Power Generation Project Qianwan LNG Power Plant (Contract No. 03JP01GTA10IXC0007) between Yudean Group and Mitsubishi Heavy Industries, Ltd., Mitsubishi Corporation and Dong Fang Steam Turbine Works, signed in March 2003 /30/.

July 2003: The FSR was prepared by Guangdong Electric Power Design Institute (GEDI). The FSR report was verified by DNV /6/.

February 2004: Due to the increase in the natural gas price, the project owner commissioned the Guangdong Electric Power Design Institute to develop a revised Financial Assessment (FA) to take potential CDM revenues into account/23/. The revised FA is based on the FSR as well as the results from case study for a similar natural gas-fired power generation project completed in November 2003 ("Case Study of Clean Development Mechanism Project of Natural Gas Zhuhai Power Plant Project Phase II", Energy Research Institute of the NDRC & Global Climate Change Institute, Tsinghua University, November 2003/22/). The results from the case study showed the project owner that CER revenues could improve the financial performance of the project.

30 April 2004: The project investor, Yudean Group signed the LNG Sales and Purchase Contract with the Guangdong Dapeng LNG Company /19/. DNV has verified the contract. The conditions for this contract to become effective were as follow:

a. Getting the project FSR approval from NDRC (National Development and Reform Commission);

b. The confirmation from the project participant to the contract counterparty on validity of the contract in written format.

May 2004: Guangdong Electric Power Design Institute completed the revised financial assessment, which was verified by DNV. The revised FA shows that the IRR of total investment is 5.55% without CDM revenues, which is lower than the benchmark of 8%/20/.

28 May 2004, the Directorate Decision of Shenzhen Guangqian Electric Power Co., Ltd. discussed the financial viability of the project. The directors agreed that applying CDM will ensure the financial validity of project. This was evidence through the Directorate Decision dated 28 May 2004, which was reviewed by DNV.

31 May 2004: The project owner (Shenzhen Guangqian Electric Power Co., Ltd.) submitted the FSR and the FA to the government. This was evidenced through the confirm letter issued by Guangdong provincial Development and Reform Commission/32/. The confirmation letter was verified by DNV.

13 July 2004: The approval letter was issued by the National Development and Reform Commission and the project was approved by the government. The approval letter was verified by DNV /6/.

18 August 2004: Performance Guarantee from equipment supplier was issued based on receipt of the project owner's notice of the contract validity /47/.

14 December 2004: The construction permit was issued by Guangdong Tianan Engineering Supervision Co. Ltd.) /21/.

May 2005: The project owner got the information that the CDM application from an India natural gas project was approved by the Indian government and the validation started, which is evidenced by project owner's meeting minutes in May 2005 /33/.

October 2005: The project owner made a CDM work group, which was evidenced by the Notice of Shenzhen Qianwan LNG Project Building up CDM Work Group. This notification was reviewed by DNV /34/.

June 2006: the project owner started the CDM application process for the project after getting the information that the methodology AM0029 was approved by EB on 10 May 2006. This was evidenced by the project owner's Directorate Decision dated 03 June 2006 /35/.

19 July 2006: The CDM consulting agreement was signed between the project owner and Tsinghua University, which was evidenced by the CDM consulting agreement with Tsinghua University date 19 July 2006 /36/. The agreement was reviewed by DNV.

16 September 2006: The PDD of the project was made public on UNFCCC's website (http://cdm.unfccc.int/Projects/Validation/index.html)

October 2006: the Power Purchasing Agreement (PPA) was signed by the project owner and Guangdong Power Grid Company /37/. The PPA was verified by DNV.

26 June 2008: ERPA (certified Emission Reductions Purchase Agreement) for the project was signed between the project owner and Mitsui /38/, which was checked by DNV.

According to the time table and EB's latest guidance on CDM project start date, the earliest date of the main equipment contract, the LNG Sales and Purchase Contract and the PPA will be selected as the project start date. The main equipment contract become effective /30/ after the project FSR was approved by NDRC on 13 July 2004 /6/ and the Performance Guarantee from equipment supplier was issued on 18 August 2004 based on receipt of the project owner's notice of the contract validity/47/. The Performance guarantee was verified by DNV. The advance payment was paid by the project owner, which is evidenced by the advance payment invoice

issued by the supplier on 23 August 2004. The effective date of the main equipment purchase contract is therefore 18 August 2004.

The LNG Sales and Purchase Contract (LNG Sales and Purchase Contract signed between Yudean Group and Guangdong Dapeng LNG Company on 30 April 2004) /19/ became effective after the project FSR was approved by NDRC on 13 July 2004 /6/, the confirmation letter to the contract counterparty on validity of the contract by the project owner was issued on 29 September 2004 and the letter to the contract counterparty confirming on validity of the contract by LNG supplier was issued on 27 June 2005. This was verified by DNV. The actual legal effective date of the LNG Sales and Purchase Contract therefore comes after the main equipment contract effective date.

The Power Purchase Agreement was signed by the project owner and Guangdong Power Grid Company in October 2006 /37/.

Hence, the earliest date of the main equipment contract, the LNG Sales and Purchase Contract and PPA comes into force is 18 August 2004 (equipment purchase contract effective date), which should be considered as the project activity start date.

In addition, DNV can confirm that the effective condition in the contract is the right endued by Chinese law, which is evidenced by the Contract Law of P. R. China /48/. The effective condition in the contract is also common practice in other industries. In China, no construction or actual investment is legally permitted without the official approval (http://www.law110.com/law/jiwei/16044.htm). Hence, the signed equipment or fuel purchasing contracts are only the intent without legal effectiveness before the governmental approval (http://www.cec.org.cn/news/showc.asp?ID=11937).

DNV was able to verify and confirm that the earliest date of the main equipment contract, the LNG Sales and Purchase Contract and PPA comes into force is on 18 August 2004 (equipment purchase contract effective date), which is the starting date of the project activity.

On February 2004 the project entity commissioned Guangdong Electric Power Design Institute to develop a revision of the Financial Assessment (FA) to take potential CDM revenues into account /23/. The revision of the Financial Assessment (FA) prepared by Guangdong Electric Power Design Institute /20/ was based on the latest data on the gas price and quantity /19/ and a case study for a similar natural gas-fired power generation project /22/. The revised financial analysis showed that the Internal Rate of Return (IRR) of the project without CDM support would be 5.55%, which was lower than the industry benchmark of 8 % /7/. It also shows that the Internal Rate of Return of project will exceed the industry benchmark with CDM revenues /20/. Furthermore, on 28 May 2004, the Directorate Decision was made for the discussion of the financial viability of the project and the shareholders were actively seeking potential CDM revenues, which is shown in the Directorate Decision dated 28 May 2004 /24/.

According to the description in the timeline, continuing and real actions were taken to secure CDM status for the project in parallel with its implementation. Hence, evidence was provided and reviewed by DNV that demonstrates that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.

Step 1. Benchmark investment analysis

The project generates financial and economic benefits through the sales of electricity other than CDM related income. Therefore, the simple cost analysis (Option I) is not applicable. The

benchmark analysis (Option III) was chosen to assess the financial viability of the project activity. The benchmark IRR has been selected as 8%. This is in line with the document *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* /17/, issued by State Power Corporation of China in 2003. The project IRR without CER revenues is 5.55 %, (lower that the benchmark) and it improves to 9.26% when considering CDM revenues.

The input parameters used in the financial analysis of the project activity are taken from the feasibility study report (FSR) developed by Guangdong Electric Power Design Institute in July 2003 and approved letter by the National Development and Reform Commission of 13 July 2004/6/, except for the gas price, the supply gas volumes and electricity generation. These three parameters were calculated in May 2004 in the revision of the Financial Assessment (FA) by Guangdong Electric Power Design Institute (Revision of the Financial Assessment (FA) by Guangdong Electric Power Design Institute in May 2004) /20/ based on LNG Sales and Purchase Contract (LNG Sales and Purchase Contract signed between Yudean Group and Guangdong Dapeng LNG Company on 30 April 2004) /19/.

Guangdong Electric Power Design Institute is a qualified third party independent organization, which is verified by the DNV through its website /49/. The input parameters used in the financial analysis can thus be considered information provided by an independent and recognized source.

DNV compared the input parameters for the financial analysis included in the PDD with the parameters stated in the FSR and was able to confirm that the values applied are consistent with the value stated in FSR. The electricity generation, the supply gas volumes and gas price were taken from the revised Financial Analysis /20/.

The FSR was approved in 13 July 2004 and thus only one month prior to the decision to proceed with the project activity (i.e. the start date of the project) which was on 18 August 2004 as mentioned above (the earliest date of the main equipment contract, the LNG Sales and Purchase Contract and PPA comes into force). Given this relative short period of time between approval of the FSR and the decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed and that it is thus reasonable to assume that the FSR has been the basis of the decision to proceed with the investment in the project.

Furthermore, the input parameters used in the financial analyses were compared with the data reported for other similar proposed CDM projects in China. By in addition applying our sectoral competence, DNV was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.

- The value of 1.55 Yuan/m^3 (incl. tax) was used in the financial analysis. This value was calculated by Guangdong Electric Power Design Institute based on LNG sales and purchase contract (30 April 2004) /19/. This is evidenced in the revision of the Financial Assessment (FA) by Guangdong Electric Power Design Institute in May 2004 /20/. The value is higher than 1.442 Yuan/m^3 in FSR dated in July 2003 (incl. tax), due to the continuous rising price of crude oil and raw materials in early 2004, which is checked by DNV in the website /50/. The gas price of the project increased to 1.5961 Yuan/m^3 (incl. tax) from 1 April 2007, which is evidenced by DNV through the Notice of the Price of Natural Gas from Guangdong Dapeng Company issued by Bureau of Commodity Price of Guangdong Province [Yuejia 2007 Doc No.190] on 3 September 2007 /25/. Therefore, the gas price of 1.55 Yuan/m^3 used in the investment analysis is conservative and credible.

- The value of supply gas volume used in the financial analysis was calculated by Guangdong Electric Power Design Institute based on LNG sales and purchase contract /19/ and the calculation model in the FSR complied in July 2003, which is verified by the FA prepared by Guangdong Electric Power Design Institute (dated May 2004) /20/.
- The value of supply gas volume used in the financial analysis was calculated by Guangdong Electric Power Design Institute based on annual supply gas volume and the unit gas consumption (m^3/kWh), which are sourced from LNG sales and purchase contract /19/ and FSR respectively. The calculated value was mentioned in the financial analysis (dated May 2004), which was checked by DNV. According to the PPA, the annual electricity generations of Qianwan project's units are subject to the provincial electricity generation plan regulated by Electricity Power Administration Department of Guangdong Province /37/. In the meanwhile, the annual electricity generation is also limited by the sales and purchase contract.
- The annual electricity generation has been stated in item 3). The install capacity of the project is sourced for FSR. The project PLF in the financial analysis is 39%, which is reasonable due to the function of peak load regulation. DNV also checked the websites of other NG projects' load factors mentioned in response by the project participants for request for review, and could confirm that other NG projects have a similar load factor. The value of load factor used in the financial analysis is reasonable.
- The value of 3690.55 million RMB of investment in fixed assets in the financial analysis was sourced from the FSR /6/. The actual investment in fixed assets is 3985.79 million RMB, the difference with the FSR value is due to the price increase of raw material. This is evidenced by the completion of settlement audit report of the project issued by Guangzhou Zhiheng Construction cost of the Advisory Co., Ltd. on 22 October 2007 /39/ and verified by DNV. The input data of total investment used in the financial analysis is conservative and credible.
- The value of O&M expenditure in the financial analysis was sourced from the FSR. In early 2004, the main part of O&M expenditure, fuel cost is continuous rising (http://okokok.com.cn/Htmls/GenCharts/080215/7037.html). The cost of raw material is also rising in these years (http://www.stats.gov.cn/tjgb/ndtjgb/qgndtjgb/t20060227_402307796.htm), including the spare parts. The Consumer Price Index (CPI) was increasing from 2004 to 2008 in China. Moreover, the parts supplier, Dongfang Steam Turbine Works was damaged in the earthquake occurred in Sichuan Province on 12 May 2008, which will cause parts supply more difficult and parts price rising. All of these factors will make O&M cost increase. The value of O&M expenditure in the financial analysis is conservative and reasonable. Relevant websites have been verified by DNV.
- The feed-in tariff is strictly regulated by the government and feed-in tariff changes need government's approval, which is evidenced by Notification of Electric Power Tariff Reform by the Office of national council issued on 9 July 2003. Moreover, the average electricity tariff of Guangdong Province power plant was decreasing year by year from 1999 to 2003, which is evidenced by the document of "Certificate of the Average Electricity Tariff from Year 1999 to Year 2003 in Guangdong Province" issued by Guangdong Power Grid Company in November 2008 /40/. From 2006 to 2008, the actual tariff of the project has being fixed as 0.495 RMB/kWh (including VAT), which is the

same as the tariff described in PPA /37/. It is evidenced by the electricity invoices of the project, which were crossed-checked by DNV. This tariff in the PPA is 3.12% higher than in the tariff available at the time of decision.

The "Guidance on the Assessment of Investment Analysis" version 2 (adopted at EB41), paragraph 6 states the following: "*Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant. The DOE is therefore expected to validate the timing of the investment decision and the consistency and appropriateness of the input values with this timing*". Furthermore the rationale is presented as "*The use of investment analysis to demonstrate additionality is intended to assess whether or not a reasonable investor would or not decide to proceed with a particular project activity without the benefits of the CDM. This decision will therefore be based on the relevant information available at the time of the investment decision and not information available at an earlier or later point.*"

Hence, the changes in the input parameters after the starting date of the project activity should not be used for or against the project since the decision was already taken and financial commitment was in place. This is also valid for the tariff of this project activity; it is incorrect to use a tariff from after the starting date. It is therefore correct to use the available tariff in 2004 at the time of the financial commitment instead of the tariff in the PPA from October 2006.

In conclusion, the input values used in the investment analysis are reasonable and conservative. Relevant documents and websites have been crossed-checked by DNV.

The sensitivity analysis included in the PDD considers variations in the total investment, gas price, annual O&M cost, annual electricity generation and tariff fluctuation. The sensitivity analysis confirms that the IRR of the project is below 8%.

If the feed-in tariff increases by about 6.5%, the IRR begins to exceed the benchmark. However, the feed-in tariff is regulated by the government[2] and feed-in tariff changes need government's approval. Moreover, policy on the feed-in tariff indicates rather decreases in the tariff price[3]. Therefore, the IRR is not likely to exceed the benchmark 8% due to tariff's fluctuation. The actual electricity price in the PPA is 0.495 Yuan/kWh (including VAT) while the electricity price in the FSR and applied in the IRR analysis in the PDD is 0.48 Yuan/kWh (including VAT). Nonetheless, even if considering an electricity price of 0.495 Yuan/kWh, the IRR remains below 8%.

DNV has verified that the tariff used in the investment analysis during validation of the project activity is 0.48 RMB/kWh including VAT (0.4106 RMB/kWh excl. VAT). The data source for this electricity tariff is the project FSR prepared in July 2003 and approved in July 2004 /6/. The starting date of the project activity is 18 August 2004.

The power purchase agreement (PPA) was signed in October 2006. The PPA tariff is 0.495 RMB/kWh including VAT (0.423 RMB/kWh excl. VAT) /37/. Invoices were also verified by DNV.

[2] http://www.nnpn.gov.cn/zcfg/guojia/2001/2001g701.htm

[3] http://www.gzwjj.gov.cn/infomake2004/homepage/view/paper.asp?pap_no=PAP_040101_00365

The project used a tariff from an accredited third party that had evaluated the financial viability of the project and the FSR was approved by the government only one month before the starting date. The tariff is therefore deemed a reasonable assumption at the time. The fact that a PPA was signed more than two years afterwards at a slightly higher tariff (3.12% higher) does not alter the investment decision and the additionality of the project. Besides, the small change in tariff confirms the sensitivity analysis; that the financial analysis is robust and that actual variations did not cause the IRR to pass the benchmark.

In addition, it is difficult in China to predict with accuracy the change of feed-in tariff because the feed-in tariff is strictly controlled by the government and feed-in tariff adjustment needs government's approval as described in the Notification of Electric Power Tariff Reform by the National Council Office issued on 9 July 2003. The adjustment of the electricity tariff can not be controlled by any specific electricity generation enterprise.

At the time of the proposed project investment decision in August 2004, the average electricity tariff of Guangdong Province thermal power plants showed a decreasing trend from 1999 to 2003. This was verified by DNV from the "Certificate of the Average Electricity Tariff from Year 1999 to Year 2003 in Guangdong Province" issued by Guangdong Power Grid Company. Therefore, at the time of the project investment decision in August 2004, it was reasonable for the project owner to predict that the electricity tariff was unlikely to increase by 6.5%.

Moreover, the increase of the electricity tariff in PPA of the project activity is a result of increasing the fuel price, i.e. the electricity tariff and the fuel price have a causal relationship. A national electricity tariff policy in relation to the fuel price increase was issued by NDRC in December 2004 /42/. This policy states that the increase of electricity tariff is to be based on the increase of the fuel price increase, if the increase of the fuel price is more than about 5%, the electricity tariff will be adjusted, but the increase of electricity tariff will only compensate about 70% of the fuel price increase.

The increase of the electricity tariff is a result of the fuel price increase. This increase is less than the increase of fuel price, which is evidenced by Indices of Purchasing Prices of Raw Materials, Fuels and Power and Product Price Index (Electricity tariff) of Guangdong Province from 2004 to 2006.

From 2004 to 2006, the Indices of Purchasing Prices of Raw Materials, Fuels and Power increased by 8.8% in Guangdong province and the Product Price Index of electricity tariff was increased 4.14% in Guangdong province /43/. This is in line with the trend of the Indices of Purchasing Prices of Raw Materials, Fuels and Power and the Product Price Index of electricity tariff in China from 2004 to 2006 /44/.

On 22 April 2005, NDRC issued a notification on the price linkage between fuel and electricity in China Southern Power Grid, which mentioned that the increase of electricity tariff was the compensation of fuel price increase since June 2004 in China Southern Power Grid /31/. DNV has checked the above mentioned documents and was able to confirm that the electricity tariff and the fuel price have a causal relationship and the increase of the electricity tariff in PPA of the project activity is a result of increasing the fuel price.

If the gas price decreases by more than 10%, the IRR will exceed the benchmark. However, the gas price has been increasing gradually in recent years /50/. Furthermore, the gas price is based on the pricing clause in the LNG sales and purchase contract /19/, with a correlation to the price fluctuation of crude oil. The gas price has risen to 1.5961 Yuan/m^3 recently /25/ while the IRR

analysis in the PDD assumes a gas price of 1.55 Yuan/m^3 and the gas price assumed in the FSR was 1.442 Yuan/m^3. Hence, it is unlikely that the gas price will decrease by more than 10%.

If annual electricity generation increases more than 20%, the IRR exceeds the benchmark. However, the annual electricity generation depends on the gas supply, which is regulated in the contract /19/. According to the PPA, the annual electricity generations of the project's units are subject to the provincial electricity generation plan regulated by the Electricity Power Administration Department of Guangdong Province. Given the provisions in the PPA and the fact that the power plant is expected to be operated as peak load power plant, it is reasonable to assume that the operating hours will not increase by more than 20%. However, the assumed load factor for the power plant is only 39%. Hence, if the actual project implementation will show that the power plant operates with higher operating hours the economical viability of the project without CDM revenues should again be re-evaluated by the verifying DOE to ensure that the project continues to depend on CER revenues to be economically attractive.

If the total investment decreases more than about 17% or annual O&M costs decreased more than 8.6%, the IRR will exceed the benchmark. Due to increasing price of the material in the Chinese and international market, the probability that the total investment decreases more than about 17% or annual O&M costs decreases by more than 8.6% is very small.

The data source and spreadsheet of calculation of IRR has been checked by DNV.

In addition, Using actual values of feed-in tariff (0.495 RMB/kWh (including tax))/37/, investment in fixed assets (3 985.79 million RMB) and LNG price (1.5961 Yuan/m^3 (including tax)) instead of predicted value in PDD to recalculate IRR without CDM revenue, the result is 5.04%, which is lower the estimated value of 5.55% in PDD. Based on these values, even a 10% increase in the tariff to 0.544 RMB/kWh would result in the IRR to increase to only 7.95%, which is still lower than the benchmark of 8%. Hence, the estimation of IRR for the project in PDD is conservative and the proposed project is not economically attractive without the support of CDM revenue. The data source and spreadsheet of recalculation of IRR has been checked by DNV as well.

Step 2. Common practice analysis

There are four LNG power generation projects in the CSPG, including:

- Huizhou LNG project;
- Zhujiang LNG project,
- Shenzhen Dongbu LNG project
- The proposed project activity.

In China, NG and LNG projects must be approved by government before the construction. After checking relevant government websites, such as the website of National Development and Reform Commission (http://www.sdpc.gov.cn) and Guangdong Provincial Development and Reform Commission (http://www.gddpc.gov.cn/), and China Electric Power Yearbooks (China Electric Power Yearbook from 2002 to 2007) /11/, DNV could confirm that there are only 4 LNG power generation projects and two NG power generation projects in CSPG. Four LNG power generation projects are the same as the projects stated in PDD.

According to "Tool for the demonstration and assessment of additionality (Version 04)"/18/, activities similar to the proposed project activity should be considered for the common practice analysis. Similar project activities include:

- Those activities that are implemented previously or currently underway

- Projects in the same region and/or rely on a broadly similar technology;
- Projects are of similar scale;
- Projects take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.

DNV checked the websites mentioned in PP's response and could confirm that all of other three LNG power generation projects in CSPG are in the process of applying as CDM projects.

Moreover, the other two NG power generation projects in CSPG are also in the process of applying as CDM projects, which is verified by DNV through checking the relevant websites /41/.

Hence, DNV can confirm, after validating the information, that the proposed project activity is not common practice

Step 3. Impact of CDM registration:

The CER revenues improve the financial performance of the project and increase the IRR above the benchmark.

In DNV's opinion, it is sufficiently demonstrated that the project is not a likely baseline scenario and that emission reductions are hence additional.

4.5 Monitoring

The proposed project applies the approved monitoring methodology, AM0029 "*Methodology for Grid Connected Electricity Generation Plants using Natural Gas*", version 01.1. The selected monitoring methodology is applicable for the project.

4.5.1 Parameters determined ex-ante

The build margin emission factor (BM) is 0.6748 tCO_2/MWh, combined margin emission factor (CM) is 0.843 tCO_2/MWh and the emission factor of the technology (and fuel) identified as the most likely baseline scenario is 0.8639 tCO_2/MWh , which are determined *ex-ante* based on the most recent information available to identify the lowest emission factor among the three as the baseline emission factor. More detailed information is provided in Chapter 4.6.

4.5.2 Parameters monitored ex-post

The following are the main data and parameters to be monitored in accordance with AM0029:

1) *BM*, Build margin emission factor.
Calculated *ex-post* as per ACM0002
2) $F_{f,y,}$ Annual quantity of fuel "f" consumed in project activity.
The natural gas flow will be monitored continuously both by the supplier and the project owner. The natural gas consumption will be aggregated automatically and recorded daily.
3) $NCV_{f,y,}$ Net Calorific Value of fuel "f"
The value is according to the report from supplier and the details are based on the relevant terms in the Purchase Agreement and will be collected fortnightly.
4) $OXID_{f,}$ Oxidation factor
IPCC default value
5) $EF_{CO2,f,y,}$ Emission factor for fuel "f"
EF_{CO2} of natural gas will use supplier-provided data or local data or country-specific values, EF_{CO2} of fuel other than natural gas will apply IPCC default value.
6) $COEF_{y,}$ CO_2 emission coefficient

Calculated, $COEF_{f,y} = \sum NCV_y * EF_{CO2,f,y} * OXID_f$

7) EG_y, Electricity supplied to the grid by the project.

The electricity supplied to the grid by the project will be measured hourly and recorded monthly. This data will be cross verified against the sales receipt from the grid company. The metering equipments are with an accuracy of 0.2s. The electricity meters shall be calibrated once half a year.

8) PE_y, Project emission due to combustion of fuel

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

4.5.3 Management system and quality assurance

The project's monitoring plan includes:

- A description of the responsibilities and authorities for project management,
- Procedures for monitoring and reporting, and QA/QC procedures,
- A description of the installation of metering equipment,
- Procedures for the calibration of metering equipment,
- A description of training and maintenance needs.

Detailed procedures have been elaborated and are in place. These will be maintained and implemented to enable subsequent verification of emission reductions.

4.6 Estimate of GHG Emissions

The GHG emission reduction calculations are in accordance with the formulae given in the baseline and monitoring methodology AM0029 version 01.1.

1) Baseline emissions

In line with the methodology, the emission factor of the first crediting period is determined as the least of the following 3 options:

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 coal based sub critical power plant which has been identified as the baseline scenario.

$$EF_{BL,CO2}(tco2/Mwh) = \frac{COEF_{BL}}{\eta_{BL}} * 3.6GJ/MWh$$

Calculation of the BM emission factor

Because plant specific fuel consumption and electricity generation data is not publicly available in China, the EB guidance on the request for deviation titled "Application of AM0005 and AMS-I.D in China" /14/ the build margin is calculated with the following parameters:

- The capacity addition from the years 2003 to 2005 is chosen and represents 21.42% of total installed capacity /11/
- The weight of installed capacity additions for thermal power plant is accounted for 74.01% of total installed capacity additions. /11/

- The standard coal consumption of 343.33gSCE/kWh is used to determine the BM emission factor, which is deemed conservative. The coal consumption efficiency of 343.33 g SCE/kWh is defined as the best technology commercially available in China by the DNA of China /15/.
- The local net calorie value of each kind of fuel, the local carbon content of each kind of fuel and the IPCC 2006 default value of carbon oxidization factor are used to calculate the BM. /13/
- The BM is calculated as 0.6748 tCO_2/MWh

Calculation of the OM emission factor and CM emission factor

The simple OM emission factor calculation method is selected because low cost must run projects constitute less than 50% of the total grid generation and data is not available for applying the dispatch data analysis.

The aggregated generation and fuel consumption data are used as more disaggregated data are not available in the CSPG. Country specific data for the net calorific value (NCV_i) of each type of fossil fuel, which can be obtained from the China Energy Statistical Yearbook /12/, the IPCC 2006 default values /13/ for the oxidation factor of each type of fossil fuel and the total electricity delivered to the CSPG selected are deemed reasonable. Vintage data for the years 2003, 2004 and 2005 are used for the OM emission factor calculation, which are the most recent data available. The OM is calculated to be 1.0119 tCO_2/MWh as a generation-weighted average for the three years,

The weights ω_{OM} and ω_{BM} are selected as 0.5 and 0.5, respectively, as stipulated by AM0029. The combined margin is determined ex-ante at 0.8498 tCO_2/MWh However, the BM emission factor will be updated ex-post and that actual combined margin will be updated accordingly.

The most recent data at the time of PDD are used to calculate the OM emission factor. The OM emission factor is derived from the China Energy Statistical Yearbooks 2004, 2005, and 2006 /12/; the BM calculation is derived from the China Power Electric Power Yearbooks 2004, 2005, and 2006 /11/.

For the calculation of the identified fuel emission factor

$$EF_{BL,CO_2,Option3} = \frac{COEF_{BL}}{\eta_{BL}} \times 3.6GJ/MWh = \frac{\frac{25.8 \times 44/12}{1000}}{39.42\%} \times 3.6 = 0.8639 \text{ tCO}_2\text{/MWh.}$$

The lowest emission factor among the three options is the BM emission factor (0.6748 tCO_2/MWh), which is selected to be the baseline emission factor. Therefore, baseline emissions are calculated as $BE_y = EGP_{J,y} * EF_{BL,co2,y}$=3 611 000 MWh*0.6748 tCO_2/MWh =2 436 703 tCO_2/year.

2) Project emissions

$$COEF_{LNG,y} = NCV_{LNG,y} \times EF_{CO_2,Gas,y} = 49.39 \times 56100/1000 = 2.771 \text{ tCO}_2\text{/t}$$

$$PE_y = FC_{LNG,y} \times COEF_{LNG,y} + FC_{Diesel,y} \times COEF_{Diesel,y} = 505600 \times 2.771 = 1{,}401{,}018 \text{ tCO}_2$$

3) Leakage

Fugitive CH_4 emissions associated with fuel extraction, processing, liquefaction, transportation, regasification and distribution of natural gas used in the project plant are calculated to be smaller than fugitive CH_4 emissions from the use of fossil fuels in the grid in the absence of the project activity. The leakage from project activity is thus calculated to be negative, and leakage can thus can be assumed to be zero.

4) Emission reductions

$ER_y = BE_{,y} - PE_{,y} - LE_{,y}$=2 436 703 tCO_2/year -1 401 018 tCO_2/year-0 =1 035 685 tCO_2/year.

4.7 Environmental Impacts

The environmental impact assessment (EIA) of the project has been conducted according to Chinese laws and regulations. The potential environmental impacts have been sufficiently identified. The conclusion of the report has been described in the PDD, and no significant environmental impacts are expected from the project activity. The project doesn't involve the resettlement based on the EIA. The State Environmental Protection Administration (SEPA) approved the project in 22 February 2002 /7/.

4.8 Comments by Local Stakeholders

A survey of local residents was carried out to invite comments from local stakeholders in the stage of Environmental Impact Assessment. Totally 250 questionnaires for stakeholders returned out of 210 with 84% response rate. And 203 respondents supported the project construction. No negative comments have been received.

The survey shows that the proposed project receives strong support from the local people and the comments received have been taken into consideration during construction and operation to achieve environmental and social benefits.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD (version 01 of 10 September 2006) was made publicly available on DNV's climate change website (http://www.dnv.com/certification/climatechange/) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 16 September 2006 to 15 October 2006.

Two comments were received and are given (in unedited form) in the below text box.

Comment by: Ailsa Brook, CRRRO
Inserted on: 2006-10-11
Subject: The baseline scenarios may be not in compliance with all applicable legal and regulatory requirements

Comment:

When I read the CDM PDD of Huizhou& Qianwan LNG generation project, I found a few confused problems, which are conflicting compared with some point view in previous PDD using ACM0002 methodology. Some are pointed out as follow:

In Page 10 of the CDM PDD of Huizhou& Qianwan LNG generation project:

"…According to the version 01 of AM0029, the baseline alternatives with the best financial indicator, i.e. the lowest levelised cost, can be pre selected as the most plausible scenario. Then the 135 MW sub-critical coal-fired power plants have the lowest levelised cost, then the most plausible scenario. The sensitive analysis in the previous table confirms and supports that the 135 MW sub-critical coal-fired power plants is always the least levelised cost alternatives within reasonable variations in the critical assumptions."

Some relevant point views are easily found in many registered or validated CDM PDD, only two of them are listed:

1)in the PDD (Page 9 and Page 10) of registered Jilin Tongyu Huaneng 100.05 MW Wind Power Project,
http://cdm.unfccc.int/Projects/Validation/DB/1NWSH2PLH2G2ZQRRWHCVMSXZ9P9ILQ/view.html

"…However, according to Chinese regulations, coal-fired power plants of less than 135MW are prohibited to be built in the areas covered by the large grids such as provincial grids (from: Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135mw or below issued by the General Office of the State Council, decree no. 2002-6.), and the fossil fuel-fired power units with less than 100MW is strictly regulated for installation 2. For these reasons, the possible alternative baseline scenario of building a 25MW fuel-fired power plant conflicts with Chinese regulations. So, scenario 1) is not feasible as an alternative scenario…"

2)in the PDD (Page 11) of validated Guohua Huitengliang Windfarm Project,
http://cdm.unfccc.int/Projects/Validation/DB/UV0KG7BGHK4TNW9L8U5DVJUHSJECCK/vi

ew.html

"However, according to Chinese regulations, coal-fired power plants of less than 135MW are prohibited for construction in the areas covered by the large grids such as provincial grids. (from: Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135mw or below issued by the General Office of the State Council, decree no. 2002-6…)"

In these PDD abovementioned, Notice on Strictly Prohibiting the Installation of Fuel- Generators with the Capacity of 135mw or below issued by the General Office of the State Council are frequently referenced. It seems difficult to find this Notice in English just from website, so I can not make sure whether this Notice is really issued or carried out in China, however, if this Notice is really true after verification by DOE, it means that coal-fired power plant with the capacity of 135MW or below is strictly prohibited, then it is not in compliance with all applicable legal and regulatory requirements.

According to the AM0029, the project participant may exclude baseline scenarios that are not in compliance with all applicable legal and regulatory requirements in the step of identifying plausible baseline scenarios. So if abovementioned reflected the real case of legal and regulatory requirements, the baseline scenarios identified in the CDM PDD of Huizhou& Qianwan LNG generation project are not incorrect.

Comment by: Carol Grear, Ohio EPA
Inserted on: 2006-10-11
Subject: If the proposed project were registered, It will create a ture lies in CDM world

Comment:

As a part of the overall Guangdong LNG project, which is a China-Australia Cooperation Project strongly supported by two governments, the proposed project cannot be considered additional.

Before my comment is made, some background information of the overall Guangdong LNG project is stated as following to achieve a better comprehension.

The history of this project

1.1995, NDRC (National Development and Reform Commission) started to develop natural gas plan and organize LNG pre-study.

2.Oct, 1998, State Council approved Guangdong start LNG pilot importing.

3.Dec, 1999, the State Council approved the 1st LNG project in China – Guangdong LNG Pilot Project Phase I

4.Oct, 2002 by international tendering and approval of State Council, Australia NWS LNG project was selected as supplier.

5.Oct, 2003, NDRC approved the FSR of Guangdong LNG Pilot Project Phase I.

6.June, 2006, Premier Wen Jiabao of Chinese State Council and Australian Prime Minister John Howard jointly attended the ceremony on the operation of the first-phase Guangdong LNG project.

The whole picture of this project (include 14 sub-projects)

1.LNG Terminal and Trunckline Project

2.4 newly-built power plants (Dongbu, Huizhou, Qianwan, Zhujiang), including the proposed project

3.1 conversion power plant (Meishi)

4.4 Town Gas (Shenzhen, Dongguan, Guangzhou, Foshan)

5.HK Customers (HK Electric, HK&China Town Gas)

6.LNG Transportation (COSCO and China Merchant)

7.LNG Ship-building (Shanghai Hudong Ship Yard)

The details of the background information can be found from many places, only three of them are list as below:

1) The United States Energy Association (USEA), the website is: http://www.usea.org/OGIF%20Presentations%20for%20the%20website/Topic%2014-%20Chu%20Yanqun-%20CNOOC-%20English.pdf#search=%22%E5%B9%BF%E4%B8%9CLNG%E9%A1%B9%E7%9B%AE%E4%BB%8B%E7%BB%8D%22

2) North West Shelf Australia LNG is Australia, the website is: http://www.australialng.com.au/website.aspx?mp=4&pn=402

3) LNG project reflects closer Canberra ties, from People Daily Online, the website is: http://english.people.com.cn/200606/29/eng20060629_278375.html

As mentioned above, the Overall Guangdong LNG project is a pilot one, which is planed and supported by Chinese central government from the very beginning. Nearly all the activities are conducted by the State Council of China and Australia government. Furthermore, this project has been approved by NDRC in 2003, three years from now, and part of it has been completed. Being a part of the overall project, the proposed LNG power plant will be consequently developed even without CDM revenues.

What's more, the Overall Guangdong LNG project is deeply related to the collaboration between China and Australia and symbolizes increasingly close China-Australia ties. The relevant news can be read everywhere, for example,

(http://archives.cnn.com/2002/BUSINESS/asia/08/08/aust.chinalng.biz/), (http://www.fmprc.gov.cn/eng/zxxx/t260999.htm), (http://english.gov.cn/2006-06/28/content_321985.htm)

The Leaders of two countries express their strong support and high praises for Guangdong LNG project, including the proposed project, some remarks from leaders are list as below:

1) President Hu Jintao

“Australia is China's ninth largest trading partner and the biggest supplier of wool. Over the years, China has purchased large amounts of iron ore and aluminium oxide from Australia which has such energy and mineral riches. Last year, the two countries signed a 25-year, 25-billion-Australian dollar deal on LNG in Guangdong, thus laying a solid foundation for bilateral energy cooperation.”

President Hu Jintao's Address to the Federal Parliament of the Commonwealth of Australia

Building A Better Future Together for the China-Australia Relationship of All-round Cooperation

December 27, 2003.Seen from the website: http://au.china-embassy.org/eng/zt/hjtcf/t57097.htm

2) Prime Minister John Howard

“China and Australia want to strengthen co-operation ranging from the energy, mining and resources sectors to upstream exploration, new energy, renewable energy, clean energy and safe production”

Remarked by John Howard, during a ceremony inaugurated the first liquefied natural gas (LNG) project in South China's Guangdong Province, June 28, 2006. Seen from the website:

http://english.people.com.cn/200606/29/eng20060629_278375.html

3) Premier Wen Jiabao

“We are willing to continue high-level exchanges with Australia, enhance strategic dialogue, and actively promote free trade negotiations”

Said by Premier Wen Jiabao, during a ceremony inaugurated the first liquefied natural gas (LNG) project in South China's Guangdong Province, June 28, 2006. Seen from the website:

http://english.people.com.cn/200606/29/eng20060629_278375.html

It’s shown that since the project began, the leaders of both countries have been keeping an eye on it. Therefore, Guangdong LNG project is easy to be considered a Cooperation Project between two national governments, and then the proposed project consequently will be developed even without CDM revenues. It can also be confirmed by some most latest news:

Phase I of Guangdong LNG Pilot Project put into operation on June 28, 2006, Premier Wen Jiabao and his Australian counterpart John Howard pushed the start-up button together during a ceremony at Dapeng Gas Terminal.(http://english.people.com.cn/200606/29/eng20060629_278375.html). My translator also confirmed that the Num 1 unit (390MW) of Huizhou LNG power plant fired on July 21,2006, commissioning on August 15,2006 and put into commercial operation with Grid on September 21,2006.(http://www.gd.gov.cn/govpub/gdyw/0200608160001.htm,,http://city.hz0752.com/n/200609/3508.shtml)

Due to the comprehensive facts mentioned above, it's no doubt that the proposed LNG power plant can be developed without any help from CDM, and then the proposed project cannot be considered additional. I also suggest the DOE of this project strictly incorporate "Tool for the demonstration and assessment of additionality" to assess the additionality of the proposed project.

***How DNV has considered the comments received in its validation**:*

The project participants provided the below response to the issues raised by the two comments. DNV was able to verify the information presented in the project participant's response by reviewing the documents referred to in the response. It is DNV's opinion that the response adequately addresses the issues raised in the comments.

Comment 1

The project entity agreed with the Public Comment, made by Ailsa Brook on November 10, 2006 that the 135 MW sub-critical coal-fired power plants should not be included in the baseline alternatives. As a result, alternative scenario of 135 MW sub-critical coal fired power plant has been excluded from the analysis in the PDD.

Comment 2

China is a lack of energy resources per capita countries, with the rapid economic development, and from the rest of the world needs to import large quantities of energy to offset domestic energy shortage. At the same time the strategic energy security point of view, countries also hope to import energy through improved energy mix. Guangdong is a big energy consuming provinces, but the lack of energy resources, the self-sufficiency rate of less than 20 per cent[4], there is a need from other domestic provinces and abroad purchased a large amount of energy to meet the needs of economic development. Imports of liquefied natural gas (LNG) are in line with the country's energy development strategy, the result has been a national concern, but the state has not given on the import of LNG subsidies and economic support.

Issue 1: Overall Guangdong LNG project is a pilot one, which is planed and supported by Chinese central government from the very beginning.

The construction of Qianwan project is not a mandatory from the Guangdong LNG program. The planning of Qianwan project was independently carried out by the project investors.

[4] P219 Analyzing & Investment Consulting Report on China Liquefied Natural Gas Industry, the Year of 2006.(Second Part)

a) Investment decision of Qianwan project was made by project investors based upon a long and cautious review of the project feasibility.

As early as January 28, 1994, the Electrical Power Bureau of Guangdong Province, predecessor of Guangdong Yudean Group Co., Ltd, together with Shenzhen Shekou Electrical Power Development Co., Ltd, KANEMATSU Corporation signed the letter of intent of Qianwan project[5]. On August 22, 1994, the project owner of the "Shenzhen Qianwan project's proposal" submitted Ministry of Power Industry[6]. In February 1995, National Planning Commission approved this project, the fuel for Hainan Ya-13 natural gas pipeline, and prior to Guangdong LNG program. Because gas source of project had not carried out, the Qianwan project ceased in 1998. The Guangdong LNG program's appearance, caused the fuel issue of Qianwan project to be solved, the project entered into the feasibility study stage. In the actual feasibility study stage, the original two investors, Shenzhen Shekou Electrical Power Development Co., Ltd and KANEMATSU Corporation withdrawn from this project one after another. In fact, the project investors had been seeking various ways to improve the project's financial performance for a long period.

As early as February 2004[7] the project entity had commissioned a revision of the Financial Assessment (FA) to take the potential CDM revenue into account based on a case study for a similar natural gas-fired power generation project[8] and the latest data on the gas price and quantity. According to the Directorate Decision dated May 28, 2004, to ensure financial viability of the project, the shareholders has also actively seeking potential revenue from participating in CDM even when the Kyoto Protocol was not yet in force and no relevant methodology was available.

It has been demonstrated in the FA that without the CDM revenue, the Internal Rate of Return (IRR) of the project would be 5.55 percent, which was 2.45 percent lower than the industry benchmark of 8 percent[9]. With the CDM revenue, the IRR would be 9.26 percent /20/, higher than the industry benchmark, therefore CDM revenue could mitigate the project risk and improve financial performance.

The construction permit issuance of proposed project was issued on 14 December 2004 /21/.

Thus the above statement demonstrates that the Guangdong LNG program only plays a role of gas supplier in the Qianwan project. Such commercial relationship is also reflected in the condition term of Gas Purchase and Sales Contract, which defines the NDRC's approval of feasibility study report (FSR) of Qianwan project as one of the key preconditions of the gas contract effectiveness[10].

b) The preferential treatment that the project investors appealed for NDRC didn't put into effect.

In the FSR of Qianwan project, project investors appealed for preferential measures, including long-term Electric Power Purchase and Supply Contract, guaranteed on-grid power amount,

[5] 《Letter of Intent for Qianwan Project》

[6] Dianji[1994] No.702 document

[7] Agreement on Financial Assessment on Qianwan LNG Power Plant with Guangdong Electric Power Design Institute dated February 17, 2004.

[8] "*Case Study of Clean Development Mechanism Project of Zhuhai Power Plant Project Phase II*", Energy Research Institute of the NDRC & Global Climate Change Institute, Tsinghua University, November 2003.

[9] State Power Corporation of China. *"Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects".* Beijing: China Electric Power Press, 2003.

[10] Page 10 in 《Gas Sales Contract》 signed April, 2004.

preferential electricity tariff, as well as lower taxation, which are considered the prerequisites of the investment decision[11].

However, in the FSR approval from NDRC dated July 2004, the project has not received any preferential treatment from the government and was required that power generated from the project must participate in the on-grid price bidding[12]. Currently, no guaranteed on-grid power amount and preferential electricity tariff are received[13] in the project.

Issue 2）：Nearly all the activities are conducted by the State Council of China and Australia government.

a) As LNG supplier for the Guangdong LNG program, Australian LNG Company has never played a role in the investment decision-making of Qianwan project.

The gas supply contract was signed between Qianwan LNG Company and Dapeng LNG Company which is a joint-venture between China and Britain. There is no direct business cooperation between Qianwan LNG Company and Australian LNG Company. Two major shareholders of Qianwan project are all domestic companies operating under market conditions.

b) During the selection of the LNG supplier of Guangdong LNG program, a global sourcing was launched and a number of competitors participated. Australian supplier was one of the most qualified candidates and was finally selected as the gas supplier.

During the period of November 8, 2001 to August 8, 2002, CNOOC called for bid in gas supply and transmission. Altogether 7 international LNG companies participated. After a long process of evaluation and negotiation, Australian LNG Company was selected as LNG supplier for the 'Guangdong LNG Program'[14]. Thus, the high quality LNG resource with lowest international price was selected by tendering in the Guangdong LNG program.

Issue 3: This project has been approved by NDRC in 2003, three years from now, and part of it has been completed.

This project's FSR was submitted to NDRC for approval in July 2003 and was approved by NDRC in July 2004[15].

In addition, as early as February 2004[16], the project entity had commissioned a revision of the Financial Assessment (FA) /20/ to take the potential CDM revenue into account in mitigating project risk and improving financial performance.

Issue 4: Being a part of the overall project, the proposed LNG power plant will be consequently developed even without CDM revenues.

In sum, through the above statement, it is demonstrated that the Guangdong Qianwan project has never received any preferential treatment from the government.

The project will not be financially viable thus would not be implemented without taking CDM revenue into consideration to overcome high upfront investment cost and the industry benchmark rate of return.

[11] Part 13.3.3 and 13.3.4,<<Feasibility Study Supplement of Qianwan LNG Power Plant>>, Oct 2002
[12] National Development and Reform Commission, Fagainengyuan [2004] No. 1369.
[13] 《Power Purchase Agreement》 signed in 2006
[14] http://cnooc.redcome.com/servlet/Report?node=8908&language=1
[15] National Development and Reform Commission, Fagainengyuan [2004] No 1369.
[16] Agreement on Financial Assessment on Qianwan LNG Power Plant with Guangdong Electric Power Design Institute dated February 17, 2004.

APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory Requirements for Clean Development Mechanism (CDM) Project Activities

Requirement	Reference	Conclusion
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a	OK
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art.12.2.	OK
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	~~CAR 1~~ OK
5. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK
6. Reduction in GHG emissions shall be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	~~CL 1~~ OK
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures §29	OK
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities §30/31a	OK
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	OK

Requirement	Reference	Conclusion
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	OK
12. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received	CDM Modalities and Procedures §37b	OK
13. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
14. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	CDM Modalities and Procedures §37e	OK
15. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP	CDM Modalities and Procedures §37f	OK
16. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available	CDM Modalities and Procedures §40	OK
17. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances	CDM Modalities and Procedures §45c,d	OK
18. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure	CDM Modalities and Procedures §47	OK
19. The project design document shall be in conformance with the UNFCCC CDM-PDD format	CDM Modalities and Procedures Appendix B, EB Decision	OK

Table 2 Requirements Checklist

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
A. General Description of Project Activity *The project design is assessed.*					
A.1. Project Boundaries *Project Boundaries are the limits and borders defining the GHG emission reduction project.*					
A.1.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR I	Yes. The proiejct is located at Dachan Island, Nanshan district of Shenzhen city, Guangdong province, China. The geological location of the proposed project is 22°30´54"N, 113°50´35"E.		OK
A.1.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	/1/	DR	The project's system boundaries is defined as the China Southern Power Grid (CSPG) and project site.		OK
A.2. Technology to be employed *Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.*					
A.2.1. Does the project design engineering reflect current good practices?	/1/ /6/	DR	Yes. The project involves installation of 3 CCGT (combined-cycle gas turbine) each with a capacity of 361.03MW. These "combined cycle" will results in cycle thermal efficiencies of over 50% when used with the most recent gas turbine technology.		OK
A.2.2. Does the project use state of the art technology	/1/	DR	Yes.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/6/				
A.2.3. Is the project technology likely to be substituted by other or more efficient technologies within the project period?	/1/	DR	No. see also A.2.1.		OK
A.2.4. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project period?	/1/	DR I	Yes. Extensive initial training and maintenance efforts are needed.		OK
A.2.5. Does the project make provisions for meeting training and maintenance needs?	/1/	DR I	The training plan for the project needs to be provided.	~~CL 2~~	OK
A.3. Contribution to Sustainable Development *The project's contribution to sustainable development is assessed.*					
A.3.1. Is the project in line with relevant legislation and plans in the host country?	/1/	DR	Yes. The project has been reviewed and approved by the NDRC in 2004.		OK
A.3.2. Is the project in line with host-country specific CDM requirements?	/1/	DR	Yes. But the LOA from DNA of China has not been obtained.	~~CAR 1~~	OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	Yes. The LOA from DNA of China has not been obtained.	~~CAR 1~~	OK
A.3.4. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes. The project will also mitigate local environmental pollution caused by coal-fired power plants.		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
B. Project Baseline *The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.*					
B.1. Baseline Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
B.1.1. Is the baseline methodology previously approved by the CDM Executive Board?	/1/	DR	Yes. AM0029 (version 01) is chosen for the project.		OK
B.1.2. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	/1/	DR	Yes. The project activity is the construction and operation of a new LNG fired grid-connected power plant. The natural gas is sufficient available in the region. The choice of the CSPG as the system boundary needs to be sufficiently justified.	~~CL 3~~	OK
B.2. Baseline Determination *The choice of baseline will be validated with focus on whether the baseline is a likely scenario, whether the project itself is not a likely baseline scenario, and whether the baseline is complete and transparent.*					
B.2.1. Is the application of the methodology and the discussion and determination of the chosen baseline transparent?	/1/	DR	Yes. The determination of the baseline is in line with the methodology: *Identify all plausible baseline scenarios:*		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The following alternatives are identified, Natural Gas power generation using combined cycle gas turbine (CCGT) without CDM. Natural Gas power generation using single Gas Turbine technology Light Oil based power plants using CCGT Coal based power plant with Sub-critical boilers Coal based power plant with Supercritical boilers Wind Solar Biomass Nuclear Hydro Import electricity from other grid Natural Gas power generation using single Gas Turbine technology is not plausible because it is not widely used in CSPG due to the lower thermal efficiency than that of the CCGT.[17] Wind, solar, biomass or nuclear power are not plausible because will not deliver outputs and services for peak load. Hydropower is not plausible because it can not deliver outputs and services comparable to the project activity with full-year peak regulation capacity[18]. Import electricity from	~~CL 4~~	

[17] http://www.china5e.com/gasturbine/introduction.php
[18] Peaking capacity analysis in Guangdong Grid. Hao CHEN, Zhanying LI. Guangdong Electric Power. Apr 2001. Vol.14 No.2, pp6-8

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			other grid is not plausible because it can not deliver outputs and services comparable to the project activity with full-year peak regulation capacity.[19] So at last, four alternatives are realistic and credible, Natural Gas /CCGT Light Oil /CCGT Coal /Sub critical Coal /Supercritical *Identify the economically most attractive baseline scenario alternative.* The economically most attractive baseline scenario alternative is identified using levelised cost as a financial indicator. Based on the data from the *Design reference cost index for thermal power transmit electricity and transformer electricity projects (2004)* /16/, the 600 MW subcritical coal-fired power plant has the lowest levelised cost of 0.2173 RMB/kWh, taken as the most attractive baseline scenario alternative.. *A sensitivity analysis was also performed.* To further demonstrate the financial attractiveness of the 600 MW sub-critical coal-fired power plant is robust to reasonable variations in the critical assumptions for the alternatives (i.e. fuel		

[19] Power source characteristics of project "Power from west to east" and its influences on Guangdong power system. Zhigang CHEN, Qingyi HUANG. Guangdong Electric Power. Apr 2002. Vol 15, No 2. pp9-12.

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			cost and the load factor), a sensitivity analysis has been conducted. The sensitivity analysis confirms that the construction of a 600 MW subcritical coal-fired power plant is likely to remain the most economically scenario under the reasonable variations (-10% to +10%) of the assumptions. Hence, the construction of a coal-fired power plant is identified as the baseline scenario.		
B.2.2. Has the baseline been determined using conservative assumptions where possible?	/1/	DR	All reference related to the calculation and determination of the baseline need to be provided to confirm whether conservative assumptions have been used.	~~CL 4~~	OK
B.2.3. Has the baseline been established on a project-specific basis?	/1/	DR	Yes.		OK
B.2.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes.		OK
B.2.5. Is the baseline determination compatible with the available data?	/1/	DR	Yes.		OK
B.2.6. Does the selected baseline represent the most likely scenario among other possible and/or discussed scenarios?	/1/	DR	Yes. The most likely baseline scenario is the construction and operation of coal-fired sub-critical power plant represented as the build margin of CSPG.		OK
B.2.7. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario?	/1/	DR	According to the version 01 of AM0029, the assessment of additionality comprises the following three steps: The project has started construction before		OK

* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			its CDM validation process started.. Evidences on how incentive from CDM has been seriously considered during the decision making process are needed. Step 1 – benchmark investment analysis: a benchmark of 8% has been chosen and been properly justified. The IRR without revenue from CERs is 5.55% which shows that the project is less financially attractive. Sensitivity analysis shows the changes of total investment, O&M cost and the output of the project within a reasonable range (+/- 10%) will keep the IRR below the benchmark. Tariff of electricity could also be a sensitive parameter and need s to be justified with sensitivity analysis. All data related to the calculation of IRR need to be supported with solid references or evidences, and should be provided to DNV. (for example, where does the 0.41/kWh come from?) Step 2 – common practice analysis was also performed. DNV was able to confirm that the project is one of the first natural gas power plants in CSPG. The other 3 similar activities are all applying for CDM. Power generation with natural gas is not a common practice in the region. Step 3 – Impact of CDM registration: Besides reducing the greenhouse gas	~~CL 1~~ ~~CL 5~~ ~~CL 6~~	

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			emissions, .CDM revenue could improve the financial performance of the project and enhance the confidence of the project owner for the project's successful implementation. Furthermore, the CDM registration can help China to achieve the goal of energy source diversity and encourage other prospective developers to invest in natural gas fired combined cycle power plants.		
B.2.8. Have the major risks to the baseline been identified?	/1/	DR	The major risk for the baseline will be the dramatic increase of power generation from renewable sources in future, such as wind and hydro.		OK
B.2.9. Is all literature and sources clearly referenced?	/1/	DR	No. all literature and sources need to be provided in details. Web links are needed in detailed specific webpage, not just a homepage.	~~CL 7~~	OK
C. Duration of the Project/ Crediting Period *It is assessed whether the temporary boundaries of the project are clearly defined.*					
C.1.1. Are the project's starting date and operational lifetime clearly defined and reasonable?	/1/	DR	DNV was able to verify and confirm that the project activity's start date is 18 August 2004 (equipment purchase contract effective date), which is the earliest date of the main equipment contract, the LNG Sales and Purchase Contract and PPA comes into force (refer to the description in section 4.4)	~~CL 8~~	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The 25 years of the project lifetime need to be justified.		
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	A 7-year renewable crediting period has been selected for the project.		OK
D. Monitoring Plan *The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed ((Blue text contains requirements to be assessed for optional review of monitoring methodology prior to submission and approval by CDM EB).*					
D.1. Monitoring Methodology *It is assessed whether the project applies an appropriate baseline methodology.*					
D.1.1. Is the monitoring methodology previously approved by the CDM Executive Board?	/1/	DR I	The project applies the approved monitoring methodology, AM0029 Version 01 of 19 May 2006.		OK
D.1.2. Is the monitoring methodology applicable for this project and is the appropriateness justified?	/1/	DR I	Yes. see also in B.1.2		OK
D.1.3. Does the monitoring methodology reflect good monitoring and reporting practices?	/1/	DR I	Yes. For the project emission, the annual fuels consumption, net caloric value (NCV) of the fuel used and emission factor for the fuel used in the project will be monitored. For the monitoring of baseline emission, it is in line with the ACM0002.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.1.4. Is the discussion and selection of the monitoring methodology transparent?	/1/	DR I	Yes.		OK
D.2. Monitoring of Project Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.2.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR I	Yes. See also in D.1.3.		OK
D.2.2. Are the choices of project GHG indicators reasonable?	/1/	DR I	Yes. The choices of project emission indicators are reasonable.		OK
D.2.3. Will it be possible to monitor / measure the specified project GHG indicators?	/1/	DR I	Yes.		OK
D.2.4. Will the indicators give opportunity for real measurements of project emissions?	/1/	DR I	Yes.		OK
D.2.5. Will the indicators enable comparison of project data and performance over time?	/1/	DR I	Yes.		OK
D.3. Monitoring of Leakage *It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.*					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	According to AM0029, no indicators need to be monitored for the leakage.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.4. Monitoring of Baseline Emissions *It is established whether the monitoring plan provides for reliable and complete project emission data over time.*					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	No. The project is choosing option 1 – the build margin (BM) as the baseline. And according to AM0029, it needs to be estimated and monitored ex post according to ACM0002. No plan has been provide for the monitoring of BM in the crediting period.	~~CL 9~~	OK
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	See above.	~~CL 9~~	OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	See above.	~~CL 9~~	OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?		DR	See above.	~~CL 9~~	OK
D.5. Monitoring of Sustainable Development Indicators/ Environmental Impacts *It is checked that choices of indicators are reasonable and complete to monitor sustainable performance over time.*					
D.5.1. Does the monitoring plan provide the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Chinese DNA does not require collection and archiving of data related to environmental, social and economic impacts. The environmental impacts will be monitored by local environmental authority.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
D.6. Project Management Planning *It is checked that project implementation is properly prepared for and that critical arrangements are addressed.*					
D.6.1. Is the authority and responsibility of project management clearly described?	/1/	DR I	A CDM workgroup has been established. One staff will be responsible for the monitoring and another one for verification.		OK
D.6.2. Is the authority and responsibility for registration, monitoring, measurement and reporting clearly described?	/1/	DR I	No. No procedures related to the registration, monitoring, measurement and reporting has been identified. Procedures related to training, emergency treatment, monitoring calibration, maintenance, data handling and data adjustment need to be included in the Monitoring Manual. The manual has not been identified.	~~CL 10~~	OK
D.6.3. Are procedures identified for training of monitoring personnel?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.8. Are procedures identified for day-to-day records handling (including what records to keep,	/1/	DR I	Ditto	~~CL 10~~	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
storage area of records and how to process performance documentation)					
D.6.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.10. Are procedures identified for review of reported results/data?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.11. Are procedures identified for internal audits of GHG project compliance with operational requirements where applicable?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.12. Are procedures identified for project performance reviews before data is submitted for verification, internally or externally?	/1/	DR I	Ditto	~~CL 10~~	OK
D.6.13. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR I	ditto	~~CL 10~~	OK
E. Calculation of GHG Emissions by Source *It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.*					
E.1. Project GHG Emissions *The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.*					
E.1.1. Are all aspects related to direct and indirect GHG emissions captured in the project design?	/1/	DR	Yes. all direct and indirect emission have been included in the project design.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
E.1.2. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes.		OK
E.1.3. Have conservative assumptions been used to calculate project GHG emissions?	/1/	DR	For the natural gas used in the project, NCV from China Energy Statistics Yearbook is used. Yet the LNG will be imported from Australia. NCV data from supplier need to be used. For the fuel used for start-up, diesel, IPCC default value is used.	~~CL 11~~	OK
E.1.4. Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	/1/	DR	Uncertainties related to the project emission need to be properly addressed.	~~CL 12~~	OK
E.1.5. Have all relevant greenhouse gases and source categories listed in Kyoto Protocol Annex A been evaluated?	/1/	DR	Yes.		OK
E.2. Leakage *It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.*					
E.2.1. Are potential leakage effects beyond the chosen project boundaries properly identified?	/1/	DR	Leakage from two sources have been considered: - Fugitive emission associated with fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of natural gas used in the project and fossil fuels used in the grid in the absence of the project activity.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			- CO2 emission from fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression into a natural gas transmission or distribution system.		
E.2.2. Have these leakage effects been properly accounted for in calculations?	/1/	DR	Yes. Leakage emissions due to fugitive upstream CH4 emission and leakage emissions due to fossil fuel combustion / electricity consumption associated with the liquefaction, transportation, re-gasification and compression of LNG into a natural gas transmission or distribution system, have been accounted for in the calculation.		OK
E.2.3. Does the methodology for calculating leakage comply with existing good practice?	/1/	DR	Yes.		OK
E.2.4. Are the calculations documented in a complete and transparent manner?	/1/	DR	Yes. The calculation for leakage is complete and transparent.		OK
E.2.5. Have conservative assumptions been used when calculating leakage?	/1/	DR	The default emission factors for fugitive CH4 upstream emissions (13.4t CH4 / kt coal, 4.1 t CH4 / PJ) were used for coal and oil. Default emission factor for fugitive CH4 upstream emission 160 t CH4 / PJ was selected for natural gas, which was the default value for USA and Canada. Please provide evidence proving the relevant system element (gas production and / or processing/ transmission/ distribution) is predominantly of recent vintage and built	~~CL 13~~	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			and operated to international standard. For the CO2 emission from LNG, default value 6 t CO2 /TJ was used in compliance with AM0029. The total net leakage effects are negative, the PDD assumes leakage is zero, which is conservative.		
E.2.6. Are uncertainties in the leakage estimates properly addressed?	/1/	DR	No uncertainties in the leakage estimates have been identified.		OK
E.3. Baseline Emissions *The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.*					
E.3.1. Have the most relevant and likely operational characteristics and baseline indicators been chosen as reference for baseline emissions?	/1/	DR	For the first crediting period, option 1 – the BM calculated according to ACM0002 was selected as the baseline emission.		OK
E.3.2. Are the baseline boundaries clearly defined and do they sufficiently cover sources and sinks for baseline emissions?	/1/	DR	Yes. The China Southern Power Grid was defined as the baseline boundary. This is the grid boundary provided by the DNA of China. (http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf)		OK
E.3.3. Are the GHG calculations documented in a complete and transparent manner?	/1/	DR	Yes. For the calculation of OM, The simple OM emission factor calculation method is selected because low cost must		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			run projects constitute less than 50% of the total grid generation and data is not available for applying the dispatch data analysis. The aggregated generation and fuel consumption data are used as more disaggregated data are not available in the CSPG. Country specific data for the net calorific value (NCV_i) of each type of fossil fuel, which can be obtained from the China Energy Statistical Yearbook /12/, the IPCC 2006 default values /13/ for the oxidation factor of each type of fossil fuel and the total electricity delivered to the CSPG selected are deemed reasonable. Vintage data for the years 2003, 2004 and 2005 are used for the OM emission factor calculation, which are the most recent data available. The OM is calculated to be 1.0119 tCO_2/MWh as a generation-weighted average for the three years,. For the calculation of BM, Because plant specific fuel consumption and electricity generation data is not publicly available in China, the EB guidance on the request for deviation titled "Application of AM0005 and AMS-I.D in China" /14/ has been applied as follows: - Use of capacity additions for estimating the build margin emission factor for grid		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			electricity. - Use of weights estimated using installed capacity in place of annual electricity generation. - Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM). Following the EB's guidance the build margin is calculated with the following parameters: - The capacity addition from the years 2003 to 2005 is chosen and reach 21.42% of total installed capacity /11/ - The weight of installed capacity additions for thermal power plant is accounted for 74.01% of total installed capacity additions. /11/ - The standard coal consumption of 343.33gSCE/kWh is used to determine the BM emission factor, which is deemed conservative. The coal consumption efficiency of 343.33 g SCE/kWh is defined as the best technology commercially available in China by the DNA of China /15/.		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			- The local net calorie value of each kind of fuel, the local carbon content of each kind of fuel and the IPCC 2006 default value of carbon oxidization factor are used to calculate the BM. /13/ - The BM is calculated as 0.6748 tCO_2/MWh The weights ω_{OM} and ω_{BM} are selected as 0.5 and 0.5, respectively, as stipulated for hydropower project by ACM0002, version 06. The combined margin 0.8498 tCO_2/MWh is fixed *ex-ante* for the first crediting period. The most recent data at the time of PDD are used to calculate the OM emission factor. The OM emission factor is derived from the China Energy Statistical Yearbooks 2004, 2005, and 2006 /12/; the BM calculation is derived from the China Power Electric Power Yearbooks 2004, 2005, and 2006 /11/. For the calculation of the identified fuel emission factor $EF_{BL,CO_2,Option3} = \frac{COEF_{BL}}{\eta_{BL}} \times 3.6 GJ/MW$ $= \frac{\frac{25.8 \times 44/12}{1000}}{39.42\%} \times 3.6 = 0.8639$ tCO_2/MWh.		

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
			The lowest emission factor among the three options is the BM emission factor (0.6748 tCO_2/MWh), which is selected to be the baseline emission factor. Therefore, baseline emissions are calculated as $BE_{y} = EGP_{J,y} * EF_{BL,co2,y}$=3 611 000 MWh*0.6748 tCO_2/MWh =2 436 703 tCO_2/year		
E.3.4. Have conservative assumptions been used when calculating baseline emissions?	/1/	DR	Yes. See above.		OK
E.3.5. Are uncertainties in the GHG emission estimates properly addressed in the documentation?	/1/	DR	Yes.		OK
E.3.6. Have the project baseline(s) and the project emissions been determined using the same appropriate methodology and conservative assumptions?	/1/	DR	Yes.		OK
E.4. Emission Reductions *Validation of ex-ante estimated emission reductions*.					
E.4.1. Will the project result in fewer GHG emissions than the baseline scenario?	/1/	DR	Yes.		OK
F. Environmental Impacts *Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.*					
F.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/		No. Please provide more analysis of the environmental impacts in the PDD	~~CL 14~~	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
F.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	The original EIA was performed in 1995 and it was approved by the State Environment Protection Administration (SEPA) on 5 September 1995. The approval letter for the revised EIA needs to be provided.	~~CL 15~~	OK
F.1.3. Will the project create any adverse environmental effects?	/1/	DR	No significant adverse environmental effect has been identified.		OK
F.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	No transboundary environmental impacts has been identified.		OK
F.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	No amendant needs to be conducted to the project activity.		OK
F.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	See also in F.1.1	~~CL 15~~	OK
G. Stakeholder Comments *The validator should ensure that a stakeholder comments have been invited and that due account has been taken of any comments received.*					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR	Yes. Stakeholders in the neighbouring area, including residents, workers, soldiers and representatives from different government agencies were invited to comments. 210 questionnaires were collected.		OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes. Meetings and questionnaires were used to invite comments.		OK
G.1.3. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried	/1/	DR	Yes. It was carried out in accordance with the regulations.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl	Final Concl
out in accordance with such regulations/laws?					
G.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Yes.		OK
G.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	There were some negative comments during the consultation process. Please address how due account has been taken.	~~CL 16~~	OK

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Table 3 Resolution of Corrective Action and Clarification Requests

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
CAR 1: The LoA from DNA of China has not been obtained.	A.3.2 A.3.3	DNA of China issued the LoA on 13 December 2006.	OK. The CAR is closed.
CL 1: The project has started construction before the CDM validation process started. Evidences on how incentive from CDM has been seriously considered during the decision making process are needed.	B.2.7	Evidences on how incentive from CDM has been seriously considered during the decision making process has been provided in latest PDD.	OK The CAR is closed.
CL 2 The training plan for the project needs to be provided.	A.2.5	The training plan for the Qianwan Project has been provided on 30 August 2007, which is including NOSA and HSE etc.	OK The CL is closed.
CL 3 The choice of the CSPG as the system boundary needs to be sufficiently justified.	B.1.2	China Southern Power Grid (CSPG) consist of five provincial power grids, including Guangdong, Guangxi, Guizhou, Yunnan, Hainan. Qianwan project belong to CSPG, and will be connected to the Shenzhen Municipal Power Grid (SMPG), then Guangdong Provincial Power Grid (GPPG) and SCPG.	OK The CL is closed.
CL 4 The Feasibility Study Reports (FSRs), as the data source of the baseline determination, and references supporting the calculation need to be provided. The calculation spreadsheets for the levelized cost of electricity production	B.2.1	All the parameters needed and formula have been provided to DOE.	OK The CL is closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
need to be provided to confirm the calculation.			
CL 5 Tariff of electricity could also be a sensitive parameter and need s to be justified with sensitivity analysis.	B.2.7	Tariff of electricity has been included in the sensitive analysis in PDD.	OK The CL is closed.
CL 6 All data related to the calculation of IRR need to be supported with solid references or evidences, and should be provided to DNV. (for example, where does the 0.41/kWh come from?)	B.2.7	All data related to the calculation of IRR need to be supported with solid references or evidences have been provided to DNV.	OK The CL is closed.
CL 7 All literature and sources need to be provided in details. Web links are needed in detailed specific webpage, not just a homepage.	B.2.9	The full addresses have been supplied in the revised PDD.	OK The CL is closed.
CL 8 Data source for the 25 years of the project lifetime.	C.1.1	It has been change to 20 years as per FSR.	OK The CL is closed.
CL 9 The project is choosing option 1 – the build margin (BM) as the baseline. And according to AM0029, it needs to be estimated and monitored ex post according to ACM0002. No plan has been provide for the monitoring of BM in the crediting period.	D.4.1	The monitoring of BM has been supplemented in latest PDD.	OK The CL is closed.
CL 10 No procedures related to the registration,	D.6.2	The procedures related to monitoring measurement and reporting has been	OK

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
monitoring, measurement and reporting has been identified. Procedures related to training, emergency treatment, monitoring calibration, maintenance, data handling and data adjustment need to be included in the Monitoring Manual. The manual has not been identified.		added in the revised PDD	The CL is closed.
CL 11 For the natural gas used in the project, NCV from China Energy Statistics Yearbook is used. Yet the LNG will be imported from Australia. NCV data from supplier need to be used.	E.1.3	The value of NCV used in PDD for calculation is conservative. Because the gas supply contract only provide GCV not NCV, that is why we select national value as the basis for ex-ante calculation. In fact if assuming a factor of 1.1, the national value is well in the range of GCV provided in the gas supply contract. In addition, NCV data need to monitor and provide by ex-post, so we select the national value in revised PDD.	OK The CL is closed.
CL 12 Uncertainties related to the project emission need to be properly addressed.	E.1.4	The value of NCV is uncertain in the GHG emissions estimate, because the value is only from gas supplier and variable. So the national value is selected as the basis for ex-ante calculation. In fact if assuming a factor of 1.1, the national value is well in the range of GCV provided in the gas supply contract. Because NCV data need to monitor and provide by ex-post, so we select the national value in	OK The CL is closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
		revised PDD.	
CL 13 Default emission factor for fugitive CH4 upstream emission 160 t CH4 / PJ was selected for natural gas, which was the default value for USA and Canada. Please provide evidence proving the relevant system element (gas production and / or processing/ transmission/ distribution) is predominantly of recent vintage and built and operated to international standard	E.2.5	After discussed with DNV, Default emission factor for fugitive CH4 upstream emission 296 t CH4 / PJ was selected for natural gas, which was the Other oil exporting countries/Rest of world. We've selected the value in revised PDD.	OK
CL 14 Please provide more analysis of the environmental impacts in the PDD	F.1.1	More analysis of the environmental impacts have been provided in latest PDD.	OK The CL is closed.
CL 15 The original EIA was performed in 1995 and it was approved by the State Environment Protection Administration (SEPA) on 5 September 1995. The approval letter for the revised EIA needs to be provided.	F.1.2	The revised EIA was completed on October 2001 and the approval letter for the revised EIA was issued by the State Environment Protection Administration (SEPA) on 22 February 2002. The approval letter has been provided to DOE.	OK The CL is closed.
CL 16 There were some negative comments during the consultation process. Please address how due account has been taken.	G.1.5	It is clarified that none of negative comments were received in the consulation process. The project owner received two negative comments during PDD public period in website and have replied it one by one. The responds have been provided to DOE.	OK The CL is closed.
CL 17	B.2.7	3611 GWh is net electricity generation	OK, but the following further

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
The project activity is expected to generate 3611 GWh of energy per annum at a plant load factor of 38%. This PLF is very low and needs further justification.		of the project per year. The total electricity generation per year is 3700GWh, which is calculated in May 2004 in the revision of the Financial Assessment (FA) by Guangdong Electric Power Design Institute /20/ based on LNG Sales and Purchase Contract /19/. So the PLF is 39%. The project activity is to improve the peak regulating capacity of power grid, therefore the utilization hour of project and PLF is lower. It could be demonstrated from the data of some similar projects in China that the proposed project's PLF is at the similar level with them. It is verified for PLF in the similar projects.	clarifications are requested: i) What was the electricity generation and the gas price in the FSR? ii) How was the electricity generation and the gas price calculated in the revised financial analysis based on the LNG sales and purchase contract? iii) Is the annual electricity generation also limited by other contracts, such as the power purchase agreement? iv) One unit was commissioned in December 2006, what were the annual operating hours of this unit?
CL 17 (continued) i) What was the electricity generation and the gas price in the FSR? ii) How was the electricity generation and the gas price calculated in the revised financial analysis based on the LNG sales and purchase contract? iii) Is the annual electricity generation also limited by other contracts, such as the power purchase agreement? iv) One unit was commissioned in December 2006, what were the annual operating hours	B.2.7	i) In the FSR, the annual electricity generation is 3791GWh. The annual net electricity generation is 3700GWh, which is excluding auxiliary electricity consumption. The gas price is 1.442 Yuan/m^3, which is including transportation, gasification, pipeline charges and VAT." ii) Electricity generation= annual gas volume/ power generation gas consumption (annual gas volume: sourced from LNG sales and purchase	OK. Adequate clarifications were provided and DNV reviewed the documents referred to in the response. This CL is closed.

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
of this unit?		contract power generation gas consumption: sourced from FSR). Calculation formula: sourced from LNG sales and purchase contract. Calculated by Guangdong Electric Power Design Institute." iii) According to the PPA, the annual electricity generations of Qianwan project's units are subject to the provincial electricity generation plan regulated by Electricity Power Administration Department of Guangdong Province. According to the PPA, the annual electricity generations of Qianwan project's units are subject to the provincial electricity generation plan regulated by Electricity Power Administration Department of Guangdong Province. In the meanwhile, the annual electricity generation also limited by the sales and purchase contract. iv) "Re: The annual operating hours of 1# unit in 2007 is about 2449 hours, which is sourced from the project participant's actual operating data . (According to the revised Financial Analysis, it was estimated to be 2409 hours)."	
CL 18	B.2.7	AM0029 version 1 was approved by EB	OK. The validation process was

Draft report corrective action requests and requests for clarifications	Ref. to Table 2	Summary of project participants' response	Final conclusion
PDD was prepared in September 2006 and the validation commenced with the publication of the PDD on 16 September 2006, A explanation for the time gap between starting construction of the project and the starting of the validation process is requested.		on May 19, 2006 and the project activity started validation by DNV in September 2006.	commenced few months after AM0029 was approved.

APPENDIX B

CERTIFICATES OF COMPETENCE

CERTIFICATE OF COMPETENCE

Sequoia (Qingxing) A

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 4 January 2008

Michael Lehmann
Technical Director, International Climate Change Services

CERTIFICATE OF COMPETENCE

Zhi Ang (Walter) Tang

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	--	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	--		

Høvik, 30 October 2007

Michael Lehmann
Technical Director, International Climate Change Services

CERTIFICATE OF COMPETENCE

Wilson Tang

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 13		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes		
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes		

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director

CERTIFICATE OF COMPETENCE

Hendrik Brinks

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	--	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1, 2, 3 & 12		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	*AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I*	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	*ACM0006, AM0007, AM0015, AM0036, AM0042*	Yes
ACM0004, ACM0012	Yes		

Høvik, 30 October 2007

Michael Lehmann
Technical Director, International Climate Change Services

CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	--
CDM Verifier:	Yes	***JI Verifier:***	--
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 5		
Technical Reviewer for (group of) methodologies:			
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes		

Høvik, 30 October 2007

Michael Lehmann
Technical Director, International Climate Change Services

CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJI-i1

GHG Auditor:	Yes		
CDM Validator:	Yes	***JI Validator:***	Yes
CDM Verifier:	Yes	***JI Verifier:***	Yes
Industry Sector Expert for Sectoral Scope(s):	Sectoral scope 1, 2, 3		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	*AM0027*	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029, AM0045	Yes	*AM0030*	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	*AM0031*	Yes
ACM0004, ACM0012	Yes	*AM0032*	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	*AM0035*	Yes
ACM0007	Yes	*AM0038*	Yes
ACM0008	Yes	*AM0041*	Yes
ACM0009, AM0008, AMS-III.B	Yes	*AM0034*	Yes
AM0006, AM0016, AMS-III.D, ACM0010	Yes	*AM0043*	
AM0009, AM0037	Yes	*AM0046*	
AM0013, AM0022, AM0025, AM0039, AMS-III.H, AMS-III.I	Yes	*AM0047*	
AM0014	Yes	*AMS-II.A-F, AM0044*	Yes
AM0017	Yes	*AMS-III.A*	Yes
AM0018	Yes	*AMS-III.E, AMS-III.F*	Yes
AM0020	Yes		
AM0021, AM0028, AM0034, AM0051	Yes		
AM0023	Yes		
AM0024	Yes		

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director