



VALIDATION REPORT

Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. in China

REPORT No. 2007-0960

REVISION No. 01



VALIDATION REPORT

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DNV CERTIFICATION AS

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Client: Trading Emissions PLC.	Client ref.: Mr. Des Godson

Project Name: Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.

Country: China

Methodology: AM0029

Version: 01

GHG reducing Measure/Technology: natural gas for power generation

ER estimate: 937 067 tCO₂e

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 Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd., as described in the PDD version 03 of 19 July 2007, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0029 version 01. DNV thus requests the registration of the project as a CDM project activity.

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Report title: Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. in China		
Work carried out by: Ming (Mindy) Yue, Michael Lehmann		
Work verified by: Einar Telnes		

Key words:

- 1 Climate Change
- 2 Kyoto Protocol
- 3 Validation
- 4 Clean Development Mechanism

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VALIDATION REPORT

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 ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EIA	Environmental impact assessment
EPB	Environmental Protection Bureau
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval.
MP	Monitoring Plan
MVP	Monitoring and Verification Plan
NCV	Net Calorific Value
ECPG	East China Power Grid
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PJ	Peta joule
UNFCCC	United Nations Framework Convention on Climate Change
SCE	Standard coal equivalent



VALIDATION REPORT

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY – VALIDATION OPINION	6
2	INTRODUCTION	6
2.1	Objective	7
2.2	Scope	7
3	METHODOLOGY	7
3.1	Desk Review of the Project Design Documentation	7
3.2	Follow-up Interviews with Project Stakeholders	9
3.3	Resolution of Outstanding Issues	10
3.4	Internal Quality Control	11
3.5	Validation Team	12
4	VALIDATION FINDINGS	12
4.1	Participation Requirements	12
4.2	Project Design	12
4.3	Baseline Determination	13
4.4	Additionality	15
4.5	Monitoring	16
4.6	Estimate of GHG Emissions	17
4.7	Environmental Impacts	20
4.8	Comments by Local Stakeholders	20
4.9	Comments by Parties, Stakeholders and NGOs	20
	The common practice of the PDD version 03 dated 19 July 2006 has included the similar project activities in east China region. References of the analysis have been verified by DNV. The natural gas project in Zhejiang Banshan Natural Gas Power Plant and Huaneng Shanghai Gas Turbine Power Plant are also applying for CDM project.	22

Appendix A: Validation Protocol

Appendix B: Certificates of Competence



VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS has performed a validation of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country 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 fulfillment of stated criteria.

The host party is China and the Annex I party is the United Kingdom. Both countries fulfill the participation criteria and have approved the project and authorized the project participants. The DNA of China has confirmed that the project will assist in achieving sustainable development.

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

The project correctly applies AM0029 version 01: "Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas".

By generating electricity using natural gas, the project will displace fossil fuel based grid electricity. The project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is 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 average 937 067 tCO₂e per year over the first 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.

Adequate training and monitoring procedures have been implemented.

In summary, it is DNV's opinion that the "Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd." in China as described in the PDD version 03 of 19 July 2007 meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology AM0029 version 01. DNV thus requests the registration of the "Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd." as a CDM project activity.

2 INTRODUCTION

Trading Emissions PLC has commissioned DNV to perform a validation of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. 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



VALIDATION REPORT

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. The validation team has, based on the recommendations in the Validation and Verification Manual /21/ 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 consists 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, version 01 of 17 September 2006 and version 03 of 19 July 2007.
- /2/ DNA of China, Host country approval letter, 17 January 2007.
- /3/ DNA of the United Kingdom, Annex I country approval letter, 4 July 2007.
- /4/ Zhejiang Power Design Institute, Feasibility study report of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.
- /5/ National Development and Reform Commission, Project approval letter [2005] No. 345



VALIDATION REPORT

- /6/ Southwest Electric Power Institute, Environmental impacts assessment report of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.
- /7/ National Environment Protection Bureau, Approval letter of the EIA of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.
- /8/ Ministry of State Land & Resource, Approval letter on the occupation of lands for the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. [2005]No.505
- /9/ Zhejiang Provincial 11th electric power 5-year expansion plan
- /10/ Natural Gas Pipeline Net Planning of Zhejiang Province, Gui-497, September 2005
- /11/ Notice regarding the price of natural gas, National Development and Reform Commission, 28 September 2003, [2003] No. 1323.
- /12/ Natural Gas Price by Price Bureau of Zhejiang Province, 2006
- /13/ Picture of the Project Construction Opening Ceremony
- /14/ Hangzhou Branch of China EverBright Bank, Letter of Confirmation and Reply to the Submission of Supplementary Loan Evaluation Materials, 30 January 2005.
- /15/ Bulletin of questionnaire investigation of local residents comments on the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.
- /16/ Opinion on the CDM project development of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. by the Development and Reform Commission of Hangzhou City, Xiaoshan District.
- /17/ Opinion on the CDM project development of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. by the People's Government of Hangzhou City, Xiaoshan District.
- /18/ Opinion on the CDM project development of the Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. by the Environmental Protection Bureau of Hangzhou City, Xiaoshan District.
- /19/ Questionnaires of stakeholder consultation
- /20/ Project Monitoring Plan
- /21/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*. <http://www.vvmanual.info>
- /22/ AM0029 Approved methodology "baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas", version 01 of 19 May 2006
- /23/ ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources" version 06 of 19 May 2006.
- /24/ CDM Executive Board: Tool for the demonstration and assessment of additionality,



VALIDATION REPORT

version 03 (EB29), 16 February 2007

- /25/ China Electric Power Yearbook 2001-2005
- /26/ China Energy Statistical Yearbook 2002-2005
- /27/ DNA of China, Grid boundaries and their emission factors, December 2006.
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1053.pdf>
- /28/ Chinese National Standard GB2589-81
- /29/ CDM EB, Answer to DNV's request for deviation of Chinese project activities from AM0005, received on 1 December 2005. To be found on
<http://cdm.unfccc.int/Projects/Deviations>
- /30/ IPCC 2006 Guidelines for National Greenhouse Gas Inventories
- /31/ State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003
- /32/ Approval letter of the Establish of Zhejiang Provincial Natural Gas Development Co., Ltd. by Zhejiang Provincial Development and Plan Commission, [2001]758

Main changes between the version published for the 30 days stakeholder commenting period and the final version submitted for registration:

- *Changes related to the CARs and CLs identified in the DNV's draft validation report.*
- *The IPCC default values used for OM & BM calculation have been changed from IPCC 1996 to IPCC 2006.*

3.2 Follow-up Interviews with Project Stakeholders

The following personnel have been interviewed and/or provided additional information to the presented documentation.

	Date	Name	Organization	Topic
/33/	2006-12-12	Mr. Huang Jianhua	Zhejiang Provincial Development and Reform Commission	- Local and central policy on natural gas and power generation - Project background
/34/	2006-12-12	Mr. Zhong Jianzhong Mr. Sheng Yongxiao	Zhejiang Province Energy Group. Co. Shareholder of the project owner	➤ Project technology, operation, maintenance and monitoring capability. ➤ Project additionality. ➤ Project monitoring and management plan. ➤ Project approval status (incl. EIA approval, CDM project approval status) Stakeholder consultation process.



VALIDATION REPORT

/35/	2007-05-31	Mr. Zhao Xiaoming	Zhejiang Provincial Natural Gas Development Co., Ltd.	➤ Natural gas supply in Zhejiang Province ➤ Natural gas pipeline grid Planning of Zhejiang Province
/36/	2006-12-12 2007-05-31	Mr. Feng Yougen	Xiaoshan Power Plant of Zhejiang Southeast Electric Power Co., Ltd.	➤ Project implementation ➤ Project management and future monitoring plan.
/37/	2006-12-12	Mr. Zhang Yanlong Mr. Ding Zhaoming	China Carbon Technology Co. Ltd. Project owner	➤ Applicability of selected methodology. ➤ Baseline determination. ➤ Emission reductions calculation. ➤ Emission reduction monitoring plan
/38/	2007-05-31	Mr. Jiang Haoxiang	Trading Emission Plc. CERs buyer	➤ Project implementation and monitoring

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation is to resolve any outstanding issues which need to be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol is 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.

The validation protocol consists of three tables. The different columns in these tables are described in the figure below. The completed validation protocol for Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd. 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 (CARs) 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		
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>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.</i>		

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<i>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.</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>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.</i>	<i>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.</i>	<i>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.</i>

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
<i>If the conclusions from the draft Validation are either a CAR or a CL, these should be listed in this section.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL is explained.</i>	<i>The responses given by the project participants during the communications with the validation team should be summarised in this section.</i>	<i>This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".</i>

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.



VALIDATION REPORT

3.5 Validation Team

Role/Qualification	Last Name	First Name	Country
Team leader/ CDM validator	Yue	Ming (Mindy)	China
CDM validator	Rescalvo	Miguel	Norway
Sector expert	Lehmann	Michael	Norway
Technical Reviewer	Telnes	Einar	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.

4.1 Participation Requirements

The project participants are Zhejiang Southeast Electric Power Co., Ltd. of China and Trading Emissions PLC of the United Kingdom. The host Party China and the Annex I Party UK meet all relevant participation requirements.

The DNA of China has issued a Letter of Approval (LoA) /2/ on 17 January 2007, authorizing Zhejiang Southeast Electric Power Co., Ltd. as a project participant and also confirming that the project assists in achieving sustainable development.

The DNA of the United Kingdom has issued a LoA /3/ on 4 July 2007, authorizing Trading Emissions PLC as a project participant.

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 is a natural gas for power generation project activity with a rated output of 806 MW using natural gas as fuel and exporting the generated electricity to the East China Power Grid (ECPG).

The proposed project activity applies large-scale gas-steam combined cycle power generation technology provided by SIEMENS. The project involves two sets of gas-steam combined cycle power generation units with each unit including a gas turbine, heat recovery steam generator, steam turbine and generator /4/. The technology utilized in this project will be transferred to the project owner and intensive training will be required.

The project has been approved by the National Development and Reform Commission /5/. The project is expected to bring social, environmental and economic benefits, thus contributing to the sustainable development objectives of the Chinese government.



VALIDATION REPORT

The project started construction on 28 December 2005^{*} /13/. Evidence that the incentives from CDM has been seriously considered before the project start is represented by the Letter of Confirmation and Reply to the Submission of Supplementary Loan Evaluation Materials, which is issued by the Hangzhou Branch of China EverBright Bank on 30 January 2005, which states that the project owner was seeking for the assistance of CDM to improve the financial attractiveness of the proposed project and the potential CDM benefits would be evaluated and considered when the bank granted loans to the project /14/.

The expected operational lifetime of the project activity is 21 years. A renewable crediting period of 7 years is selected, starting on 1 December 2007 or the official registration date of project, whichever is later. The emission reductions are estimated to be 937 067 tCO₂e per year and 6 559 469 tCO₂e over the first seven-year crediting period.

4.3 Baseline Determination

The project applies the approved consolidated baseline methodology AM0029 “*Baseline methodology for grid-connected electricity generating plants using natural gas*” (version 01) /22/. The project fulfils the conditions under which AM0029 is applicable:

- It is a new power plant generating electricity with natural gas.
- The electricity generated will be supplied to the ECPG, of which geographic and system boundaries could be clearly defined.
- Natural gas is sufficiently available in the region. This is supported by following reasons: The natural gas supply in Zhejiang Province will be operated by Zhejiang Provincial Natural Gas Development Co., Ltd /32/. According to the *Natural Gas Pipeline Net Planning of Zhejiang Province (Gui-497, September of 2005)* provided by Zhejiang Provincial Natural Gas Development Co., Ltd., the natural gas supply of Zhejiang Province comes from three sources: natural gas transferred from west, from the East China Sea gas field and imported LNG. The total supply of natural gas will reach $81.98 \times 10^8 \text{Nm}^3/\text{a}$, $129.66 \times 10^8 \text{Nm}^3/\text{a}$ and $175.04 \times 10^8 \text{Nm}^3/\text{a}$ in 2010, 2015 and 2020 respectively. This has been confirmed by the Zhejiang Provincial Natural Gas Development Co., Ltd. /35/ and the *Natural Gas Pipeline Net Planning of Zhejiang Province (Gui-497, September of 2005)*, which has been verified by DNV /10/. According to the feasibility study report of the project, the expected consumption of natural gas by the proposed project is $5.3354 \times 10^8 \text{Nm}^3/\text{a}$, which is very small compared with the total amount of natural gas available in Zhejiang Province. Furthermore, in the *Natural Gas Pipeline Net Planning of Zhejiang Province*, the natural supply to industry user, natural gas power plant, natural gas thermal plant and civil use is ensured. For the above reason, the consumption of the natural gas will not lead to any leakage effects except for the leakage addressed by the baseline methodology.

^{*} <http://www.zjol.com.cn/05zjnews/system/2005/12/29/006422333.shtml>



VALIDATION REPORT

The PDD has identified four plausible baseline scenarios in compliance with the baseline methodology AM0029, including:

- (1) The project activity not implemented as a CDM project;
- (2) Power generation using natural gas, but technologies other than the project activity;
- (3) Power generation technologies using energy sources other than natural gas;
- (4) Import of electricity from connected grids, including the possibility of new interconnections.

Natural gas for power generation using technologies other than the project activity, i.e. simple cycle gas turbine, has relatively lower thermal efficiency and is presently rarely used[†]. According to the official statistics /9/, all other natural gas projects that have recently been constructed, are under construction or are being planned in east China power grid, and which can deliver the similar service as the proposed project, apply or will apply the same technology as the proposed project - Large-scale gas-steam combined cycle for power generation. Therefore the alternative (2) is excluded. Alternative (3) includes construction of (a) a renewable energy power plant with comparable capacity or electricity generation; (b) a nuclear power plant with comparable capacity or electricity generation; and (c) coal-fired power plant with comparable capacity or electricity generation (300MW and 600MW desulfurized coal-fired power units). Among the renewable energy options, pumped storage hydropower project can provide peak load regulation service as the proposed project. However, the limited hydro resources within the project boundary have been largely exploited[‡] and the remaining will have low utilization hours, small installed capacity and are difficult to be developed[§]. Therefore alternative (a) of (3) is not able to provide the similar service as the proposed project and is not deemed realistic. A nuclear power plant cannot deliver peak load power service^{**} thus (b) of (3) is also not a reasonable scenario. Alternative (4) is the import of electricity from the Central China Power Grid (CCPG) to the East China Power Grid^{††} (ECPG). A large part of the CCPG consists of hydro plants that must utilize the water resources when available, and is thus considered as must-run. As a consequence of this, the CCPG has little extra peak capacity and cannot export electricity to the ECPG in a manner that would provide peak load regulation. Import of electricity from the CCPG can thus not be considered as a credible baseline scenario. All the relative references have been verified by DNV and the above justification is deemed reasonable.

As analyzed above, scenario (1) *the project activity not implemented as a CDM project* and scenario (c) of (3) *300MW and 600MW desulfurized coal-fired power plants* are selected as realistic and credible alternatives. The economically most attractive baseline scenario alternative has been identified using investment analysis. The levelized cost of electricity production in RMB/kWh^{‡‡} has been used as financial indicator for investment analysis.

The levelized costs of electricity production for the proposed project not undertaken as a CDM project, 300MW coal-fired power plant and 600MW coal-fired power plant are calculated using the formula in the *Projected Costs of Generation Electricity* published by

[†] <http://www.hdrqw.com/news/20060505-31.htm>

[‡] <http://www.shp.com.cn/zhwx/showcontent.asp?id=18090>

[§] White Book on Energy of Zhejiang, the People's Government of Zhejiang Province, Zhejiang Daily, 09 Decemember, 2004

^{**} Safety Management Rules on Nuclear Power Generation, Ministry of Power Industry

^{††} engine.cqvip.com/content/tv/95255x/1998/016/003/gc23_tv1_3203139.pdf

^{‡‡} Exchange rate: 1US Dollar=8.2RMB in 2004

VALIDATION REPORT

IEA^{§§}, resulting in 0.387 RMB/kWh, 0.214 RMB/kWh and 0.172 RMB/kWh. The sources of the data used in the calculation and the calculation process have been verified by DNV.

To further demonstrate that the financial attractiveness of a 600MW coal-fired power unit is robust to reasonable variations in the critical assumptions for the alternatives (e.g. fuel prices and the load factor), a sensitivity analysis has been conducted. The sensitivity analysis confirms that the construction of a 600MW coal-fired power plant is likely to remain the most economically scenario under the reasonable variations of the assumptions.

Hence, the construction of a 600MW coal-fired power plant is identified as the baseline scenario.

The spatial extent of the project boundary includes the project site and all power plants connected physically to the baseline grid as defined in ACM0002, i.e. ECPG.

Emission sources and gases included in the project boundary are:

	<i>GHGs involved</i>	<i>Description</i>
<i>Baseline emissions</i>	<i>CO₂</i>	<i>CO₂ from power generation in baseline, main emission source.</i>
<i>Project emissions</i>	<i>CO₂</i>	<i>On site fuel combustion due to the project activity.</i>
<i>Leakage</i>	<i>CH₄</i>	<i>Fugitive CH₄ 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.</i>

4.4 Additionality

The additionality of the project has been established using steps required by AM0029 version 01.

Step 1: Benchmark investment analysis:

The IRR of 8 % for total investment of project has been selected as the benchmark and this is deemed properly justified /31/. Based on the data in the feasibility study report and the *Notice regarding the price of natural gas* by National Development and Reform Commission /11/, the project IRR without CER revenues is calculated at 6.34 %, which shows that the project is not financially attractive compared to the benchmark in the absence of CDM benefits.

Four factors are considered in the sensitivity analysis: total investment, natural gas price, annual output and annual O&M cost. The electricity tariff is not considered in the sensitivity analysis because the tariff is strictly regulated by the government. When the total investment, annual output and annual O&M cost fluctuates within the range of -10% and 10%, the IRR for total investment will still not reach the benchmark. If the natural gas price decreases by

^{§§} Projected Costs of Generating Electricity- 2005 Update, International Energy Agency, http://www.iea.org/Textbase/publications/free_new_Desc.asp?PUBS_ID=1472



VALIDATION REPORT

about 8%, the IRR of the project will exceed the benchmark. However this is very unlikely considering the increased price of natural gas^{***}. As a matter of fact, according to the document issued by the Price Bureau of Zhejiang Province in 2006, the natural gas supplied to NG power plant has increased to 1.445 RMB/Nm³/12/.

In conclusion, the investment analysis and sensitivity assessment have shown that the project activity is unlikely to be the most financially attractive option.

Step 2: Common practice analysis:

Natural gas power plants with similar scale in east China region are listed in the common practice presentation in the PDD. The source of the information has been verified by DNV^{†††}. Among them, the Fujian Xiamendongbu CCGT power project is totally invested by an international company, East Asia Power (EAP) China, which is owned by RGM International, a multinational corporation with the head office in Singapore; this can enjoy financial benefits in the Fujian Province^{†††}, which is likely to make it more financially attractive than the proposed project. Other natural gas power plants are applying for CDM support due to the same financial unattractiveness as the proposed project activity^{§§§}.

Step 3: Impact of CDM registration:

The investment analysis done in year 2004 indicated that the IRR for total investment of the project is 6.34%, which is lower than the benchmark. The project owner thus considered applying for CDM assistance, which is reflected in the Letter of Confirmation and Reply to the Submission of Supplementary Loan Evaluation Materials by the Hangzhou Branch of China EverBright Bank on 30 January 2005 /14/. The project IRR will increase to 10.32% with the CDM revenues, thus increase the investment return and directly reduce investment risk. The registration of the proposed project as a CDM project will also promote the development of the technology of gas-steam combined cycle power generation.

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 project applies the approved monitoring methodology AM0029 version 01 "Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel" /22/. The selected monitoring methodology is justified to be applicable for the project activity.

4.5.1 Parameters determined ex-ante

The build margin emission factor (BM), combined margin emission factor (CM) and the emission factor of the technology (and fuel) identified as the most likely baseline scenario are

*** <http://www.ocn.com.cn/reports/2006123tianranqi.htm>
 ††† http://nyj.ndrc.gov.cn/ggtz/t20050913_42429.htm
http://www.ndrc.gov.cn/zcfb/zcfbgg/gg2006/t20060315_63031.htm
 ††† <http://www.fjzt.gov.cn/display.jsp?articleId=2385>
<http://www.huaxia.com/gd/csdh/xm/00258615.html>
 §§§ <http://cdm.unfccc.int/Projects/Validation/index.html>
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1272.pdf>

VALIDATION REPORT

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 below.

4.5.2 Parameters monitored ex-post

The methodology requires monitoring of the following:

- 1) EG_y , Electricity supplied to the grid by the project.

The electricity supplied to the grid by the project will be measured continuously and recorded monthly. This data will be cross verified against the sales receipt from the grid company.

- 2) BM , Build margin emission factor.

Calculated *ex-post* as per ACM0002

- 3) $FC_{f,y}$, 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.

- 4) $NCV_{f,y}$, 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.

- 5) $OXID_f$, Oxidation factor

IPCC default value

- 6) $EF_{CO2,f,y}$, 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.

- 7) $COEF_y$, CO_2 emission coefficient

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

- 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 /20/ 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

- 1) Baseline emissions

For the baseline emission, the emission factor of the first crediting period is determined from the below 3 options:

Option 1: The build margin, calculated according to ACM0002 /23/; and

VALIDATION REPORT

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

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

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

For the calculation of the operating margin (OM) 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 due to the fact that more disaggregated data are not available in the ECPG. Country specific data for net calorific value (NCV_i) of each type of fossil fuel, the IPCC 2006 default values for the oxidation factor of each type of fossil fuel and the total electricity delivered to the ECPG are selected and are deemed reasonable. Vintage data for the years 2002, 2003 and 2004 from China Energy Statistics Yearbooks and China Electric Power Yearbooks 2003-2005 editions are used for operating margin calculation. The OM is calculated to be 0.917 tCO₂/MWh as a generation-weighted average for the three years.

Because plant specific fuel consumption and electricity generation data is not public available in China, DNV requested guidance from the CDM Executive Board for a deviation of the baseline methodology of AM0005 and received the following answers**** which are deemed to be applicable for this project.

- Use of capacity additions for estimating the build margin emission factor for grid 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).

Since AM0005 has been replaced by ACM0002, the application of the above confirmation from EB to this project is deemed to be acceptable.

Following the EB’s guidance the build margin is calculated as follows:

- The capacity additions from the years 2002 to 2004 is chosen and reach 21.7% of total installed capacity.
- The weight of installed capacity additions for thermal power plant is accounted for 86.9% of total installed capacity additions.
- The standard coal consumption of 320 g SCE/kWh is used to determine the BM emission factor, which is deemed conservative. The coal consumption efficiency of 336.66 g SCE/kWh is defined as the best technology commercially available in China (<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1051.pdf>) by the DNA of China.

**** to be found on <http://cdm.unfccc.int/Projects/Deviations>

VALIDATION REPORT

- There are no data available of installed capacity additions for oil and gas power in ECPG. However China Energy Statistics Yearbook (data of 2004) shows that the oil and gas used in ECPG are very small, and only for starting up systems of coal fired power plant, accounting for 3.92%^{††††} of the total CO₂ emissions. It is unlikely that there will be significant additions of gas fired power plant in the ECPG during the first crediting period. So the installed capacity addition for oil and gas power plant being regarded as zero is deemed reasonable.
- The local value of 29.27 GJ/t standard coal equivalent, CO₂ emission factor of IPCC 2006 default value of 0.0946 tCO₂/GJ are used to calculate the BM. The EF_{BM} is calculated as 0.770 tCO₂/MWh.

The weights ω_{OM} and ω_{BM} are selected as 0.5 and 0.5 respectively. The combined margin emission factor EF_{CM} is calculated as 0.844 tCO₂/MWh.

The identified baseline scenario is the construction of 600MW coal-fired power plant. IPCC 2006 default value of 0.0946 tCO₂/GJ is used as $COEF_{BL}$, 36.53% is chosen as η_{BL} the energy efficiency of the 600MW coal-fired power generation unit^{††††}. Thus EF_{BL} is calculated as 0.9323 tCO₂/MWh.

The lowest emission factor among the three options is the BM emission factor (0.770 tCO₂/MWh), which is selected to be the baseline emission factor. Therefore, baseline emissions are calculated as $BE_y = EGP_{J,y} * EF_{BL, CO_2, y} = 2\,525\,250 \text{ MWh} * 0.770 \text{ tCO}_2/\text{MWh} = 1\,944\,445 \text{ tCO}_2/\text{year}$.

2) Project emissions

For the calculation of project emission, NCV of the natural gas, 33.656MJ/Nm³, is from the supplier's report as per the feasibility study report. IPCC default values for EF_{CO_2} (56.1tCO₂/TJ) and for oxidation rate (100%) are also used. The $COEF_{f,y}$ is calculated as 0.001888102 tCO₂/Nm³.

According to the feasibility report, there are no fuels consumed in the proposed project other than natural gas. Therefore, project emissions are calculated as $PE_y = \sum_f FC_{f,y} * COEF_{f,y} = 533$

540 000 Nm³/year*0.001888102 tCO₂/Nm³=1 007 377 tCO₂/year.

3) Leakage

Since no LNG will be used in the proposed project, the leakage emissions result from LNG will not be considered. Therefore leakage emissions are calculated as:

$$LE_y = LE_{CH_4, y} = (FC_y * NCV_y * EF_{NG, upstream, CH_4} - EG_{PJ, y} * EF_{BL, upstream, CH_4}) * GWP_{CH_4}$$

For the calculation of leakage, $EF_{NG, upstream, CH_4}$ takes the default value in AM0029 (296 t CH₄/PJ), $EF_{BL, upstream, CH_4}$ takes the default values in AM0029 (13.4tCH₄/kt coal as underground mines account for about 97% of coal production capacity in China) for calculation. 320 g SCE /kWh is taken as the best technology commercially available for the coal power generation in ECPG. Compared with the value (336.66 g SCE/kWh) specified by Chinese DNA^{††††}, this is deemed conservative. GWP_{CH_4} applies IPCC value of 21. The

^{††††} <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1051.pdf>



VALIDATION REPORT

leakage from project activity is calculated to be -85989 tCO₂/year therefore can be assumed to be zero.

4) Emission reductions

$ER_y = BE_y - PE_y - LE_y = 1\,944\,445 \text{ tCO}_2/\text{year} - 1\,007\,377 \text{ tCO}_2/\text{year} - 0 = 937\,067 \text{ tCO}_2/\text{year}$.

4.7 Environmental Impacts

An environmental impact assessment (EIA) has been conducted according to Chinese laws and regulations. The potential environmental impacts have been sufficiently identified. No significant environmental impacts are expected from the project activity. The National Environmental Protection Bureau (EPB) approved the project activity /7/.

4.8 Comments by Local Stakeholders

A stakeholder consultation has been carried out during the Environmental Impact Analysis. Questionnaires were distributed to local residents and all the respondents supported the project construction /6/. The project developer also carried out a consultation in July of 2006. This includes inviting different stakeholders from the local government and the local residents /15//19/. The survey was conducted through distributing and collecting responses to questionnaires. Totally 34 questionnaires returned out of 34 with 100% response rate. No negative comments have been received. All the respondents support the development of the project. The support letters from the local Development & Reform Commission, People's Government and Environmental Protection Bureau have been verified by DNV /16//17//18/.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of 17 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 4 October 2006 to 2 November 2006.

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

Comment by:

☐ Accredited NGO

☐ Party

☐ Stakeholder

Comment by: [long yan, Huanneng environmental Consulting](#)

Inserted On: 2006-10-10

Subject: natural gas supply

Comment: It's well known that several provinces in China, include Zhejiang, is short of natural gas.
<http://www.nanfangdaily.com.cn/southnews/sjjj/chanjing/200603130604.asp>

If this project is full of gas (especially when it signed concrete gas purchase and sale letter of intent with Zhejiang Provincial Natural Gas Development Company Ltd., then it must make other non CDM natural gas usages short of



VALIDATION REPORT

gas, for example, several Zhejiang natural gas power stations. This is leakage.

page 9: "Explain about confirming baseline emission factor of regional power grid in China± announced by Office of National Coordination Committee on Climate Change , National Development and Reform Commission (NDRC) of China (DNA of China) on Aug. 8th, 2006"

As I know, it has been withdrawn.

page 17: sensitivity analysis is not understandable. What does the writer want to say?

page 18: if you can get business loan, where is the investment barrier?

page 19: What is the reason the writer defines "250MW" is not at similar scale of this project? I can understand 10mw is small scale compare with this project. But a few hundred MW are basically same.

Comment by: [Li, Green Capital Consulting Company](#)

Inserted On: 2006-10-10

Subject: Comments on the Common Practice

Comment: Dear Sir,

We would like to provide the comments regarding this PDD, base on our current knowledge of the NGCC market in the PRC, as follows F

1. In the common practice analysis of the PDD, it stated

"At present, the completed natural gas power plants with similar scale and power generation technique with the proposed project include: Huaneng Shanghai Gas Turbine Power Plant located in Shanghai City, with the installed capacity of 3*390MW, entirely put into production on July 30th, 2006; Gas-steam Combined Cycle Power Plant located in Jingbian County, Shaanxi Province, with the installed capacity of 2*300MW, entirely put into production in the late of 2005."

As a matter of fact, there are other NGCC projects were already put into operations including Zhejiang Banshan Natural Gas Power Plant.

2. In the common practice analysis of the PDD, it stated,

"It enjoys the favorable natural gas price and has the guarantee on pool purchase price."

As a matter of fact, According to the gas purchasing agreement signed, Huaneng Shanghai Gas Turbine Power Plant enjoys no favorable natural gas price with much higher price of 1.35 RMB/m3;



VALIDATION REPORT

3. Huaneng Shanghai Gas Turbine Power Plant started the CDM development activities since Oct last year, and the PDD designed was actually conducted right after the methodology of AM0029 approved by the EB on the May 13.

Sincerely yours

Dr Li Li, Project Manager, Green Capital Consulting Company

Ms. Huang, Jin-feng, Consultant, Green Capital Consulting Company

How DNV has considered the comment received in its validation:

DNV has confirmed with Zhejiang Provincial Natural Gas Development Co., Ltd. (the natural gas supplier of Zhejiang Province /32/) that the natural gas supply of Zhejiang Province comes from three sources: natural gas transferred from west, the East China Sea gas field and as imported LNG. According to the *Natural Gas Pipeline Net Planning of Zhejiang Province (Gui-497, September of 2005)* provided by Zhejiang Provincial Natural Gas Development Co., Ltd., the total supply of natural gas will reach $81.98 \times 10^8 \text{Nm}^3/\text{a}$, $129.66 \times 10^8 \text{Nm}^3/\text{a}$ and $175.04 \times 10^8 \text{Nm}^3/\text{a}$ in 2010, 2015 and 2020 respectively. According to the feasibility study report of the project, the expected consumption of natural gas by the proposed project is $5.3354 \times 10^8 \text{Nm}^3/\text{a}$, which is small compared with the total amount of natural gas available in Zhejiang Province. Furthermore, in the *Natural Gas Pipeline Net Planning of Zhejiang Province (Gui-497, September of 2005)*, the natural supply to industry user, natural gas power plant, natural gas thermal plant and civil use is ensured.

It has also been confirmed that with Zhejiang Provincial Natural Gas Development Co., Ltd. that the natural gas from Sichuan Province oil and gas field will begin to supply Zhejiang Province from late 2008 and the annual natural gas supply will reach $18 \times 10^8 \text{Nm}^3$. Therefore the natural gas is sufficiently available in the region and except the leakage addressed by the baseline methodology, the consumption of the natural gas will not lead to any leakage effects.

The baseline emission factor of regional power grid in China announced by Office of National Coordination Committee on Climate Change, National Development and Reform Commission (NDRC) of China (DNA of China) on 8 August 2006 was withdrawn. However, it is reissued on 15 December 2006, which can be found on <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2006/2006121591135575.pdf>.

Contents related to page 17, 18 and 19 in the PDD that was published for the 30 days stakeholder commenting period have been revised in the investment analysis and common practice of the PDD version 03 dated 19 July 2007 and deemed to be reasonable.

The common practice of the PDD version 03 dated 19 July 2006 has included the similar project activities in east China region. References of the analysis have been verified by DNV.



VALIDATION REPORT

The natural gas project in Zhejiang Banshan Natural Gas Power Plant and Huaneng Shanghai Gas Turbine Power Plant are also applying for CDM project^{****}.

^{****} <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1346.pdf>

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Xiaoshan Power Plant's NG Power Generation Project of Zhejiang Southeast Electric Power Co., Ltd.

VALIDATION REPORT



APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion
About Parties		
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
The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
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	OK
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
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
Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK

VALIDATION REPORT



Requirement	Reference	Conclusion
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
About Additionality		
Reduction in GHG emissions shall be additional to any that would occur in the 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	OK
About forecast emission reductions and environmental impacts		
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
For large-scale projects only		
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
About stakeholder involvement		
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
Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project	CDM Modalities and Procedures §40	OK

VALIDATION REPORT



Requirement	Reference	Conclusion
design document and comments have been made publicly available.		
Other		
The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
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
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
The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
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

VALIDATION REPORT**Table 2 Requirements Checklist**

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>					
Are the project's spatial boundaries (geographical) clearly defined?	/1/	DR I	Yes. The project is located in Xiaoshan District, Hangzhou City of China. The project has geographical coordinates with longitude of 120°14'E and latitude of 30°03'N.		OK
Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	The project's system boundaries are defined as the project site and all power plants connected physically to the baseline grid as defined in ACM0002, i.e., the East China Power Grid (ECPG).		OK
Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
Which Parties and project participants are participating in the	/1/	DR	The participants of the project are Zhejiang Southeast Electric Power Co., Ltd. of China		OK

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

CDM Validation 2007-0960, rev. 01



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
project?			and Trading Emissions PLC of UK.		
Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?	/1/ /2/	DR	The letters of approval from the DNA of the UK have not been obtained.	~~CAR-1~~	OK
Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR	China ratified the Kyoto Protocol on 30 August, 2002. The UK ratified the Kyoto Protocol on 31 May 2002. Both Parties participate in the CDM on a voluntary basis. Both Parties involved have designated national authorities for the CDM. DNA of China is the National Development and Reform Commission (NDRC). DNA of UK is the Department for Environment, Food and Rural Affairs.		OK
Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR	The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards China.		OK
Technology to be employed <i>Validation of project technology focuses on the project</i>					

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
Does the project design engineering reflect current good practices?	/1/	DR	Yes. The project design engineering reflects current good practices in China.		OK
Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?	/1/ /4/	DR I	The proposed project activity applies large-scale gas-steam combined cycle power generation technology provided by SIEMENS. This technology is more advanced compared with simple-cycle gas turbines and medium combined cycle gas turbine technology in China.		OK
Does the project make provisions for meeting training and maintenance needs?	/1/	DR I	Yes. The training has been provided by project owner and manufacturer.		OK
Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
Has the host country confirmed that the project assists it in achieving sustainable development?	/1/ /2/	DR	The letter of approval from the DNA of China confirming that the project is in line with the sustainable development policies of the host country has been received.		OK



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Will the project create other environmental or social benefits than GHG emission reductions?	/1/ /6/ /7/	DR	Yes. The project will also mitigate local environmental pollution caused by coal-fired power plants.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
Does the project apply an approved methodology and the correct version thereof?	/1/ /22/	DR	Yes. AM0029 (version 01) is chosen for the project.		OK
Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR I	It is a new power plant generating electricity with natural gas; The electricity generated will be supplied to the CCPG, of which geographic and system boundaries could be clearly defined; In the PDD, the description of availability of natural gas in the region is not sufficient. Solid evidence and reference are needed.	CL1	OK
Baseline Scenario Determination					

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i>					
What is the baseline scenario?	/1/	DR	The provision of equivalent amount of the annual power output of East China Power Grid where the project connected into is claimed to be the project's baseline scenario.		OK
What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR I	The PDD has identified four plausible baseline scenarios and has analyzed the feasibility of them. However the economically most attractive baseline scenario alternative should be identified using investment analysis. The levelized cost of electricity production in \$/kWh should be used as financial indicator for investment. A sensitivity analysis shall be performed for all alternatives.	~~CL 2~~	OK
Has the baseline scenario been determined according to the methodology?	/1/	DR	This can be concluded after CL 2 is clarified.	~~CL 2~~	OK
Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	This can be concluded after CL 2 is clarified.	~~CL 2~~	OK

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	This can be concluded after CL 2 is clarified.	~~CL 2~~	OK
Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	This can be concluded after CL 2 is clarified.	~~CL 2~~	OK
Have the major risks to the baseline been identified?	/1/	DR	Yes. The major risk to the baseline is dramatic increase of power generation from renewable sources in future, such as wind and hydro.		OK
Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
Is the project additionality assessed according to the methodology?	/1/ /22/	DR I	The additionality of the project has been established using the “Tool for the demonstration and assessment of additionality” approved by the CDM-EB. Please follow the steps required by AM0029 version 01 to demonstrate the additionality.	~~CL 3~~	OK
Are all assumptions stated in a transparent and conservative manner?	/1/	DR	In the benchmark investment analysis, the IRR of 8 % for total investment of project has		OK

VALIDATION REPORT



CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/4/ /9/ /10/ /11/ /12/		been selected as the benchmark and was properly justified ^{§§§§} . Based on the data in the feasibility study report and the <i>Notice regarding the price of natural gas</i> by National Development and Reform Commission, the project IRR without CER revenues is below the benchmark, which shows that the project is not financially attractive compared to the benchmark in the absence of CDM benefits. However, the underlying calculation of IRR needs to be presented in the PDD to make the process transparent.	CL-4	
			Three factors are considered in the sensitivity analysis: static total investment, pool purchase price and fuel price. However, it has not been demonstrated whether the conclusion regarding the project financial attractiveness is robust to reasonable variations in these assumptions.	CL-5	

§§§§ Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003

VALIDATION REPORT



CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			In the common practice analysis, not all the similar activities in the region have been identified.	~~CL-6~~	
Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /4/ /9/ /10/ /11/ /12/	DR I	Yes. The data used in calculating IRR and sensitivity analysis are from the feasibility study and government approval letter.		OK
If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/ /13/ /14/	DR I	Yes. The project started construction on 28 December 2005. From the Letter of Confirmation and Reply to the Submission of Supplementary Loan Evaluation Materials by the Hangzhou Branch of China EverBright Bank on 30 January 2005, it is demonstrated that the incentive from CDM has been seriously considered by the project owner before the project start and the bank also considered the benefits and feasibility of CDM when it evaluated the loan grant.		OK
Calculation of GHG Emission Reductions – Project emissions					

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /22/	DR	Yes. It is in compliance with AM0029 and documented in a complete and transparent manner.		OK
Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Yes.		OK
Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Yes.		OK
Calculation of GHG Emission Reductions – Baseline emissions <i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>					
Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /22/	DR	The emission factor of the first crediting period is determined from the 3 options as stipulated in AM0029. BM has been approved to be the lowest option. In the calculation of OM, the electricity		OK

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

CDM Validation 2007-0960, rev. 01



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			imported from connected system has not been considered. As for the calculation of BM, insufficient information is available, which makes the process not transparent.	~~CL-7~~ ~~CL-8~~	
Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	This can be concluded after CL 7 and CL 8 is clarified.	~~CL-7~~ ~~CL-8~~	OK
Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	The oil and gas power generation in the BM calculation have not been considered as their proportion in total power generation is quite minor. For the purpose of <i>ex-ante</i> estimation, the detailed specific data from gas and oil power generation is not available. But according to China Energy Statistics Yearbook 2005 (data vintage of 2004), the oil and gas used in ECPG are only for starting up systems of coal fired power plant, accounting for ca. 3.92% of the total CO ₂ emissions. The uncertainty level is quite low for <i>ex-ante</i> estimation. Since the BM has been calculated to be the lowest option, the determination will be made <i>ex-post</i> .		OK

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Calculation of GHG Emission Reductions – Leakage <i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i>						
Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?		/1/	DR	Yes. $EF_{NG, upstream, CH_4}$ takes the default value in AM0029 (296 t CH ₄ /PJ), $EF_{BL, upstream, CH_4}$ takes the default values in AM0029 (13.4tCH ₄ /kt coal) for calculation. 320 g SCE /kWh is taken as the best technology commercially available for the coal power generation in ECPG. Compared with the value (336.66 g SCE/kWh) specified by Chinese DNA††††, this is deemed conservative. GWP_{CH_4} applies IPCC value of 21. The leakage from project activity is assumed to be zero as the leakage calculated as per the formula in AM0029 is negative.		OK
Have conservative assumptions been used when calculating the leakage emissions?		/1/	DR	Yes.		OK
Are uncertainties in the leakage emission estimates properly addressed?		/1/	DR	Same as the uncertainties for the baseline calculation.		OK

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

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	Yes.		OK
Monitoring Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>					
Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/ /22/	DR	Yes. The project applies the approved monitoring methodology AM0029 version 01 "Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel" and is explained in a complete and transparent manner.		OK
Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	Yes.		OK
Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for</i>					



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>reliable and complete project emission data over time.</i>					
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	No. Parameters related to the project emission, such as the Net Calorific Value of fuel “f”, the oxidation factor, emission factor for fuel ‘f’ and other fuels consumed in the project activity, need to be monitored.	~~CAR-2~~	OK
Are the choices of project GHG indicators reasonable and conservative?	/1/	DR	Refer to CAR 2.	~~CAR-2~~	OK
Is the measurement <i>method</i> clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR	Refer to CAR 2.	~~CAR-2~~	OK
Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	Refer to CAR 2.	~~CAR-2~~	OK
Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR I	The accuracy of all the meters needs to be addressed and the procedures on how to deal with erroneous measurements have not been in place.	~~CL-9~~	OK
Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR I	Measurement interval needs to be described.	~~CL-9~~	OK



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/	DR I	Yes.		OK
Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR I	Yes.		OK
Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR I	Yes.		OK
Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/ /22/	DR	The electricity supplied to the grid by the project will be measured continuously and recorded monthly. This data will be cross verified against the sales receipt from the grid company. In section B.6.2 of the PDD, parameters related to the calculation of operating margin emission factor (OM) and build margin emission factor (BM) are listed. According to AM0029, if either option 1 (BM) or option 2	~~CAR-3~~	OK



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			(CM) are selected, they will have to be estimated <i>ex-post</i> . Since option 1 (BM) is selected, it also needs to be monitored.		
Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	Refer to CAR 3.	~~CAR 3~~	OK
Is the measurement <i>method</i> clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR	The electricity delivered to the grid will be measured continuously and recorded monthly. Electricity sales invoices will also be obtained for cross check. Refer to CAR 3.	~~CAR 3~~	OK
Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	The electricity meters will be subject to regular maintenance and testing in accordance with stipulation of the applicable industry, national standards and relevant agreements to ensure accuracy. Refer to CAR 3.	~~CAR 3~~	OK
Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	The accuracy of all the meters needs to be addressed and the procedures on how to deal with erroneous measurements have not been	~~CAR 3~~	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation 2007-0960, rev. 01

VALIDATION REPORT



CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			in place.		
Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Measurement interval needs to be described.	~~CL-9~~	OK
Is the <i>registration, monitoring, measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	Yes.		OK
Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	Yes.		OK
Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes.		OK
Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	Leakage from the project activity is assumed to be zero as the total net leakage effects are negative when calculating these in accordance with the methodology.		OK
Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable</i>					

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<i>and complete to monitor sustainable performance over time.</i>					
Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	DNA of China 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
Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
Is the authority and responsibility of overall project management clearly described?	/1/	DR I	Yes.		OK
Are procedures identified for training of monitoring personnel?	/1/	DR I	No. The procedures for training of monitoring personnel have not been identified.	~~CL-10~~	OK
Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR I	The procedures for emergency preparedness for cases where emergencies can cause unintended emissions have not been identified.	~~CL-10~~	OK
Are procedures identified for review of reported results/data?	/1/	DR	The procedures for review of reported	~~CL-10~~	OK

VALIDATION REPORT



CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
		I	results/data have not been identified.		
Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR I	The procedures for corrective actions in order to provide for more accurate future monitoring and reporting have not been identified.	CL 10	OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/ /13/	DR	The project started construction on 28 December 2005. The pictures of the Project Construction Opening ceremony and the relative website confirming the start date have been verified by DNV. Its operational life time is 21 years.		OK
Is the start of the crediting period clearly defined and reasonable?	/1/	DR	Yes. A renewable crediting period (7 years) is selected and the crediting period of the project will be started on 1 December 2007.		OK
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/	DR	Yes. The environmental impacts during construction period and operation period are		OK



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			elaborated in the PDD, mainly about impacts of waste water, noise and solid waste on the environment.		
Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /6/ /7/	DR	Yes. An EIA is required. The EIA of the project has been approved by the National Environment Protection Bureau.		OK
Will the project create any adverse environmental effects?	/1/ /6/	DR I	There are no significant adverse environmental effects for the project according to the EIA.		OK
Are transboundary environmental impacts considered in the analysis?	/1/	DR I	There are no transboundary environmental impacts foreseen for the project.		OK
Have identified environmental impacts been addressed in the project design?	/1/	DR	Yes. No amendment needs to be conducted to the project activity.		OK
Does the project comply with environmental legislation in the host country?	/1/	DR	Yes.		OK
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					

VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
Have relevant stakeholders been consulted?	/1/ /15/ /19/	DR I	Yes. All the relevant stakeholders including villagers and governmental organizations are consulted.		OK
Have appropriate media been used to invite comments by local stakeholders?	/1/ /15/ /19/	DR I	The survey was conducted through distributing and collecting responses to questionnaires. Totally 34 questionnaires returned out of 34 with 100% response rate. The support letters from the local Development & Reform Commission, People's Government and Environmental Protection Bureau are also invited for comments.		OK
If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	/1/	DR I	Yes. The stakeholder consultation is in accordance with what is required by the relative regulations.		OK
Is a summary of the stakeholder comments received provided?	/1/	DR	Yes.		OK
Has due account been taken of any stakeholder comments received?	/1/ /16/ /17/	DR I	No negative comments have been received. All the respondents support the development of the project. The project owner will carry		OK



VALIDATION REPORT

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/18/		out strict environmental monitoring and mitigation measures during the construction and operation phase as per the EIA report of the project activity to minimize the environmental impacts.		

VALIDATION REPORT

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 1 The Letter of Approval from the DNA of the United Kingdom has not been obtained.	A	The LoA from DNA of UK has been received.	OK. The Letter of Approval from the DNA of the United Kingdom was issued on 4 July 2007. The CAR is closed.
CAR 2 Parameters related to the project emission, such as the Net Calorific Value of fuel “f”, the oxidation factor, emission factor for fuel ‘f’ and other fuels consumed in the project activity, need to be monitored. Measurement method and equipment of the parameters need to be described.	B	The relevant parameters, which should be monitored, have been added.	OK. All parameters required by AM0029 such as the Net Calorific Value of fuel “f”, the oxidation factor, emission factor for fuel ‘f’ and other fuels consumed in the project activity are included in the PDD. Corresponding monitoring methods are also described. The CAR is closed.
CAR 3 In section B.6.2 of the PDD, parameters related to the calculation of operating margin emission factor (OM) and build margin emission factor (BM) are listed. According to AM0029, if either option 1 (BM) or option 2 (CM) are selected, they will have to be	B	The parameters related to the calculation of operating margin (OM) and build margin (BM) have been added to the monitoring section.	OK. All parameters related to the calculation of operating margin (OM) and build margin (BM) are monitored in B.7.1. The CAR is closed.

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
estimated <i>ex-post</i> . Since option 1 (BM) is selected, it also needs to be monitored.			
CL 1 In the PDD, the description of availability of natural gas in the region is not sufficient. Solid evidence and reference are needed.	B	According to the <i>Natural Gas Pipeline Net Planning of Zhejiang Province (Gui-497, September of 2005)</i> , the natural gas supply of Zhejiang Province comes from three sources: natural gas transferred from west, East China Sea gas field and imported LNG. The natural gas supply in the future years is shown in the revised PDD. It shows that compared with the total amount of natural supply in Zhejiang Province, the expected consumption of natural gas by the proposed project is very small. Nature gas is sufficiently available in Zhejiang Province.	OK. The <i>Natural Gas Pipeline Net Planning of Zhejiang Province (Gui-497, September of 2005)</i> has been verified by DNV /10/ and the sufficiently availability of natural gas in Zhejiang Province has been confirmed by the Zhejiang Provincial Natural Gas Development Co., Ltd. /35/ The CL is closed.
CL 2 The PDD has identified several plausible baseline scenarios and has analyzed the feasibility of these. However the economically most attractive baseline scenario alternative should be identified using	B	Four plausible baseline alternatives have been identified and discussed in the revised PDD. The levelized cost of electricity production in \$/kWh analysis and relative sensitivity analysis have been included in the revised PDD.	OK. Plausible baseline scenarios have been identified according to AM0029. The feasibility of all the baseline alternatives has been discussed. An analysis of levelized cost of electricity production

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
investment analysis. The levelized cost of electricity production in \$/kWh should be used as financial indicator for investment. A sensitivity analysis shall also be performed for all alternatives.			in \$/kWh and sensitivity analysis have been performed. The calculation and source of data have been verified by DNV. The CL is closed.
CL 3 The additionality of the project has been established using the "Tool for the demonstration and assessment of additionality" approved by the CDM-EB. Please follow the steps required by AM0029 version 01 to demonstrate the additionality.	B	The additionality of the project has been established according to the requirement of AM0029.	OK. The additionality of the project has been demonstrated following the steps in AM0029. The CL is closed.
CL 4 A benchmark investment analysis is performed while demonstrating the additionality. However the underlying calculation of IRR needs to be presented in the PDD to make the process transparent.	B	The detailed cash flow table for IRR calculation has been presented in Annex 5 of the revised PDD.	OK. The IRR calculation spreadsheet and the sources of the assumptions are verified by DNV. The cash flow table has been added in the PDD. The CL is closed.
CL 5 Three factors are considered in the sensitivity analysis: static total investment, pool	B	Four critical assumptions are considered in the sensitivity analysis in the revised PDD: static total investment, natural gas	OK. The impact of the fluctuation of the static total investment, annual output,

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
purchase price and fuel price. However, it has not been demonstrated whether the conclusion regarding the project financial attractiveness is robust to reasonable variations in these assumptions.		price, annual output and annual O&M cost. It shows that while the annual output and annual Operation & Maintenance cost vary between -10% to 10%, the IRR for total investment will remain below the benchmark 8%. If the natural gas price decreases by 8%, the IRR begins to exceed the benchmark. However, the natural gas price is increasing these years. In the document issued by the Price Bureau of Zhejiang Province in 2006 /12/, the natural gas supplied to NG power plant increased to 1.445 RMB/Nm³. The price of natural gas is expected to keep on increasing in the following years^{*****}, therefore the IRR will not exceed the benchmark 8%. If the statistic total investment decreases by about 9%, the IRR of the project could exceed the benchmark. However, the statistic total investment is unlikely	annual O&M cost and fuel price within the range of -10% and 10% on the IRR for total investment has been discussed and demonstrated in the revised PDD. The referred documents have been verified by DNV and it can be verified that the financial unattractiveness is robust to reasonable variations in the critical assumptions. The CL is closed.

***** <http://www.ocn.com.cn/reports/2006123tianranqi.htm>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		to decrease by 9% considering the high prices of imported equipments, which constitutes the primary part in the total investment. The project investment has already been committed as planned and therefore a decrease of the investment is unlikely.	
CL 6 In the common practice analysis, not all the similar activities in the region have been identified.	B	Similar project activities in east China region are listed and discussed in the common practice analysis.	OK. The references of the similar project activities in the region and the reference for the analysis of the projects are verified by DNV ^{††††} . It can be verified that the project activity cannot be said to represent common practice in the Zhejiang Province even in east China region. The CL is closed.
CL 7 In the calculation of OM, the electricity	B	The electricity imported from connected system has been considered in the OM	OK. The OM calculation has been verified to

†††† http://nyj.ndrc.gov.cn/getz/t20050913_42429.htm
http://www.ndrc.gov.cn/zcfb/zcfbgg/gg2006/t20060315_63031.htm
<http://www.fjit.gov.cn/display.jsp?articleId=2385>
<http://www.huaxia.com/gd/csdh/xm/00258615.html>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
imported from connected system has not been considered.		calculation in the revised PDD.	be in compliance with the methodology. The CL is closed.
CL 8 As for the calculation of BM, insufficient information is available, which makes the process not transparent.	B	BM calculation has been explained in detail in the revised PDD.	OK. The BM calculation process has been included in the PDD. It seems to be transparent and reasonable. The CL is closed.
CL 9 In the monitoring of project emissions and baseline emissions, the accuracy of all the meters needs to be addressed and the procedures on how to deal with erroneous measurements have not been in place. Measurement interval needs to be described.	B	The accuracy of all meters and measurement interval has been added in B.7.1. The procedures on how to deal with erroneous measurements are included in B.7 and the CDM manual of the project.	OK. Relevant contents and procedures have been included. The CL is closed.
CL 10 The procedures for training of monitoring personnel, for emergency preparedness for cases where emergencies can cause unintended emissions, for review of reported results/data and for corrective actions in order to provide for more accurate future monitoring and reporting have not been	B	The procedures for training of monitoring personnel, for emergency preparedness for cases where emergencies can cause unintended emissions, for review of reported results/data and for corrective actions in order to provide for more accurate future monitoring and reporting have	OK. Relevant procedures have been established and included. The CL is closed.



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
identified.		been included B.7 and the CDM manual of the project.	



CERTIFICATE OF COMPETENCE

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-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 & 9		
Technical Reviewer for (group of) methodologies:			
<i>ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G</i>	Yes	<i>AM0021</i>	Yes
<i>ACM002, AMS-I.A-D, AM0019, AM0026, AM0029</i>	Yes	<i>AM0023</i>	Yes
<i>ACM003, ACM0005, AM0033, AM0040</i>	Yes	<i>AM0024</i>	Yes
<i>ACM0004</i>	Yes	<i>AM0027</i>	Yes
<i>ACM0006, AM0007, AM0015, AM0036, AM0042</i>	Yes	<i>AM0028, AM0034</i>	Yes
<i>ACM0007</i>	Yes	<i>AM0030</i>	Yes
<i>ACM0008</i>	Yes	<i>AM0031</i>	Yes
<i>ACM0009, AM0008, AMS-III.B</i>	Yes	<i>AM0032</i>	Yes
<i>AM0006, AM0016, AMS-III.D</i>	Yes	<i>AM0035</i>	Yes
<i>AM0009, AM0037</i>	Yes	<i>AM0038</i>	Yes
<i>AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I</i>	Yes	<i>AM0041</i>	Yes
<i>AM0014</i>	Yes	<i>AM0034</i>	Yes
<i>AM0017</i>	Yes	<i>AMS-II.A-F</i>	Yes
<i>AM0018</i>	Yes	<i>AMS-III.A</i>	Yes
<i>AM0020</i>	Yes	<i>AMS-III.E, AMS-III.F</i>	Yes

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Miguel Rescalvo

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

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

Høvik, 6 November 2006

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Mindy (Ming) Yue

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1

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

Høvik, 24 January 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director