



VALIDATION REPORT

HUADIAN BEIJING NATURAL GAS BASED POWER GENERATION PROJECT IN CHINA

REPORT No. 2008-1196

REVISION No. 02

DET NORSKE VERITAS



VALIDATION REPORT

DET NORSKE VERITAS
CERTIFICATION AS

Climate Change Services

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Date of first issue: 2008-09-26	Project No.: PRJC-11572-2009-CCS-CHN
Approved by: Hendrik W. Brinks	Organisational unit: Climate Change Services
Client: Global Carbon Capital Limited	Client ref.: Mr Xu Wenlin

Project Name: Huadian Beijing Natural Gas based Power Generation Project

Country: China

Methodology: AM0029

Version: 03

GHG reducing Measure/Technology: Power generation using natural gas

ER estimate: 726 820tCO₂/year

Size

☒ Large Scale

☐ Small Scale

Validation Phases:

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

Validation Status

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the "Huadian Beijing Natural Gas based Power Generation Project", as described in the PDD of version 04 dated 30 June 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology AM0029, version 03. DNV thus requests the registration of the "Huadian Beijing Natural Gas based Power Generation Project" as a CDM project activity.

Report No.: 2008-1196	Date of this revision: 2010-02-12	Rev. No. 02
Report title: Huadian Beijing Natural Gas based Power Generation Project in China		
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Key words:

Climate Change

Kyoto Protocol

Validation

Clean Development Mechanism

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Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
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
EF	Emission Factor
EIA	Environmental Impact Assessment
EPB	Environmental Protection Bureau
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MP	Monitoring Plan
NCPG	North China Power Grid
NCV	Net Calorific Value
NDRC	National Development and Reform Commission
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change
SCE	Standard coal equivalent
UK	the United Kingdom of Great Britain and Northern Ireland
VVM	Validation and Verification Manual



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Huadian Beijing Natural Gas based Power Generation Project” in China. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

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

The host Party is China and the Annex I Party is United Kingdom of Great Britain and Northern Ireland. Both Parties fulfil the participation criteria and have approved the project and authorized the project participants. The DNA of China confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology AM0029 “Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas”, version 03.

By generating electricity using natural gas, the project activity displaces fossil fuel intensive grid electricity, thereby resulting in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It has been demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 726 820 tCO₂e per year over the selected 7-year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

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

In summary, it is DNV’s opinion that the “Huadian Beijing Natural Gas based Power Generation Project” in China, as described in the PDD of version 04 dated 30 June 2009, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the simplified baseline and monitoring methodology AM0029, version 03. DNV thus requests the registration of the project as a CDM project activity.



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2 INTRODUCTION

Global Carbon Capital Limited has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Huadian Beijing Natural Gas based Power Generation Project” in China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

2.1 Objective

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

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology. The validation was based on the recommendations in the Validation and Verification Manual.

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.



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3 METHODOLOGY

The validation consisted of the following three phases:

- I a desk review of the project design documents
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

The following sections outline each step in more detail.

3.1 Desk Review of the Project Design Documentation

The following table outlines the documentation reviewed during the validation:

/1/	Mr Xu Wenlin, Mr James Jiang, Project Design Document for Huadian Beijing Natural Gas based Power Generation Project, version 01 dated 23 March 2007, version 03 dated 02 July 2008 and version 04 dated 30 June 2009.
/2/	Letter of approval, DNA of the People's Republic of China on 22 March 2007
/3/	Letters of approval, DNA of United Kingdom of Great Britain and Northern Ireland on 28 August 2009
/4/	Approved baseline methodology AM0029, "Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas", version 03, 16 May 2008.
/5/	CDM Executive Board: Validation and Verification Manual, version 01.
/6/	North China Power Engineering (Beijing) Co., Ltd, Feasibility Study of the project in September 2005 and the approval letter by Beijing Development and Reform Commission on 14 December 2005.
/7/	North China Power Engineering (Beijing) Co., Ltd, the Environmental Impact Assessment of the project in October 2005, and the approval letter by Beijing Environmental Protection Administration on 11 November 2005.
/8/	FSR Supplementary developed by North China Power Engineering (Beijing) Co., Ltd, in 8 December 2005.
/9/	Notice on the Adjustment of Electricity Price of North China Grid issued by the National Development and Reform Commission on 28 June 2006 (NDRC[2006]1228)
/10/	Chinese DNA's guidance for the determination of grid boundaries (18 July 2008) http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/2008/200887164119674.pdf
/11/	China Electric Power Yearbook 2001- 2008.
/12/	China Energy Statistical Yearbook 2000- 2005.
/13/	CDM Executive Board, Guidance for request for deviation titled "Application of AM0005 and AMS-I.D in China" (http://cdm.unfccc.int/Projects/Deviations).
/14/	Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
/15/	State Power Corporation of China. Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects. Beijing: China Electric Power Press, 2003.
/16/	Project construction permission, issued by Hebei Power Engineering Construction Supervision Co., Ltd. on 8 June 2006.
/17/	Beijing Power Grid is directly connected with South Hebei Power Grid, Shanxi Power



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	Grid, West Inner Mongolia Power Grid and Northeast China Grid Http://www.ncgc.com.cn/submodal_dwdd.htm
/18/	CDM Executive Board: Tool to calculate the emission factor for an electricity system Version 01.1
/19/	LI Yangfu, LENG Feiyue. Feasibility Analysis for the Boiler Changing from Burning Oil to Gas. Industrial Boiler, No. 01, 2007
/20/	China's Regional Grid Baseline Emission Factors made publicly available by China's DNA, published on 15 December 2006, NDRC official website: http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1051.pdf
/21/	Gas turbine status and development in China http://www.ntet.net.cn/html/UploadFile/2005620164910134.doc
/22/	Introduction on natural gas power generation http://www.hdrqw.com/news/20060505-31.htm
/23/	Notice on Grid-connecting Operation and Management of Power Plants issued by the State Electric Regulation Commission on 22 July 2003
/24/	Directive Catalog on Industry Structure Adjustment of Beijing (2007 Edition), Degree No. JFG[2007]2039 (Nov. of 2007)
/25/	Natural Gas Supply Analysis for Shaanxing Project Http://www.china5e.com/dissertation/naturalgas/0009.htm .
/26/	Natural Gas Supply by Shaanxing Project No. 2 Line Http://www.cnpc.com.cn/Paper/2006/12/19/Plate1/005.htm
/27/	Sale receipt of the actual price of natural gas for the project
/28/	2nd Natural Gas Pipeline Proposed to Link Gas Field and Beijing Http://english.people.com.cn/200404/13/eng20040413_140287.shtml .
/29/	Provisions on Safety Management of Power Generation in On-grid Nuclear Power Plants (Document No.GWYFG[1997])
/30/	Agriculture Analysis in Beijing Area Http://www.bjagri.gov.cn/detail?model=000000000000000005135&documentid=27345
/31/	Solar PV Development in China Http://market.ccidnet.com/pub/article/c1798_a135747_p1.html
/32/	Thermal Power Engineering Design Reference Cost Guide (2004 edition) published by China Institute of Power Planning and Design.
/33/	CDM Executive Board: Tool for the demonstration and assessment of additionality, version 05.2.
/34/	Equipment Procurement Contract of Turbines and Generators signed between Huadian Beijing Thermal Power Co., Ltd. and Shanghai Electric Group Co. Ltd. on 28 February 2006
/35/	Equipment Procurement Contract of Boilers signed between Huadian Beijing Thermal Power Co., Ltd. and Wuhan Boiler Co. Ltd. on 03 April 2006
/36/	Civil Engineering Contract signed between Huadian Beijing Thermal Power Co., Ltd. and Tianjin Power Construction Company in April 2006
/37/	Sale receipt of the actual electricity tariff for the project
/38/	30 Copies of stakeholders' consultation questionnaires in November 2006



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- /39/ Board Meeting Minutes for Starting CDM Application issued on 15 December 2005
- /40/ CDM Consulting Contract signed between Huadian Beijing Thermal Power Co., Ltd. and Taiwan Carbon Trade Promotion Association on 16 December 2005
- /41/ Term Sheet of Emission Reductions for the project signed between Huadian Beijing Thermal Power Co., Ltd. and Global Carbon Capital Limited on 05 December 2006
- /42/ Circular on Transmitting Document of the National Development and Reform Commission on Issues Concerning Implementation of Coal and Electricity Prices' Linkage in North China Grid (Document No.JFG[2005]883) issued on 28 April 2005.
- /43/ Power Purchase Method for Grid Company in China
[Http://info.westpower.com.cn/cgi-bin/Ginfo.dll?DispLaw&w=westpower&ac=&gr=505&pr=0&lid=15809](http://info.westpower.com.cn/cgi-bin/Ginfo.dll?DispLaw&w=westpower&ac=&gr=505&pr=0&lid=15809)
- /44/ Records for training and maintenance for the project in August 2006.
- /45/ Loan Agreement for Huadian Beijing Natural Gas based Power Generation Project signed between Huadian Beijing Thermal Power Co., Ltd. and bank group in March 2007
- /46/ Circular on Adjustment of the Sales Prices of Non-civil Natural Gas in Beijing (Document No.JFG[2006]1468).
- /47/ Circular of Beijing Municipal Commission of Development and Reform Transmitting Document of the National Development and Reform Commission on Issues Concerning Adjustment of Natural Gas Prices (Document No.NDRCPPrice[2007]2154
- /48/ Circular on Transmitting Circular of the National Development and Reform Commission on Issues Concerning Mediation of Conflict on the Electricity Tariff of North China Grid (Document No.JFG[2004]1061).
- /49/ Circular on Enhancing the Electricity Tariff of North China Grid by the National Development and Reform Commission (Document No.NDRCPPrice[2008]1677).
- /50/ Circular of the National Development and Reform Commission on Requirements on Planning and Construction of Coal Fired Power Plants (Document No.NDRCEnergy[2004]864)
- /51/ South Hebei Power Grid lacks the capacity of peak load regulation
[Http://www.huanghua.gov.cn/html/200701/09/092348572.htm](http://www.huanghua.gov.cn/html/200701/09/092348572.htm)
- /52/ Shanxi Power Grid lacks the capacity of peak load regulation
[Http://blog.sina.com.cn/s/blog_4b4ad05b010008h5.html](http://blog.sina.com.cn/s/blog_4b4ad05b010008h5.html)
- /53/ West Inner Mongolia Power Grid lacks the capacity of peak load regulation
[Http://www.nmgdlxw.cn/readNews.asp?id=4307](http://www.nmgdlxw.cn/readNews.asp?id=4307)
- /54/ Northeast China Grid suffers from lacks the capacity of peak load regulation
[Http://www.sxcoal.com/energy/2009/02/17/290640/article.html](http://www.sxcoal.com/energy/2009/02/17/290640/article.html)
- /55/ The data reported for other similar natural gas power generation projects registered or requesting registration as CDM projects in China, with Reference No: 2439, 2383, 2382, 2344, 1927, 1915, 1898, 1884, 1859, 1828, 1381, 1373, 1368, 1344, 1343, 1320, 1304, 1243 and 1227
<http://cdm.unfccc.int/Projects/projsearch.html>
- /56/ Decree No. 70 of Guoshuifa [2003] issued by the State Administration of Taxation on 18 June 2003



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- /57/ Quarterly analysis report for power industry issued by Beijing Guoyanwang Information Co. Ltd. in 2006
http://fjgyw.fjinfo.gov.cn/DRCNet.Channel.Web/Calling/call_quarter/dlhy.doc
- /58/ Development of Energy Distribution System
<http://www.hzjingwei.gov.cn/list.asp?id=4975>
- /59/ Coal prices statistics in 2004 in China
<http://www.drcnet.com.cn/DRCNet.Common.Web/DocViewSummary.aspx?docid=-131350&leafid=1654>
- /60/ Statistics of heat generation for Huadian Beijing Natural Gas based Power Generation Project in 2009 issued by Huadian Beijing Thermal Power Co., Ltd. on 28 January 2010
- /61/ Transfer of new cycle technology for thermal power industry
<http://www.chinacements.com/news/2009/3-18/C102121892.htm>
- /62/ To close and stop small coal-fired power plants in China
<http://www.amr.gov.cn/qikanshow.asp?articleid=392&cataid=9>
- /63/ China NDRC and National Construction Committee, "Economic Evaluation Code and Parameter for Construction Project (Version 3), 2006
- /64/ New approved CDM projects by NDRC until 31 January 2007
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2406.pdf>
- /65/ Approved CDM by DNA of UK
http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/intl_strat/mechanisms/clean_developm/clean_developm.aspx
- /66/ Settlement Report of Construction Completion for Huadian Beijing Natural Gas based Power Generation Project issued by Chinese Huadian Power Construction Technological and Economic Centre on 12 December 2009

The main changes between the version of the PDD published for the globe stakeholder consultation process and the final version of the PDD submitted for registration:

- Issues addressing the CARs and the CLs raised in this report and related to the new requirements and Guidelines from EB38-EB48 regarding financial analysis, project start date and CDM consideration.
- OM and BM are updated with the most recent data for calculation of the grid emission factor available at the time of submission of PDD for validation.

After reviewing the revised PDD, DNV issued this final validation report and opinion.

3.2 Follow-up Interviews with Project Stakeholders

On 21 August 2008, DNV performed site visit and interviews with project stakeholders to confirm selected information and to resolve issues identified in the document review. Representatives of Huadian Beijing Thermal Power Co., Ltd., and representatives of



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Additional Consulting & Engineering and Global Carbon Capital Limited were interviewed. The main topics of the interviews are summarised in the table below.

	Date	Name	Organization	Topic
/67/	2008-08-21	Zhong Dong, Engineer in Production and Technology Department	Huadian Beijing Thermal Power Co., Ltd	<ul style="list-style-type: none"> – Project background information – Project technology, operation, maintenance and monitoring capability – Project additionality – Project financial structure – Project monitoring and management plan – Project approval status – Stakeholder consultation process – Status of Chinese LoA
/68/	2008-08-21	Pan Tao, Senior consultant Liu Lucia, Junior consultant	Additional Consulting & Engineering	<ul style="list-style-type: none"> – Project design document – Baseline determination – Emission reductions calculation – Project additionality
/69/	2008-08-21	King Shan, Representative in Beijing office XU Wenlin, Project manager Wu Xia, Technical engineer	Global Carbon Capital Limited	<ul style="list-style-type: none"> – Status of Annex I Party's LoA

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed 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 the "Huadian Beijing Natural Gas based Power Generation Project" is enclosed in Appendix A to this report.



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

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

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

Validation 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



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3.4 Internal Quality Control

The validation report underwent a technical review. The technical reviews were performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

3.5 Validation Team

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit	Reporting	Supervision of work	Technical review	Expert input
CDM validator / technical team leader / methodology expert	Lehmann	Michael	Oslo			✓	✓		
GHG auditor	Tang	Zhiang	China	✓	✓	✓			
Sector expert	Kakaraparthi	Raman Venkata	India						✓
Technical reviewer (applicant for draft report)	Brinks	Hendrik	Oslo					✓	
Technical reviewer	Chandrashekhara	Kumaraswamy	India					✓	

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



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4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation (version 04 of 30 June 2009).

4.1 Participation Requirements

The project participant from the host Party China is Huadian Beijing Thermal Power Co., Ltd., and the project participant from the Annex I Party the United Kingdom of Great Britain and Northern Ireland is Global Carbon Capital Limited. Both the participating Parties, i.e. China as the host Party and the United Kingdom of Great Britain and Northern Ireland as the Annex I Party, meet all the participating requirements as per the Kyoto Protocol.

The DNA of China has issued the Letter of Approval (LoA) /2/ on 22 March 2007 authorizing Huadian Beijing Thermal Power Co., Ltd. as a project participant and also confirm that the project assists in achieving sustainable development. The LoA of China was provided to DOE and it was identified from the web site of NDRC /64/. The DNA of the United Kingdom of Great Britain and Northern Ireland has also issued the LoAs /3/ on 28 August 2009 for Global Carbon Capital Limited. The LoA of United Kingdom was provided to DOE and it was identified from the web site of the Department of Energy and Climate Change from United Kingdom /65/

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

4.2 Project Design

The project activity “Huadian Beijing Natural Gas based Power Generation Project” is a power generation project using natural gas. The project, located within Fengtai district of Beijing, has geographical coordinates of 116°15'E and 39°50'N. The project has an installed capacity of 560 MW (2 * 280 MW). Power will be generated in the two combined cycle gas turbines. The project system consists of gas turbines (from German manufacturer Siemens) and steam turbines (from Shanghai Turbine Co. Ltd.), waste heat recovery boilers (from Wuhan boiler Co. Ltd.) and generators. The project activity is expected to generate 1 929 GWh of energy per annum and the net electricity supplied to grid is approximately 1 862.45 GWh per year /6/. The electricity generated will be fed to the North China Power grid (NCPG).

The signature of Equipment Procurement Contract of Turbines and Generators on 28 February 2006 /34/ was the earliest real action for the project, which is deemed as the starting date of the project activity (refer to section 4.4 for the detailed description).

The project selects a renewable crediting period of seven years, starting on 1 January 2010 or the date of registration, whichever is later. The designed operating life of the project is 20 years /20/.



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The project's power generation will replace the power generated by the existing power plants and likely capacity additions in the NCPG resulting in an estimated emission reduction of 726 820 tCO₂ annually.

The project description is to the consideration of DNV complete and accurate.

4.3 Baseline Determination

The project applies the approved baseline methodology AM0029, Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas /4/, version 03.

The application of the baseline methodology is justified as it has been demonstrated that:

- The proposed project is the construction and operation of a new natural gas fired grid-connected power generation plant connected to the North China Power Grid /6/. Hence, it meets the requirement that "The project activity is the construction and operation of a new natural gas fired grid-connected electricity generation plant" stated in the methodology.
- The project activity provides electricity to the North China Power Grid/10/. The geographic and system boundaries of the North China Power Grid can be clearly defined and the information pertaining to the grid and used to estimate baseline emissions is publicly available. Hence, the project meets the requirement that "the geographical/physical boundaries of the baseline grid can be clearly identified and information pertaining to the grid and estimating baseline emissions is publicly available" stated in the methodology.
- Natural gas is sufficiently available in the region. Shaanjing No. 1 line and Shaanjing No. 2 line will supply the natural gas for the project /6/, which is sourced from the Changqing gas field with total natural gas reserves of 4180 billion m³/25/. The Shaanjing No. 1 line started operating in October 1997 /6/ and the Shaanjing No. 2 line started operating on December 2006 /26/. The estimated total gas supply capacity to Beijing by Shaanjing No.1 line and Shaanjing No.2 line is 15.3 billion m³ per year /6/., 6.0 billion m³ of gas supply capacity had been achieved for Beijing by the end of 2005 and 20 billion m³ of gas supply capacity will achieved in 2015 for three cities including Beijing /19/. The demand for natural gas in Beijing in 2008 is 5.8 billion m³ and will grow to 8.5 billion m³ in 2014 /28/. So any other project of the same size, using annually 0.43 billion m³, can be built in Beijing without reducing the natural gas supply to any other customer in the crediting period. So it can be concluded that the natural gas is sufficiently available in the region.

In conclusion, DNV is of the opinion that the baseline methodology is applicable and justified for the project activity.

1. Identify plausible baseline scenarios.

The following alternatives are identified,

- The proposed project activity not implemented as a CDM project. This is a plausible and eligible baseline scenario, i.e. Natural Gas power generation using combined cycle gas turbine (CCGT) without considering CDM.



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- Power generation using natural gas, but technologies other than the proposed project activity. Two types of power plants are included mainly: single cycle gas turbine power plants and single cycle steam turbine power plants. Single cycle gas turbine power plants are not practical because the waste heat in the exhaust gas from gas turbine is commonly recovered by a waste heat recovery boiler and there is no large-scale single cycle natural gas turbine power generation project which is operated or under construction in China now /21/. Single cycle steam turbine power plants are not practical because the thermal efficiency of single cycle natural gas steam turbine power generation technology is lower and this technology is used rarely now /22/. So this alternative is not a reasonable alternative.
- Power generation technologies using energy sources other than natural gas, i.e.
 - Hydro Power Generation
 - Wind Power Generation
 - Nuclear Power Generation
 - Biomass power generation
 - Solar PV power generation
 - Oil-fired Power Generation
 - Coal-fired Power Generation

Oil fired power generation and hydro power generation are not plausible alternatives because the use of fuel oil and the total installed capacity of hydropower in North China Grid has declined from 2002 to 2005/12/. Wind power generation and nuclear power generation are not plausible alternatives because they can not provide peak load balancing function as the project /29/. Biomass power generation is not a plausible alternative because there are no economically exploitable biomass resources for the project /30/. Solar PV power generation is not comparable in generation capacity because the maximum installed capacity of the solar PV farm in China is only 8 MW /31/. For coal fired power plants, units with installed capacity of more than 100 MW could provide peak load balancing services /23/. However, the construction of conventional coal fired generators with installed capacity equal to or less than 300 MW is restricted in China/24/. Therefore, only sub critical coal fired power generation technology with the unit installed capacity of 600 MW and supercritical coal fired power generation technology with the unit installed capacity of 600 MW in China can provide alternative function for the peak load balancing for coal fired power plants and are plausible alternatives for the project activity.

- Import of electricity from connected grids, including the possibility of new interconnections. This is not a feasible option as the connected grid suffers from electricity shortage /6/ and it can not deliver outputs and services comparable to the project activity with peak regulation capacity from other power grids or new interconnections. This is due all grids connected with Beijing Power Grid /17/ suffering from lack of capacity of peak load regulation /51/-/54/.

Hence, the following alternatives are realistic and credible baseline alternatives:

- the proposed project activity not implemented as a CDM project
- 600MW sub-critical coal-fired power plant Coal /Sub critical
- 600MW super-critical coal-fired power plant Coal /Super critical

DNV considers the list of realistic and credible alternatives to be complete.



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2. Identify the economically most attractive baseline scenario alternative.

The economically most attractive baseline scenario alternative among the two alternatives as stated above has been identified using the levelized cost of power generation as the financial indicator. As per AM0029 version 03, “these alternatives need not consist solely of power plants of the same capacity, load factor and operational characteristics (i.e. several smaller plants, or the share of a larger plant may be a reasonable alternative to the project activity), however they should deliver similar services (e.g. peak vs. baseload power)”. The three alternatives can supply similar level of service, i.e. operating for peaking purposes. In order to provide peaking service, the power generation units (e.g. CCGT units, coal-fired sub-critical units or super-critical units) have to start up frequently. In fact the start-up of CCGT units is much quicker than that of sub-critical units and super-critical units, and hence CCGT units operate with operational hours lower than that of coal-fired sub-critical units and super-critical units. Moreover, according to the methodology, “the share of a larger plant may be a reasonable alternative to the project activity”. According to the definition of levelized cost of electricity production (LCEG), the LCEG of the share of a larger plant is the same as the LCEG for the larger plant, and this will thus not affect the comparison of LCEG between three baseline scenario alternatives.

The economically most attractive baseline scenario alternative among the three alternatives as stated above has been identified using the levelized cost as the financial indicator. It has been demonstrated that the levelized cost of power generation in a similar capacity coal based sub critical power plant is 0.2425RMB/kWh, and the levelized cost of power generation in a coal based super critical power plant is 0.2436 RMB/kWh. The levelized cost of generation of for a natural gas based power plant is 0.4168 RMB/kWh. DNV has verified that the data set used for calculating the levelized cost for a sub critical coal based power plant and a super critical coal based power plant has been sourced from the data from the *Thermal Power Engineering Design Reference Cost Guide (2004 edition) published by China Institute of Power Planning and Design*. /32/, and that for the natural gas based power plant from the feasibility study report of the project /6/.

DNV has checked and assessed all the documents during the validation process. In our opinion, these data can adequately reflect the actual situation for the following reasons:

The Feasibility Study Report was approved by the Beijing Development and Reform Commission on 14 December 2005 /6/. The *Guide* (2004 edition) is published by China Institute of Power Planning and Design. It is updated every year as a guide of designing power plants for design institutes in China. Therefore, data obtained from this source is reliable. Furthermore, DNV has cross checked the input values used in the calculation of the levelized electricity generation cost (EGC) of proposed project and coal fired power generation technologies in the PDD against third-party or publicly available sources.

1) The unit investment cost

The investment cost used in the proposed project is verified by DNV as the description in Section 4.4.2 in this report. The investment costs for 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are 3 938 RMB/kW and 4 074 RMB/kW respectively, which is sourced from *Thermal Power Engineering Design Reference Cost Guide (2004 edition) published by China Institute of Power Planning and Design*. /32/.



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The values are crosschecked with the quarterly analysis report for power industry issued by Beijing Guoyanwang Information Co. Ltd. in 2006, which mentions the estimated investment of coal-fired power plant is about 4 000 RMB/kW until 2005 in China /57/. Hence, DNV could confirm that the investment costs for 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant used in the levelized cost analysis are reasonable.

2) Discount rate

The discount rate used in the levelized cost analysis is 8%, which is sourced from *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* /15/. This discount rate was determined by the national administration of power industry in China /15/ and widely used for the large scale hydropower plants, fossil fuel fired plants and wind farm projects. The discount rate is also crosschecked with the document of “Economic Evaluation Method and Parameters for Project Construction” /63/, which has the value of discount rate. DNV considers that the discount rate used in the levelized cost analysis is appropriate.

3) Annual operation hours

The annual operation hours for proposed project is 3 500 hours, which is sourced from the FSR /6/. The data is also crosschecked by Thermal Power Engineering Design Reference Cost Guide (2004 edition) published by China Institute of Power Planning and Design/32/ with the same value. The annual operation hours for 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are 5 000 hours, which is sourced from Thermal Power Engineering Design Reference Cost Guide (2004 edition) /32/ and crosschecked with annually average operation hours of thermal power plant in China from 2004 to 2007, which is about 4 500 hours to 5 500 hours /11/. Therefore, DNV can verify that annual operation hours in the levelized cost analysis are reasonable.

4) Fuel consumption and fuel price

In the levelized cost analysis, natural gas consumption for proposed project is 0.1750 m³/kWh and relevant power generation efficiency is 58.51%, which are sourced from FSR /6/. The power generation efficiency for the gas-steam combined cycle system is about 58% to 60% in the world /58/. The natural gas price in the levelized cost analysis is 1.40 RMB/m³ (including VAT) sourced from FSR as well /6/. DNV checked the actual price of natural gas by the sale receipt and confirmed that it is 1.95 RMB/m³ (including the tax) /27/. Fuel consumption and fuel price of the proposed project used in the levelized cost analysis are conservative and reasonable.

The coal consumption efficiency for 600 MW super-critical coal-fired power plant is 41.13% sourced from Thermal Power Engineering Design Reference Cost Guide (2004 edition) /32/, which is consist with the value of the coal consumption for 600 MW super-critical coal-fired power plant in China from public information available in the website /62/. The coal consumption efficiency for 600MW sub-critical coal-fired power plant is 40.32%, sourced from Circular of the National Development and Reform Commission on Requirements on Planning and Construction of Coal Fired Power Plants (Document No.NDRCEnergy [2004]864) issued by NDRC/50/. The coal consumption efficiency for 600 MW sub-critical coal-fired power plant is in line with the efficiency range of large capacity sub-critical coal-fired power plant (about 38%~40%) /61/. DNV can confirm that the coal consumption for 600



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MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are reasonable.

The coal prices for 600 MW sub-critical coal-fired power plant and 600 MW super-critical coal-fired power plant are 400 RMB/tSCE, which is from Thermal Power Engineering Design Reference Cost Guide (2004 edition) /32/. The coal price is crosschecked with the actual coal price in 2004 and it is about 350~430 RMB/tSCE /59/. Hence the coal prices in the levelized cost analysis are appropriate.

In conclusion, based on our sectoral competence, DNV was able to confirm that the input parameters used in the levelized cost analysis are appropriate, are reasonable and adequately represent the actual situation.

The sensitivity analysis on the levelized cost with a (+/-20%) variation of the parameters of total project cost, load factor, fuel cost and power generation efficiency also demonstrates that the levelized costs of NG power generation and super-critical coal-fired power generation do not touch the levelized cost of sub-critical coal-fired power.

The assumptions and the calculations provided for the levelized cost have been verified and found to be correct.

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

The project's system boundaries are defined as the project site and the system boundary for the electricity grid includes all power plants connected physically to the North China Power Grid (NCPG), including Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia grid /20/. There are no significant transmission constraints between the power plants of the NCPG grid. The selected sources and gases are justified for the project activity.

The application of the baseline methodology is transparent and conservative.

4.4 Additionality

The additionality of the project, is demonstrated by applying the "Tool for demonstration and assessment of additionality", version 05.2 /33/.

4.4.1 CDM consideration and continued action to secure CDM status

DNV has assessed and verified the evidence and timeline for the starting date of the project activity as follows:

On 28 February 2006, Equipment Procurement Contract of Turbines and Generators was signed between Huadian Beijing Thermal Power Co., Ltd. and Shanghai Electric Group Co. Ltd. /34/.

On 03 April 2006, the Equipment Procurement Contract of Boilers was signed between Huadian Beijing Thermal Power Co., Ltd. and Wuhan Boiler Co. Ltd. /35/.

In April 2006, the Civil Engineering Contract was signed between Huadian Beijing Thermal Power Co., Ltd. and Tianjin Power Construction Company /36/.

On 08 June 2006, Construction Permit was issued by Hebei Power Supervision Co. Ltd. /16/.



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Therefore, DNV was able to verify and confirm that the signature of Equipment Procurement Contract of Turbines and Generators on 28 February 2006 /34/ was the earliest real action for the project, which is deemed as the starting date of the project activity.

The CDM consideration of the project activity is demonstrated by the following milestones:

- a) According to the data of FSR and the FSR supplementary by North China Power Engineering (Beijing) Co., Ltd /6//8/, the IRR of the Project was below the benchmark (refer to the benchmark investment analysis below). Hence, at the Board Meeting of the project owner Huadian Beijing Thermal Power Co., Ltd. held on 15 December 2005 the board decided to start CDM application, which was evidenced by the Board Meeting Minutes issued on 15 December 2005 /39/
- b) On 16 December 2005, a CDM Consulting Contract was signed between Huadian Beijing Thermal Power Co., Ltd. and Taiwan Carbon Trade Promotion Association /40/
- c) On 28 February 2006, Equipment Procurement Contract of Turbines and Generators was signed between Huadian Beijing Thermal Power Co., Ltd. and Shanghai Electric Group Co. Ltd. /34/ and the project started.

Real and continuing action to secure CDM status in parallel with the project's implementation was evidenced through:

- a) Term Sheet of Emission Reductions for the project signed between Huadian Beijing Thermal Power Co., Ltd. and Global Carbon Capital Limited on 05 December 2006 /41/
- b) PDD was web hosted and Global stakeholder process (validation) started. on 30 March 2007

The evidences were provided and verified by DNV.

Hence, evidence was provided and reviewed by DNV that demonstrates that the incentive from the CDM was seriously considered in the decision to proceed with the project activity and that real and continuing actions were undertaken to secure CDM registration in parallel with the implementation of the project.

4.4.2 Step 1. Benchmark investment analysis

Sub-steps 1. Apply benchmark analysis

According to approved baseline methodology AM0029 /4/, the benchmark analysis (Option III) was chosen to assess the financial viability of the project activity. The benchmark IRR of 8% was selected as stipulated by *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects* /15/ issued by State Power Corporation of China in 2003. The project IRR without CER revenues is 3.69 % and thus lower than the benchmark. Hence, the project is not a financially attractive option.

Sub-steps 2. Calculation and comparison of financial indicators

The input parameters used in the financial analysis, except for the bus-bar tariff, are taken from the Feasibility Study Report (FSR) and Feasibility Study Report Supplementary (FSR Supplementary) developed by North China Power Engineering (Beijing) Co., Ltd /6/ /8/. The Feasibility Study Report was approved by the Beijing Development and Reform Commission on 14 December 2005 /6/. The bus-bar tariff has been taken from Notice on the Bus-bar Tariff Adjustment for North China Power Grid issued by Beijing Development and Reform Commission on 28 April 2005 (Document No. JFG[2005]883) /42/. As the feasibility study



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reports have been prepared by independent agencies and approved by regulatory authorities, the input parameters used in the financial analysis can thus be considered information provided by an independent and recognized source.

The FSR of the project activity was approved on 14 December 2005, thus 2 months prior to the decision to proceed with the project activity (the starting date of the project), which was on 28 February 2006/34/. Given this relative short period of time between approval of the FSR and the decision to proceed with the project activity it is unlikely in the context of the project that the input values would have materially changed. It is thus reasonable to assume that the FSR has been the basis of the decision to proceed with the investment in the project.

DNV also confirms that the input parameters for the financial analysis included in the PDD and the parameters stated in the FSR are consistent. Furthermore, the input parameters used in the financial analyses were compared with the data reported for other similar proposed CDM projects in China, comparing the investment costs per MW, percentage of O&M costs relative to total investment costs, PLF and working capital relative to total investment cost as follow tables, which shows the investment costs, working capital and O&M costs are in a reasonable range /55/

Compared Data	Proposed Project Value	Compared Value in Gansu		UNFCCC Reference
Total investment costs (RMB/kW)	3 767	Max	3847	1243
		Min	2545	1927
Annual O&M cost relative to total investment cost	31%	Max	32%	1898
		Min	23%	2383
PLF	0.40	Max	0.61	1368
		Min	0.34	2383
Working capital relative to total investment cost (%)	2.8	Max	3.1	1927
		Min	1.6	1368

1) Total investment costs

The investment cost used in the financial analysis were compared with the data reported for other natural gas power generation projects registered and requesting registration as CDM in China /55/, and the investment costs per kW of the proposed project (3 767 RMB/kW) was found to be in the range of similar projects (2 545 RMB/kW~3 847 RMB/kW).

The investment costs were further attempted cross checked against real costs. DNV has checked the actual cost for total investment with Settlement Report of Construction Completion for Huadian Beijing Natural Gas based Power Generation Project issued by Chinese Huadian Power Construction Technological and Economic Centre on 12 December 2009 /66/. The actual cost for total investment (1 986 300 000 RMB) /66/ is 5.8% less than the estimated value (2 109 400 000 RMB) in IRR analysis, which is in the range of sensitivity analysis (-32%). Therefore, DNV can confirm that the total investment in IRR analysis is reasonable.



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2) Working capital

The working capital relative to total investment cost of the proposed project was compared with the data reported for other similar natural gas power generation projects registered or requesting registration as CDM projects in China /55/, and it (2.8%) was found to be in the range of the compared data (1.6%-3.3%). DNV considers that the working capital in FSR is reasonable and appropriate.

3) O&M costs (including fuel consumption cost)

The annual O&M cost relative to the total investment cost of the proposed project was compared with the data reported for other similar natural gas power generation projects registered or requesting registration as CDM projects in China /55/, and the value (31%) was found to be in the range of the compared data (23%-32%). DNV considers that the O&M in FSR is reasonable and appropriate.

4) Heat and power generation and efficiency

To assess the appropriateness of the assumed annual power generation, the plant load factor (PLF) was chosen for comparison. The comparison showed that the proposed project is in the range of those values of the similar natural gas power generation projects in China /55/.

Annex 11 of CDM-EB 48 meeting report gives a guideline for validation of annual operating hours for renewable energy. One option is to use annual operating hours provided to the government while applying the project activity for implementation approval. The FSR has this purpose and hence according to current CDM regulation, the checking that the value is in line with the FSR should be considered sufficient for validation of plant load. The data was confirmed in the FSR /6/.

Heat generation used in IRR calculation is 3 111 000 GJ annually /6/. DNV checked that the actual heat generation for Huadian Beijing Natural Gas based Power Generation Project in 2009 was 2 860 811 GJ /60/, which is less than 8% less than estimated value in IRR calculation, so the heat generation used in IRR calculation is conservative.

The power generation efficiency used in IRR calculation is 58.51%, which are sourced from FSR /6/. The power generation efficiency for the gas-steam combined cycle system is about 58% to 60% in the world/58/. The power generation efficiency used in IRR calculation is reasonable.

5) Residual value

The residual value of the assets used in FSR is 5%, which is in line with the government document of Decree No. 70 of Guoshuifa [2003] issued by the State Administration of Taxation on 18 June 2003/56/.

6) Electricity tariff and price of natural gas



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The electricity tariff is 0.480 RMB/kWh (including VAT) from Circular on Transmitting Document of the National Development and Reform Commission on Issues Concerning Implementation of Coal and Electricity Prices' Linkage in North China Grid (Document No.JFG[2005]883) issued on 28 April 2005. The price of natural gas is 1.40 RMB/m³ (including VAT) from FSR approved on 14 December 2005 /6/. The electricity tariff and price of natural gas used in IRR analysis is the information which is available at the date of CDM decision making (on 15 December 2005 the board decided to start CDM application, which was evidenced by the Board Meeting Minutes issued on 15 December 2005 /39/)

DNV also checked the actual electricity tariff and the actual price of natural gas by the sale receipt and confirmed that they are 0.452 RMB/kWh (including tax) /37/ and 1.95 RMB/m³ (including tax) /27/ respectively, so the values of electricity tariff (0.48 RMB/kWh, including tax) and the price of natural gas (1.40 RMB/m³, including tax) considered in the financial analysis are conservative.

By in addition applying our sectoral competence, DNV was able to confirm that the input parameters used in the financial analysis are reasonable and adequately represent the economic situation of the project.

The IRR calculations were provided in a spreadsheet. The calculations were verified and found to be correct by DNV. The assumptions used in the calculations are deemed to be correct by DNV.

Sub-steps 3. Sensitivity Analysis

The sensitivity analysis on the financial model considering the parameters of a) total investment, b) gas price, c) annual O&M expenditure, d) annual operation hours and e) electricity tariff fluctuation, confirm the robustness of the investment analysis. As per the sensitivity analysis, the project IRR touches the benchmark if a) total investment decreases more than about 32%, b) gas price decreases by 20%, c) O&M costs decrease more than 82%, d) operation hours increase more than 42%, and e) the electricity tariff increases by about 14%.

The main part of total investment is the equipments /6/. The main equipments price of gas-steam combined cycle power generation is hard to decrease because only very few advanced equipment manufacturers in the world could supply the equipments, so it is not likely that the total investment decreases more than about 32% in the crediting period.

DNV was also able to verify that it is unlikely for the gas price to decrease by 20% as the gas prices have been increasing continuously from 2004 to 2007 /6/ /46/ /47/.

The O&M expenditures are not unlike to decreases more than 82% because its main parts (maintenance cost, salary, insurance cost and other costs) can not fluctuate in such large scale in the crediting period.

It is also demonstrated that China has plenty of coal and will mainly use coal for power generation, so the natural gas power plant will mainly be used for peak load balancing in the future /43/ and hence it is unlikely that the annual operation hours will increase more than 42%.



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It has been demonstrated that for power plant in Beijing area, the highest bus-bar tariff (including VAT) was 0.48 RMB/kWh from 2004 to 2005 /42/ /48/. Moreover, the actual approved bus-bar tariff of the Project is 0.452RMB/kWh /49/, which is 6% lower than the bus-bar tariff used in the investment analysis. Hence, the tariff used in investment analysis is conservative and it is unlikely that the electricity tariff will increase by 14% in the crediting period.

4.4.3 Step 2. Common practice analysis

In China, electricity price and regulations are usually similar for power projects in the same province. Beijing area is a provincial area in China and the regulations and electricity price are unique. For example, as per Notice on the Adjustment of Electricity Price of North China Grid issued by the National Development and Reform Commission on 28 June 2006/9/, it was clearly pointed out that the bus-bar tariffs of the provinces within North China Power Grid(NCPG) were different on provincial level. The bus-bar tariff of coal fired power plant located in Beijing area is different from the bus-bar tariff of coal fired power plant located in other provinces in NCPG. So Beijing area is selected as the geographical scope for the common practice analysis of the project.

There are three similar projects in Beijing area. All of these projects are in the process of applying as CDM projects or have been registered as CDM projects. So the proposed project is not the common practice.

4.4.3.1 Step 3. Impact of CDM registration:

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

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

4.5 Monitoring

The proposed project applies the approved monitoring methodology, AM0029 "*Monitoring methodology for grid connected generation plants using non-renewable and less GHG intensive fuel*", version 03. The selected monitoring methodology is applicable for the project.

The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions. All the relevant data records will be kept for 2 years after the end of the crediting period or the last issuance of CERs, for the project activity, whichever occurs later.

4.5.1 Parameters determined ex-ante

To identify the lowest emission factor among the three as the baseline emission factor, the build margin emission factor (BM) of 0.9253tCO₂/MWh, the combined margin emission factor (CM) of 1.00255tCO₂/MWh and the emission factor of the technology (and fuel) identified as the most likely baseline scenario of 0.8446 tCO₂/MWh were determined *ex-ante* based on the most recent information available at the time the PDD was submitted for validation (Refer to section 4.6).

4.5.2 Parameters monitored ex-post

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

- 1) $FC_{y,i}$, Annual net quantity of natural gas consumed in project activity.



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The gas flow meters will be daily measured and recorded monthly. Transaction notes provided by the gas supplier are used for cross check..

2) NCV_y , Net Calorific Value of natural gas in project activity

The supplier-provided data will be obtained from periodical measurement (per two weeks).

3) $COEF_y$, CO₂ emission coefficient of the Project in year y

4) $EG_{PJ,y}$ The net electricity delivered to the grid by the Project..

The electricity supplied to the grid by the project will be measured hourly and recorded monthly. This data will be cross checked against the transaction notes. The metering equipments are with an accuracy of 0.2s.

4.5.3 Management system and quality assurance

The project's monitoring plan includes:

- Management structure
- Training plan
- Methods of monitoring
- Error disposal and reported data/results review
- Maintenance and calibration of meters & metering
- Quality assurance and quality control
- Emergency
- Data management system
- Procedures for corrective actions

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

The application of the monitoring methodology is transparent and DNV considers the project participants will be able to implement the monitoring plan.

4.6 Estimate of GHG Emissions

The GHG emission reduction calculations are in accordance with the formulae given in the baseline and monitoring methodology AM0029 version 03.

1) Baseline emissions

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

Option 1: The build margin, calculated according to "Tool to calculate the emission factor for an electricity system"; and

Option 2: The combined margin, calculated according to "Tool to calculate the emission factor for an electricity system", using a 50/50 OM/BM weight.

Option 3: The emission factor of the coal based sub critical power plant which has been identified as the baseline scenario.

$$EF_{BL,CO2,option3} = \frac{COEF_{BL}}{\eta_{BL}} \times 3.6GJ / MWh$$

Calculation of the BM emission factor



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Because plant specific fuel consumption and electricity generation data is not publicly available in China, the EB's guidance to DNV's request for deviation of Chinese project activities from AM0005 /13/, the build margin is calculated with the following parameters:

- The capacity addition from the years 2001 to 2004 is chosen and represents 25.69% of total installed capacity./11/
- The weight of installed capacity additions for thermal power plant is accounted for 99.57% of total installed capacity additions./11/
- Use of 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. This is 36.53% for coal power plants and 45.87% for oil power plants and gas power plants/20/. The efficiency values were only available 15 December 2006.
- The local net calorie value of each kind of fuel, the local carbon content of each kind of fuel and the IPCC 2006 default value of carbon oxidization factor are used to calculate the BM /14/.
- The BM is calculated as 0.9253 tCO₂/MWh

Calculation of the OM emission factor and CM emission factor

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

The aggregated generation and fuel consumption data are used as more disaggregated data are not available in the NCPG. Country specific data for the net calorific value and the fuel consumption of each type of fossil fuel, which was obtained from the China Energy Statistical Yearbook /12/, the IPCC 2006 default values/14/ for the oxidation factor of each type of fossil fuel and the total electricity delivered to the NCPG selected are deemed reasonable. Vintage data for the years 2002, 2003 and 2004 are used for the OM emission factor calculation, which were the most recent data available at the time of submission of the PDD for validation. The electricity generation data are sourced from China Electric Power Yearbooks 2003-2005 /11/. The OM is calculated to be 1.0798tCO₂/MWh as a generation-weighted average for the three years,

The weights ω_{OM} and ω_{BM} are selected as 0.5 and 0.5, respectively, as stipulated by AM0029. The combined margin is determined ex-ante at 1.00255tCO₂/MWh.

The most recent data are used to calculate the OM emission factor. The OM emission factor is derived from the China Energy Statistical Yearbooks 2000-2005 /12/; the BM calculation is derived from the China Power Electric Power Yearbooks 2003, 2004, and 2005/11/.

For the calculation of the identified fuel emission factor

$$\begin{aligned}
 EF_{BL,CO_2}(tco2 / Mwh) &= \frac{COEF_{BL}}{\eta_{BL}} * 3.6GJ / MWh \\
 &= 0.0946/40.32\% * 3.6 \\
 &= 0.8446 tCO_2/MWh
 \end{aligned}$$



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$COEF_{BL}$ is the coal emission coefficient (tCO₂e/GJ), which is 0.0946 tCO₂/GJ, sourced from IPCC 2006 /14/

The lowest emission factor among the three options is the baseline emission factor ($EF_{BL,CO_2,y}$) of the Project (0.8446tCO₂/MWh), which is selected to be the baseline emission factor. Therefore, baseline emissions are calculated as $BE_y = EG_y * EF_{BL, CO_2, y} = 1\ 862\ 450\ \text{MWh} * 0.8446\ \text{tCO}_2/\text{MWh} = 1\ 573\ 025\ \text{tCO}_2/\text{year}$.

Hence, DNV could confirm that the baseline assumptions used in the calculation of the emission reductions are appropriate in the project context in line with the requirements of the VVM /5/ and the baseline emission estimate can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

2) Project emissions

$$COEF_{NG,y} = NCV_{NG,y} * EF_{CO_2,NG,y} * OXID_{NG} = 35.1597 \times 56.1 \times 1 / 1000 \\ = 1.97246\ \text{tCO}_2/\text{km}^3$$

$$PE_y = FC_{NG,y} * COEF_{NG,y} = 429,010 \times 1.97246 = 846\ 205\ \text{tCO}_2\text{e}$$

3) Leakage

Fugitive upstream CH₄ emissions associated are calculated to be smaller than fugitive CH₄ emissions from the use of fossil fuels in the grid in the absence of the project activity. The leakages from project activity are thus calculated to be negative, and in line with the methodology are considered as zero.

4) Emission reductions

$$ER_y = BE_y - PE_y - LE_y = 1\ 573\ 025\ \text{tCO}_2/\text{year} - 846\ 205\ \text{tCO}_2/\text{year} - 0 = 726\ 820\ \text{tCO}_2/\text{year}.$$

Based on the above emission factor, estimated annual electricity generation supplied to the grid and estimated annual natural gas consumption, the emission reductions for the project have been determined to be 726 820 tCO₂ per year. The baseline emission estimate can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

In summary, the GHG calculations are complete and transparent, and their accuracy has been verified. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

4.7 Environmental Impacts

An environmental impact assessment (EIA) has been conducted according to Chinese law and regulation. The potential environmental impacts have been sufficiently identified, such as impacts on noise, dust and waste gas, waste water, solid waste, waste slag in construction and operation phase. No significant environmental impacts are expected from the project activity.



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The EIA for the project was prepared in October 2005 and was approved by Beijing Environmental Protection Administration on 11 November 2005.

4.8 Comments by Local Stakeholders

A stakeholder consultation workshop was held on November 2006. The project owner also carried out a questionnaire survey on the local residents and residents at the same time. Totally 30 questionnaires for stakeholders returned out of 30 with 100% response rate. No negative comments were received. A summary of comments is provided and has been verified by DNV /38/.

The questionnaire survey shows that the project received support from local people and opinions from survey has been considered seriously by the project operator.

DNV considers the local stakeholder consultation carried out adequate.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of 23 March 2007 (applying AM0029 version 1.1) was made publicly available on DNV's climate change website¹ and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 30 March 2007 to 28 April 2007.

The PDD of 02 July 2008 (applying AM0029 version 03) was made publicly available again on DNV's climate change website² and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 09 July 2008 to 07 August 2008.

One comment was received during the period. DNV requested the project participant to respond to the issues raised (refer to CL 21).

Comment by: Stephen Li, Beijing City University

Inserted On: 2008-07-29

Subject: Huadian

Comment: Huadian Beijing Natural Gas Based Power Plant is originally known as Beijing Second Thermal Power Plant, also known as Zhengchangzhuang Thermal Power Plant.

Beijing Second Thermal Power Plant is one of the most important heat sources of Beijing City. It undertakes the heat supply of some important departments in Beijing, including Zhongnanhai, the state council office building, the Great Hall of the People, Beijing municipal government office building and so on. (<http://www.zdxw.com.cn/gp/hd/hd4.htm>)

¹ http://www.dnv.com/focus/climate_change/Projects/ProjectDetails.asp?ProjectId=1105

² http://www.dnv.com/focus/climate_change/Projects/ProjectDetails.asp?ProjectId=1937



VALIDATION REPORT

As the important heat source of above-mentioned departments in Beijing, Huadian Beijing Natural Gas based Power Generation Project is classified as “Beijing Key Project in 2006 and 2007” and “The Government Project for the service of the central government.

(<http://beijing.qianlong.com/3825/2008/01/20/2502@4272177.htm>)

Government Project means that the project is not only approved by the government but also implemented by the government.
(<http://zhidao.baidu.com/question/5121003.html?fr=qrl>)

As a project supported by the government and services the government, Huadian Beijing Natural Gas based Power Generation Project is more government action than corporate behavior. And even without the support of the CDM, the project is still continuing to construction.

So, Huadian Beijing Natural Gas based Power Generation Project is not additional and needs to be carefully reviewed by DOE and CDM executive board.

Response by project participants

Although the Project will supply certain amount of heat in heating season besides power generation, there are neither regulations forbidding electricity generation using coal nor regulations forbidding heat generation using coal in Beijing. When drafting the FSR for the Project in 2005, there are only power sources of coal fired power plants and hydropower plants in Beijing. Meanwhile, the network supplying heat for Beijing had been integrated and the heat supply is centrally controlled (From P9 of the FSR). The heat sources for Beijing comprise four coal fired co-generation power plants and three heat supply plants using natural gas boilers (From P8 of the FSR). Under such circumstances, without consideration of CERs sales revenues, the reasonable option for the project owner could be to give up construction of the Project, or to generate energy with one of the following options

- using coal as fuel for power/heat generation; or
- constructing coal/natural gas fired boilers which solely meet the heat demand.

Moreover, there is a misunderstanding regarding “key project” or “government project”. There are no regulations or policies issued by the government implying that “key project” or “government project” is or should be implemented by the government. As per the FSR approval, the EIA approval and relevant documents of the Project, the project owner is a company who operates independently and assumes sole responsibility for its profits and losses, not a government department. Moreover, the Project obtains neither any investment from the government nor any preferential policy support in the aspect of loans. For example,

a. In the Loan Agreement, it is clearly defined that “the interest rate is 6.84%, the same as the normal interest policy issued by the People’s Bank of China”.



VALIDATION REPORT

b. The bus-bar tariff of the Project is controlled by the government as 0.452 RMB/kWh in Circular on Enhancing the Electricity Tariff of North China Grid by the National Development and Reform Commission (Document No.NDRCElectricity[2008]1677), which is lower than that expected by the Project Owner . The same bus-bar tariff has been approved by the government in the same document for all the other natural gas fired power plants located in Beijing .

c. The natural gas price of the Project fluctuates according to the market. The natural gas price in 2004 was 1.40 RMB/m³. By the end of 2007, the natural gas price increased to 1.95 RMB/m³ for all the industrial consumer of natural gas within Beijing, including the Project Owner. Relevant invoices have been provided as evidences.

From the above, the Project is a purely commercial action implemented by the project owner. Without consideration of CERs sales revenues, the Project will not be implemented.

How DNV has considered the comment received in its validation:

DNV checked the FSR of the project and can confirm that the heat sources of Beijing was mainly by coal fired co-generation power plants or heat supply plants using natural gas boilers at the time of FSR preparation and natural gas fired cogeneration power plant was not a common option.

Moreover, the project owner is an independent company who operates and takes responsibility for its profits and losses by itself. The project did not obtain the investment or any preferential policy support in the aspect of loans from the government. The interest rate of loan is the same as the normal interest rate, which is evidenced by Loan Agreement for Huadian Beijing Natural Gas based Power Generation Project signed between Huadian Beijing Thermal Power Co., Ltd. and bank group in March 2007. The bus-bar tariff for the project was approved by government is 0.452RMB, which is the same as the bus-bar tariff of natural gas fired power plants in Beijing /49/. Moreover, natural gas price for the project is fluctuating with the market /47/. According to above evidences, DNV verified that the project is a commercial action implemented by the project owner.

APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-1 OK
4. 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	CAR-1 OK
5. 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
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. 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		
10. 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	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK

Requirement	Reference	Conclusion
anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.		
About forecast emission reductions and environmental impacts		
11. 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		
12. 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		
13. 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
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. 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
17. 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
18. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK

Requirement	Reference	Conclusion
19. 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

Table 2 Requirements Checklist

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
* MoV = Means of Verification, DR= Document Review, I= Interview						
A. General Description of Project Activity <i>The project design is assessed.</i>						
A.1. Project Boundaries <i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i>						
A.1.1. Are the project’s spatial boundaries (geographical) clearly defined?		/1/	DR I	The project, located within Fengtai district of Beijing, has geographical coordinates of 116°15'E and 39°5'N. It is located in the northwest of Fengtai District between the West 3 rd Ring Road and the West 4 th Ring Road.		OK
A.1.2. 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 “Tool to calculate the emission factor for an electricity system”, i.e., the North China Power Grid (NCPG).		OK
A.2. 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>						
A.2.1. Which Parties and project participants are participating in the project?		/1/	DR	The project participant from the host Party China is Huadian Beijing Thermal Power Co., Ltd., and the project participant from the Annex 1 Party the United Kingdom of Great		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			Britain and Northern Ireland is Global Carbon Capital Limited.		
A.2.2. 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/	DR	No. The letters of approval from the DNAs of China and United Kingdom need to be provided.	CAR-1	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation - Designated a National Authority	/1/	DR	Yes. China ratified the Kyoto Protocol on 30 August 2002. United Kingdom ratified the Kyoto Protocol on 31 May 2002. Both of them are voluntary participation. DNA of China is National Development and Reform Commission. DNA of United Kingdom is the Department for Environment, Food and Rural Affairs.		OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR I	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
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect	/1/	DR	Yes. The project design engineering reflects		

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
current good practices?			the current good practice in China. The steam generation and the efficiencies of electricity and heat need to be described in PDD.	CL-1	OK
A.3.2. 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/	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 traditional coal fired power generation technology in China.		OK
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	The provisions for training and maintenance need to be provided	CL-2	OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR	Not yet. The LoA from the DNA of China has not been obtained.	CAR-1	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes. The project will promote reliability and safety of power supply by the local grid, reduce the environmental pollution generated from burning coal, improve technology transfer of gas-steam combined cycle power generation, and create employment opportunities for the local community during both construction and operation.		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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>						
B.1. Baseline Methodology <i>It is assessed whether the project applies an appropriate baseline methodology.</i>						
B.1.1. Does the project apply an approved methodology and the correct version thereof?		/1/	DR	Yes, the project applies approved baseline methodology AM0029, “Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas”, version 03.		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?		/1/	DR	It is a new power plant generating electricity with natural gas; The electricity generated will be supplied to the NCPG, of which geographic and system boundaries could be clearly defined; It needs to be evidenced that any other project of the same size, using annually 0.43 billion m ³ , can be built in Beijing without reducing the natural gas supply to any other customer in the crediting period. The project participants need to show the production entered into the pipelines that may supply the project, the pipeline capacities, the total uses and future projections of these. The proved reserved of natural gas should be indicated.	CAR-2	OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.2. Baseline Scenario Determination <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>					
B.2.1. What is the baseline scenario?	/1/	DR	The sub-critical coal fired power plant with a unit capacity of 600 MW is described as the baseline scenario of the Project		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR	4 alternative scenarios have been considered as following: Alternative a: The Project not implemented as a CDM project; Alternative b: Power generation using natural gas, but technologies other than that used by the Project; Alternative c: Power generation technologies using energy sources other than natural gas; Alternative d: Import of electricity from North China Grid, including the possibility of new interconnections. For Alternative b, two types of power plants are included mainly: single cycle gas turbine power plants and single cycle steam turbine power plants. Single cycle gas turbine power plants are not practical because the waste heat in the exhaust gas from gas turbine is commonly recovered by a waste heat		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>recovery boiler and there is no large-scale single cycle natural gas turbine power generation project which is operated or under construction in China now /21/. Single cycle steam turbine power plants are not practical because the thermal efficiency of single cycle natural gas steam turbine power generation technology is lower and this technology is used rarely now /22/. So alternative b is not a reasonable alternative.</p> <p>For Alternative c, oil fired power generation technology and hydro power generation technology are not possible because the use of fuel oil and the installed capacity of hydropower in North China Grid were declined from 2002 to 2005/12/. Wind power generation technology is not possible because it can not provide power plant having peak load balancing function as the project. For coal fired power plants, the units installed capacity of more than 100 MW could provide peak load balancing services /23/ and construction of conventional coal fired plants with a unit installed capacity equal to or less than 300 MW is restricted in China now/24/, so only sub critical coal fired power generation technology with the unit installed capacity of 600 MW and supercritical coal</p>		

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>fired power generation technology with the unit installed capacity of 600 MW in China are possible alternatives for coal fired power plants.</p> <p>For alternative c, biomass, solar energy and nuclear need to be included in power generation technologies using energy sources other than natural gas.</p> <p>The reason why alternative d (import of electricity from connected grids, including the possibility of new interconnections) is not possible is not clear and needs to be clarified.</p> <p>The efficiency of the project mentioned in the baseline determination does not match the efficiency (i.e. natural gas consumption) in the IRR calculation in relation to determination of additionality. This has to be consistent.</p> <p>The calculation spreadsheet and data source for levelised electricity generation cost calculation need to be provided.</p> <p>In sensitivity analysis of the levelised EGC, the possible variations of all key parameters need to be provided in the analysis.</p>	<p>CL3</p> <p>CAR3</p> <p>CAR4</p> <p>CL4</p>	

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>DNV requests evidence for the efficiencies of the two types of coal power plants and whether these efficiencies refer to after subtraction of auxiliary consumption. Justification for investment costs should be presented. Furthermore, elaboration of “others” expense for the three technologies is requested.</p> <p>The project participants need to evidence that the same level of service is provided for the baseline alternatives. The installed capacity is the same, but the project participants have chosen in the levelized cost analysis a significantly lower load factor for the project (40%) than for the alternatives. This is much lower than technologically feasible.</p>	<p>CL-5</p> <p>CL-6</p>	
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	See CL 3, CL 4, CL 5, CL 6, CAR 3 and CAR 4	<p>CL-3</p> <p>CL-4</p> <p>CL-5</p> <p>CL-6</p> <p>CAR-3</p> <p>CAR-4</p>	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	See CL 3, CL 4, CL 5, CL 6, CAR 3 and CAR 4	<p>CL-3</p> <p>CL-4</p> <p>CL-5</p>	OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
				CL-6 CAR-3 CAR-4	
B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/	DR	Yes, the baseline scenario sufficiently takes into account relevant national and/or sectoral policies, macro-economic trends and political aspirations		OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	See CL 3, CL 4, CL 5, CL 6, CAR 3 and CAR 4	CL-3 CL-4 CL-5 CL-6 CAR-3 CAR-4	OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	See CL 3, CL 4, CL 5, CL 6, CAR 3 and CAR 4	CL-3 CL-4 CL-5 CL-6 CAR-3 CAR-4	OK
B.3. Additionality Determination <i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i>					
B.3.1. Is the project additionality assessed according to the methodology?	/1/	DR	The additionality of the project, is demonstrated by applying the “Tool for demonstration and assessment of		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>additionality”, version 05.2</p> <p>Evidence needs to be provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.</p> <p>Step 1. Benchmark investment analysis</p> <p>A benchmark of 8% has been chosen as the benchmark for hydropower plants, fossil fuel fired plants and wind farm projects in China and been properly justified. This is in line with the document <i>Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects/15/</i>. The project IRR works out to 3.69% without considering the CDM revenues, which shows that the project is less financially attractive.</p> <p>Some data source in IRR calculation spreadsheet need to be clarified, such as bus-bar tariff (excluding VAT), residual value, and natural gas price (excluding VAT).</p> <p>It needs to clarify the reason for the data difference between the FSR and the FSR Supplementary.</p> <p>In sensitivity analysis, the value for each</p>	<p>CL7</p> <p>CL8</p> <p>CL9</p>	

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
				parameter which will make the IRR exceed the benchmark should be calculated and give the reason why it is unlikely to happen.	CL-10	
				<i>Assess the sources of the input parameters</i> Some data source in IRR calculation spreadsheet need to be clarified, such as bus-bar tariff (excluding VAT), residual value, and natural gas price (excluding VAT).	CL-8	
				<i>Confirm that the values used in the PDD are fully consistent with the FSR</i> To be confirmed by the response of CL 7		
				<i>Assess the period of time between the finalization of the FSR (or PDR) and the investment decision</i> The project's starting date should be clarified, with relevant evidences provided, to check whether the input values would have materially changed.	CL-13	
				<i>Cross-check the parameters used in the financial analysis with the parameters used by other similar projects</i> Because some basic value's source in IRR		

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>calculation need to be clarified, DNV can not compare the input parameters used in the financial analyses with the data reported for other similar proposed CDM projects in region.</p> <p>Step 2. Common practice analysis</p> <p>According to the government statistics of Beijing /42/, there are three other combined cycle power plants using natural gas in Beijing with a comparative scale with the project. All of them have been registered as CDM project or is applying for the CDM, so the project is not a common practice.</p> <p>It needs to be clarified why Beijing is chosen as the region for the common practice analysis. At least North China Power Grid should be chosen for the common practice analysis.</p> <p>It needs to be proven that the common practice for peak load power plant is not natural gas power plant.</p> <p>Step 3 Impact of CDM registration</p> <p>Besides reducing the greenhouse gas emissions. CDM revenue could improve the financial performance of the project and</p>	<p>CL-11</p> <p>CL-12</p>	

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
* MoV = Means of Verification, DR= Document Review, I= Interview					
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/	DR	See CL 7 to CL 13	CL-7 CL-8 CL-9 CL-10 CL-11 CL-12 CL-13	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	See CL 7 to CL 13	CL-7 CL-8 CL-9 CL-10 CL-11 CL-12 CL-13	OK
B.3.4. 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/	DR	The starting date of the project is defined with the evidence, such as the first investment for the project. Evidence needs to be provided that the incentive from the CDM was seriously considered in the decision to proceed with the	CL-13 CL-7	OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			project activity.		
B.4. Calculation of GHG Emission Reductions – Project emissions <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>					
B.4.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /4/ /6/	DR	Yes. It is in compliance with AM0029 and documented in a complete and transparent manner.		OK
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Yes		OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Yes		OK
B.5. 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>					
B.5.1. Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Yes, the calculations documented are according to approved baseline methodology AM0029, “Baseline Methodology for Grid Connected Electricity Generation Plants using Natural Gas”, version 03, the emission factor of the first crediting period is		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>determined as the least of the following 3 options:</p> <p>Option 1: The build margin, calculated according to “Tool to calculate the emission factor for an electricity system” version 01.1; and</p> <p>Option 2: The combined margin, calculated according to “Tool to calculate the emission factor for an electricity system” version 01.1, using a 50/50 OM/BM weight.</p> <p>Option 3: The emission factor of the coal based sub critical power plant which has been identified as the baseline scenario (EFBL,CO₂).</p> $EF_{BL,CO_2}(tco2/Mwh) = \frac{COEF_{BL}}{\eta_{BL}} * 3.6GJ / MWh$ <p><i>Calculation of the BM emission factor</i></p> <p>Because plant specific fuel consumption and electricity generation data is not publicly available in China, the EB answer to DNV’s request for deviation of Chinese project activities from AM0005 /13/, the build margin is calculated with the following parameters:</p> <ul style="list-style-type: none"> - The capacity addition from the years 2003 to 2005 is chosen and represents 23.78% of total installed capacity/11/ 		

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<ul style="list-style-type: none"> - The weight of installed capacity additions for thermal power plant is accounted for 99.28% of total installed capacity additions/11/. - The standard coal consumption of 343.33gSCE/kWh is used to determine the BM emission factor, which is deemed conservative. The coal consumption efficiency of 343.33 g SCE/kWh is defined as the best technology commercially available in China by the DNA of China /20/. - The local net calorie value of each kind of fuel, the local carbon content of each kind of fuel and the IPCC 2006 default value of carbon oxidization factor are used to calculate the BM /14/. - The BM is calculated as 0.9398 tCO₂/MWh <p><i>Calculation of the OM emission factor and CM emission factor</i></p> <p>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.</p> <p>The aggregated generation and fuel</p>		

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>consumption data are used as more disaggregated data are not available in the NCPG. Country specific data for the net calorific value (NCV_i) of each type of fossil fuel, which can be obtained from the China Energy Statistical Yearbook /12/, the IPCC 2006 default values/14/ for the oxidation factor of each type of fossil fuel and the total electricity delivered to the NCPG selected are deemed reasonable. Vintage data for the years 2003, 2004 and 2005 are used for the OM emission factor calculation, which are the most recent data available. The OM is calculated to be 1.1207 tCO₂/MWh as a generation-weighted average for the three years,</p> <p>The weights ω_{OM} and ω_{BM} are selected as 0.5 and 0.5, respectively, as stipulated by AM0029. The combined margin is determined ex-ante at 1.0755 tCO₂/MWh</p> <p>The most recent data at the time of PDD are used to calculate the OM emission factor. The OM emission factor is derived from the China Energy Statistical Yearbooks 2004, 2005, and 2006/12/ ;the BM calculation is derived from the China Power Electric Power Yearbooks 2004, 2005, and 2006/11/.</p>		

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p><i>For the calculation of the identified fuel emission factor</i></p> $EF_{BL,CO_2}(tco_2/Mwh) = \frac{COEF_{BL}}{\eta_{BL}} * 3.6GJ / MWh$ $= 94600/1000/1000/39.4\% * 3.6$ $= 0.8723 \text{ tCO}_2/\text{MWh}$ <p>The lowest emission factor among the three options is EF_{BL,CO₂} (0.8723 tCO₂/MWh), which is selected to be the baseline emission factor.</p> <p>The OM and BM are not exactly the same as the values of NDRC. It needs to be clarified.</p>	CL-14	
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	Same as above	CL-14	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Yes		
B.6. 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>					

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.6.1. 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 tCH ₄ /PJ), $EF_{BL, upstream, CH_4}$ takes the default values in AM0029 (13.4 tCH ₄ /kt coal) for calculation. The leakage from project activity is assumed to be zero as the leakage calculated as per the formula in AM0029 is negative. It needs to be stated in PDD why 13.4 tCH ₄ /kt coal(for underground mining) is chosen as the default value for $EF_{BL, upstream, CH_4}$	CL-15	OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Yes		OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	Yes		OK
B.7. Emission Reductions <i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>					
B.7.1. Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.	/1/	DR	Yes		OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Yes. The project applies the approved monitoring methodology AM0029, "Grid Connected Electricity Generation Plants using Non-Renewable and Less GHG Intensive Fuel" and is explained in a complete and transparent manner.		OK
B.8.2. 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	In the PDD, it is required to refer to that all the relevant data records will be kept for 2 years after the end of the crediting period or the last issuance of CERs, for the project activity, whichever occurs later.	CL-16	OK
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	Yes. FC _{NG,y} will be metered daily using the flow meter within the project boundary and will be cross-verified with the transaction notes. NCV _{f,y} will be obtained fortnightly. OXID _f and EF _{CO2,f,y} will use the IPCC 2006 value.		OK
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/	DR	Yes, the emission from on-site combustion of natural gas is selected as project GHG indicator, which is reasonable and conservative.		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR	Yes, the total volume of natural gas combusted in the project will be monitored daily by ELSTER G4000 gas flow meters		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
				installed at the gas pipeline and recorded monthly. The net calorific value per volume unit of natural gas will be provided by natural gas supplier once per two weeks		
B.9.4.	Is the measurement equipment described and deemed appropriate?	/1/	DR	Yes		OK
B.9.5.	Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	Yes, the accuracy of natural gas flow meters used in the Project is $\pm 1\%$. The procedures on how to deal with erroneous measurements have been in place.		OK
B.9.6.	Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR	Yes, the total volume of natural gas combusted in the project will be monitored daily by ELSTER G4000 gas flow meters installed at the gas pipeline and recorded monthly. The net calorific value per volume unit of natural gas will be provided by natural gas supplier once per two weeks		OK
B.9.7.	Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/	DR	Yes, the procedures for records handling are identified in the monitoring plan.		OK
B.9.8.	Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	Yes, the natural gas flow meters will be calibrated by qualified entities per two years.		OK
B.9.9.	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance	/1/	DR	Yes, the procedures are identified for day-to-day records handling		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
documentation)					
B.10. Monitoring of Baseline Emissions <i>It is established whether the monitoring plan provides for reliable and complete baseline emission data over time.</i>					
B.10.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	The electricity supplied to the grid will be measured hourly and recorded monthly. This data will be cross checked against the transaction notes. The metering equipments are with an accuracy of 0.2s. In section B.6.1 of the PDD, parameters related to the calculation of operating margin emission factor (OM) and build margin emission factor (BM) are listed.		OK
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	Yes, the net electricity delivered to the grid by the Project is selected as baseline GHG indicator, which is reasonable and conservative.		OK
B.10.3. Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?	/1/	DR	Yes, the electricity delivered to the grid will be measured hourly by the ammeters installed at the point connecting the Project to the grid system, recorded monthly by the project owner and cross-checked by the transaction notes; the electricity imported from the grid will be measured hourly by the ammeters installed at the GIS building, recorded monthly by the project owner and cross-checked by the transaction notes.		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.10.4. Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	Yes		OK
B.10.5. Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	Yes, the precision of ammeters used in the Project is 0.2S. The procedures on how to deal with erroneous measurements have been in place		OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Yes, the electricity delivered to the grid will be measured hourly by the ammeters; the electricity imported from the grid will be measured hourly by the ammeters		OK
B.10.7. Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	Yes, the procedures for records handling are identified in the monitoring plan.		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	Yes, the ammeters will be calibrated following the requirements of relevant national and local standards and rules		OK
B.10.9. 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, the procedures are identified for day-to-day records handling		OK
B.11. Monitoring of Leakage <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>					
B.11.1. Does the monitoring plan provide for the collection and archiving of all relevant data	/1/	DR	Leakage from the project activity is assumed to be zero as the total net leakage effects are		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
necessary for determining leakage?			negative when calculating these in accordance with the methodology.		
B.11.2.Are the choices of project leakage indicators reasonable and conservative?	/1/	DR	Ditto		OK
B.11.3.Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR	Ditto		OK
B.12. Monitoring of Sustainable Development Indicators/ Environmental Impacts <i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i>					
B.12.1.Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/	DR	Monitoring of sustainable development indicators is not required by the Chinese DNA. The environmental impacts are identified in the EIA that was approved on 11 November 2005.		OK
B.12.2.Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/	DR	Chinese DNA, NDRC, 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
B.12.3.Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	Ditto		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.13. Project Management Planning <i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i>					
B.13.1. Is the authority and responsibility of overall project management clearly described?	/1/	DR	Yes. The authority and responsibility of overall project management is clearly described.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR	Yes. The procedures are identified for training of monitoring personnel		OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	The procedures need to be identified for emergency preparedness for cases where emergencies can cause unintended emissions	CL17	OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	Yes.		OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	The procedures need to be identified for corrective actions in order to provide for more accurate future monitoring and reporting	CL18	OK
C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporary boundaries of the project are clearly defined.</i>					
C.1.1. Are the project's starting date and operational lifetime clearly defined and evidenced?	/1/	DR	The starting date of the project is defined with the evidence, such as the first investment for the project.	CL13	OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			The operational lifetime of the project is 20 years. The evidences are required to supply.		
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	The expected start date of the crediting period is 1 January 2009, which is not reasonable.	CL 19	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>					
D.1.1. Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /7/	DR	Yes. The impacts are properly described, such as noise, dust and waste gas, waste water, solid waste, waste slag in construction and operation phase.		OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /7/	DR	The EIA has been approved by Beijing Beijing Environmental Protection Administration on 11 November 2005.		OK
D.1.3. Will the project create any adverse environmental effects?	/1/ /7/	DR	There is no significant adverse environmental effect.		OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/ /7/	DR	There are no transboundary environmental impacts foreseen for the project.		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/ /7/	DR	Yes. The impacts are properly described in PDD.		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR I	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>					
E.1.1. Have relevant stakeholders been consulted?	/1/	DR I	Yes. Local stakeholders were identified and invited. The summary of comments received is included in the PDD.		OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Yes, a survey of the local entities and local residents was carried out in November 2006 through holding open meeting for public comments.		
E.1.3. 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	Yes		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Yes. The summary of the stakeholder comments received is described in the PDD. The stakeholder comments questionnaire need to be provided	CL-20	OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	Yes.		OK

Table 2b: Additional requirements checklist for VVM version 1 (EB 44)

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.1. Letter of approval						
A.1.1 Is the LoA received directly from the DNA or through the project participant.	/2/ /3/	DR		The LoA of the DNA of China and the LoA of Annex I Party United Kingdom of Great Britain and Northern Ireland were provided by project participant. The LoA of China was identified from the web site of NDRC (http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2406.pdf). The LoA of UK was identified from the web site of the Department of Energy and Climate Change from UK (http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/intl_strat/mechanisms/clean_developm/clean_developm.aspx).		OK
A.2. Project design						
A.2.1 Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/ /6/	DR		It is by a transparent and accurate way to describe the project activity such as project site, the capacity, the turbines and parameters and those are consistent with related information reflected in FSR /6/.		OK
A.2.2 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/ /6/ /16/	DR		At the start of the validation (date of first publication of the PDD for stakeholder was from 30 March 2007), the CDM project activity has started construction (construction permit issued on 08 June 2006) /16/.		OK

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
* MoV = Means of Verification, DR= Document Review, I= Interview						
				The CDM project activity is new-built natural gas power plant and does not use existing facilities or equipment. /6/		
A.2.3 Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?		/1/ /6/	DR	The project activity is a large scale project fully addressed in FSR and PDD; On 21 August 2008, DNV performed site visit and interviews with project stakeholders		OK
A.2.4 Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?		/1/ /6/	DR	No, the project activity is newly built natural gas power plant.		OK
A.3. Project emissions not addressed by the methodology						
A.3.1 Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).		/1/ /4/	DR	The methodology does not describe all project emission sources for the project activity that contributes all 1% of the emission reductions. Sources that the methodology considers not to take into account are not relevant.		OK
A.4. Documentation of baseline emissions						
A.4.1 Documentation of the baseline determination:			DR			OK
a. All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. b. All documentation is relevant as well as correctly quoted and interpreted. c. Assumptions and data can be deemed reasonable d. Relevant national and/or sectoral policies and		/1/		a. Yes, all assumptions and data such as OM ,BM and the data set used for calculating the levelised cost for a sub critical coal based power plant and a super critical coal based power plant used by the project participants are listed in the PDD; b. Yes, all documentation is relevant as well as correctly quoted and interpreted; c. Yes, assumptions and data can be		

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<p>circumstances are considered and listed in the PDD.</p> <p>e. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity</p>				<p>deemed reasonable</p> <p>d. Yes, relevant national and/or sectoral policies and circumstances are considered and listed in the PDD</p> <p>e. Yes, the methodology has been correctly applied</p> <p>The applicability of this methodology is justified since:</p> <p>The proposed project is the construction and operation of a new natural gas fired grid-connected power generation plant /6/.</p> <p>The project activity provides electricity to the North China Power Grid/10/. The geographic and system boundaries of which can be clearly defined and the information pertaining to the grid and used to estimate baseline emissions is publicly available.</p> <p>Natural gas is sufficiently available in the region.</p>		
A.5. Documentation of the calculations						
<p>A.5.1 Algorithms and/or formulae used to determine emission reductions</p> <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced 		/1/	DR	<p>Yes, All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration, such as data for BM, CM, project emissions and leakage calculation. The data are properly referenced.</p>		OK

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
<ul style="list-style-type: none"> • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration. 			All documentation is correctly quoted and interpreted. All values used can be deemed reasonable in the context of the project activity. The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.		
A.6. Implementation of the monitoring plan					
A.6.1 How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project be monitored ex-post and verified later by a DOE?	/1/	DR	The project's monitoring plan includes: - Management structure - Training plan - Methods of monitoring - Error disposal and reported data/results review - Maintenance and calibration of meters & metering - Quality assurance and quality control - Emergency - Data management system - Procedures for corrective actions Detailed procedures have been elaborated and it is deemed reasonable and sufficient. The monitoring plan in PDD can provide guideline for the emission reductions achieved by the project by monitored ex-post and verified later by a DOE.		OK

CHECKLIST QUESTION		Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
* MoV = Means of Verification, DR= Document Review, I= Interview						
A.7. CDM consideration prior to starting date						
A.7.1 The prior consideration of CDM for the project activity complies with EB41 annex 46		/1/	DR	<p>Yes.</p> <p>DNV has assessed and verified the evidence and timeline for the starting date of the project activity as follows:</p> <p>On 28 February 2006, Equipment Procurement Contract of Turbines and Generators was signed between Huadian Beijing Thermal Power Co., Ltd. and Shanghai Electric Group Co. Ltd. /34/</p> <p>On 03 April 2006, Equipment Procurement Contract of Boilers was signed between Huadian Beijing Thermal Power Co., Ltd. and Wuhan Boiler Co. Ltd. /35/</p> <p>In April 2006, Civil Engineering Contract signed between Huadian Beijing Thermal Power Co., Ltd. and Tianjin Power Construction Company/36/.</p> <p>On 08 June 2006, Construction Permit was issued by Hebei Power Supervision Co. Ltd.</p> <p>Therefore, DNV was able to verify and confirm that the signature of Equipment Procurement Contract of Turbines and Generators on 28 February 2006 /34/ was the earliest real action for the project, which is deemed as the starting date of the project activity.</p>		OK

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
* MoV = Means of Verification, DR= Document Review, I= Interview			<p>The CDM consideration of the project activity is demonstrated by the following milestones:</p> <ul style="list-style-type: none"> a) On 11 November 2005, the EIA was approved by the Environmental Protection Bureau of Beijing /7/ b) On 14 December 2005, the FSR was approved by Beijing Development and Reform Commission /8/ c) According to the data of FSR and the FSR supplementary by North China Power Engineering (Beijing) Co., Ltd /6//8/, IRR of the Project was below the benchmark (refer to the benchmark investment analysis below) and the project owner realized that the Project is not economically attractive without CERs sales revenues. So the Board Meeting of project owner was held on 15 December 2005 to give the board decision for starting CDM application, which is evidenced by Board Meeting Minutes for Starting CDM Application issued on 15 December 2005 /39/ d) On 16 December 2005, CDM Consulting Contract was signed between Huadian Beijing Thermal 		

CHECKLIST QUESTION				Draft Concl.	Final Concl.
* MoV = Means of Verification, DR= Document Review, I= Interview					
Ref.	MoV*	COMMENTS			
		Power Co., Ltd. and Taiwan Carbon Trade Promotion Association/40/			
		e) On 28 February 2006, Equipment Procurement Contract of Turbines and Generators was signed between Huadian Beijing Thermal Power Co., Ltd. and Shanghai Electric Group Co. Ltd. /34/ and the project started.			
		Real action to secure CDM status was evidenced through:			
		a) On 05 December 2006, Term Sheet of Emission Reductions for the project signed between Huadian Beijing Thermal Power Co., Ltd. and Global Carbon Capital Limited /41/			
		b) Chinese LOA was issued by China's DNA on 22 March 2007			
		The evidences were provided and verified by DNV.			
		Hence, evidence was provided and reviewed by DNV that demonstrates that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.			

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
<p>CAR 1</p> <p>The letters of approval from the DNAs of China and United Kingdom have not been obtained.</p>	<p>A.2.2</p> <p>A.4.1</p>	<p>LOA from DNAs of China and United Kingdom have been provided.</p>	<p>OK</p> <p>The DNA of China has issued the Letter of Approval (LoA) /2/ 22 March 2007 authorizing Huadian Beijing Thermal Power Co., Ltd. as a project participant. The LoA of China was provided to DOE and it was identified from the web site of NDRC /64/.</p> <p>The DNA of the United Kingdom of Great Britain and Northern Ireland has also issued the LoA /3/ on 28 August 2009 for Global Carbon Capital Limited. The LoA of United Kingdom was provided to DOE and it was identified from the web site of the Department of Energy and Climate Change from United Kingdom /65/</p> <p>The CAR is closed.</p>
<p>CAR 2</p> <p>It needs to be evidenced that any other project of the same size, using annually 0.43 billion m³, can be built in Beijing without reducing the natural gas supply to any other customer in the crediting period. The project participants need to show the production entered into the pipelines that may supply the project, the pipeline capacities, the total uses</p>	<p>B.1.2</p>	<p>Revision is made in Section B.2 of the PDD.</p>	<p>OK</p> <p>DNV has verified that Shaanjing No. 1 line and Shaanjing No. 2 line will supply the natural gas for the Project /6/, which are sourced from Changqing gas field with total natural gas reseason of 4180 billion m³/25/. The Shaanjing No. 1 line started operating in October 1997 /6/ and the Shaanjing No.</p>

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
and future projections of these. The proved reserved of natural gas should be indicated.			2 line started operating on Dec. 2006 /26/. The estimated total gas supply capacity to Beijing by Shaanjin No.1 line and Shaanjin No.2 line is 15.3 billion m ³ per year /6/., 6.0 billion m ³ of gas supply capacity had been achieved for Beijing by the end of 2005 and 20 billion m ³ of gas supply capacity will achieved in 2015 for three cities including Beijing /19/. The demand for natural gas in Beijing in 2008 is 5.8 billion m ³ and will grow to 8.5 billion m ³ in 2014 /28/. So any other project of the same size, using annually 0.43 billion m ³ , can be built in Beijing without reducing the natural gas supply to any other customer in the crediting period and the natural gas is sufficiently available in the region. The relevant references have been checked by DNV The CAR is closed.
CAR 3 The efficiency of the project mentioned in the baseline determination does not match the efficiency (i.e. natural gas consumption) in the IRR calculation in relation to	B.2.2	The efficiency of the Project mentioned in the baseline determination (0.1750 m ³ /kWh) is the gas consumption per kWh in non-heating period. It is obtained from P5 of the FSR (FSR-	OK DNV checked FSR and confirmed that the efficiency of the project mentioned in the baseline determination is the gas consumption in non-heating period

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
determination of additionality. This has to be consistent.		<p>A03-02) of the Project.</p> <p>The natural gas consumption provided in the IRR calculation is the sum of natural gas consumed for both electricity generation and heat generation by the Project. The data is obtained from P5 of the FSR (FSR-A02-01) of the Project.</p> <p>The same value of gas consumption per kWh is adopted both in the baseline determination and in the investment analysis. The difference between natural gas consumption comes from natural gas consumed for heat generation.</p>	<p>(only for electricity generation). The efficiency used in IRR calculation is the sum of natural gas consumed for both electricity generation and heat generation in whole year.</p> <p>The CAR is closed.</p>
<p>CAR 4</p> <p>The calculation spreadsheet and data source for levelised electricity generation cost calculation need to be provided.</p>	B.2.2	The calculation spreadsheet and data source for levelised electricity generation cost calculation is provided.	<p>OK</p> <p>The calculation spreadsheet and data source for levelised electricity generation cost calculation has been checked by DNV</p> <p>The CAR is closed.</p>
<p>CL 1</p> <p>The steam generation and the efficiencies of electricity and heat need to be described in PDD.</p>	A.3.1	The heat generation (3,111,000 GJ per year) is provided in Table 6 of the PDD. The electricity generation efficiency in non-heating period (58.51%) is provided in Table 3 of the PDD. The	<p>OK</p> <p>The heat generation and the efficiencies of electricity and heat have been described in PDD and checked by</p>

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
		energy (electricity and heat) generation efficiency in heating period (66.66%) has been added into Table 6 of the PDD. Both of these data are obtained from P5 of the FSR-A03-02 of the Project.	DNV. The CL is closed.
CL 2 The provisions for training and maintenance need to be provided	A.3.3	Provisions for training and maintenance have been provided.	OK Provisions for training and maintenance have been checked by DNV /44/ The CL is closed.
CL 3 For alternative c, biomass, solar energy and nuclear need to be included in power generation technologies using energy sources other than natural gas. The reason why alternative d (import of electricity from connected grids, including the possibility of new interconnections) is not possible is not clear and needs to be clarified.	B.2.2	Revision is done to Section B.4 of PDD to include analysis regarding biomass, solar energy and nuclear power generation technology. Revision is done to Section B.4 of PDD for the reason why alternative d (import of electricity from connected grids, including the possibility of new interconnections) is not possible.	OK DNV has verified that biomass power generation is not a plausible baseline scenario because there are no economically exploitable biomass resources for the project /30/. Solar PV power generation technology is not plausible because the maximum installed capacity of the solar PV farm in China is only 8 MW/31/. Nuclear power generation technology is not a plausible baseline scenario because it can not provide power plant having peak load balancing function as the project /29/. Import of electricity from connected grids, including the possibility of new interconnections is not a feasible option as the connected

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
			grid is suffered from electricity shortage/5/ and it can not deliver outputs and services comparable to the project activity with peak regulation capacity from other power grids or new interconnections. The CL is closed.
CL 4 In sensitivity analysis of the levelised EGC, the possible variations of all key parameters need to be provided in the analysis.	B.2.2	Revision is done to Section B.4 to include conservative assumption of possible variations of all key parameters.	OK The sensitivity analysis on the levelised cost with a (+/- 20%) variation of the parameters of total project cost, load factor, fuel cost and power generation efficiency also demonstrate that the levelised costs of NG power generation and super-critical coal-fired power generation do not touch the levelised cost of sub-critical coal-fired power. The analysis was verified by DNV The CL is closed.
CL 5 DNV requests evidence for the efficiencies of the two types of coal power plants and whether these efficiencies refer to after subtraction of auxiliary consumption. Justification for investment costs should be presented. Furthermore, elaboration of “others” expense for the three technologies is requested.	B.2.2	The efficiencies of the two types of coal power plants were obtained from the Thermal Power Engineering Design Reference Cost Guide (2004 edition) (hereafter referred to as the Guide) and Circular of the National Development and Reform Commission on Requirements on Planning and Construction of Coal Fired Power	OK DNV has verified that the efficiencies of the two types of coal power plants were obtained from the Thermal Power Engineering Design Reference Cost Guide (2004 edition) /32/and Circular of the National Development and Reform Commission on Requirements on Planning and Construction of Coal

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
		<p>Plants (Document No.NDRCEnergy [2004]864). The Guide was published by China Institute of Power Planning and Design as design guide of power plants for design institutes in China. As per the Guide, the efficiencies of the two types of coal power plants are power generation efficiency before subtraction of auxiliary consumption. EGC reflects power generation cost, not power supply cost. Therefore, the value of auxiliary consumption of power plant has no impact on the result of EGC.</p> <p>Data source of investment costs and other expenses are both provided in the calculation spreadsheet for levelised electricity generation cost.. Here “others” expenses include expenses relevant to work, such as administrative expense, travelling expense, traffic and commuting expense and business entertainment.</p>	<p>Fired Power Plants (Document No.NDRCEnergy [2004]864) /50/ and they are power generation efficiency before subtraction of auxiliary consumption. DNV can also verify that the “others” expenses include administrative expense, travelling expense, traffic and commuting expense and business entertainment.</p> <p>The CL is closed.</p>
<p>CL 6</p> <p>The project participants need to evidence that the same level of service is provided for the baseline alternatives. The installed capacity is the same, but the project participants have chosen in the levelized cost analysis a</p>	B.2.2	<p>As per the methodology AM0029, “alternatives need not consist solely of power plants of the same capacity, load factor and operational characteristics”.</p> <p>Load factor for coal fired power plants</p>	<p>OK</p> <p>In the methodology AM0029 version 3, it states “</p> <p>“these alternatives need not consist solely of power plants of the same capacity, load factor and operational</p>

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
significantly lower load factor for the project (40%) than for the alternatives. This is much lower than technologically feasible.		<p>and gas fired power plants were all obtained from the Thermal Power Engineering Design Reference Cost Guide (2004 edition) and Circular of the National Development and Reform Commission on Requirements on Planning and Construction of Coal Fired Power Plants (Document No.NDRCEnergy [2004]864).</p> <p>It is clear from EGC comparison as shown in Table 5 (sensitivity analysis of EGC of each alternative) of the PDD that EGC of coal fired power plant is significantly lower than that of natural gas power plant. The common practice for peak load balancing power plants is also coal fired power plants. China has abundant coal resources. According to the research by State Power Economic Research Institute (http://www.cnmn.com.cn/Show_20344.aspx), China will mainly resort to coal for power generation until around 2050. Under such circumstances, the fact that the natural gas power plant mainly functions as peak load balancing will be continued in the foreseeable future. As a</p>	<p>characteristics (i.e. several smaller plants, or the share of a larger plant may be a reasonable alternative to the project activity), however they should deliver similar services (e.g. peak vs. baseload power)". The three alternatives can supply similar level of service, i.e. operating for peaking purposes. In order to provide peaking service, the power generation units (e.g. CCGT units, coal-fired sub-critical units or super-critical units) have to start up frequently. In fact the start-up of CCGT units is much quicker than that of sub-critical units and super-critical units, and hence CCGT units operate with operational hours lower than that of coal-fired sub-critical units and super-critical units. Moreover, according to the methodology, "the share of a larger plant may be a reasonable alternative to the project activity". According to the definition of levelized cost of electricity production (LCEG), the LCEG of the share of a larger plant is the same as the LCEG for the larger plant, and this will thus not affect the comparison of LCEG between three baseline scenario</p>

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
		result, the load factor of power generation projects using natural gas in China is defined as 0.40 (3500 h/year) in Thermal Power Engineering Design Reference Cost Guide (2004 edition) as peak load balancing units.	alternatives. DNV has verified it is reasonable that the load factor of coal fired power plant for the peak load is higher than the NG fired power plant for the peak load because China mainly uses coal for power generation (http://www.cnmn.com.cn/Show_20344.aspx). The sources of load factors of alternatives and project have been checked by DNV. The CL is closed.
CL 7 Evidence needs to be provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.	B.3.1 B.3.4	Evidences are provided including the Meeting Minutes of Board Decision, CDM Consulting Contract and Term Sheet. Revision is done to Section B.5 in PDD to include the timeline of the Project regarding CDM consideration.	OK The CDM consideration of the project activity is demonstrated by the following milestones: a) On 11 November 2005, the EIA was approved by the Environmental Protection Bureau of Beijing /7/ b) On 14 December 2005, the FSR was approved by Beijing Development and Reform Commission /8/ c) According to the data of FSR and the FSR supplementary by North China Power Engineering (Beijing) Co., Ltd /6//8/, IRR of

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
			<p>the Project was below the benchmark (refer to the benchmark investment analysis below) and the project owner realized that the Project is not economically attractive without CERs sales revenues. So the Board Meeting of project owner was held on 15 December 2005 to give the board decision for starting CDM application, which is evidenced by Board Meeting Minutes for Starting CDM Application issued on 15 December 2005 /39/</p> <p>d) On 16 December 2005, CDM Consulting Contract was signed between Huadian Beijing Thermal Power Co., Ltd. and Taiwan Carbon Trade Promotion Association/40/</p> <p>e) On 28 February 2006, Equipment Procurement Contract of Turbines and Generators was signed between Huadian Beijing Thermal Power Co., Ltd. and Shanghai Electric Group Co. Ltd. /34/ and the</p>

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
			<p>project started.</p> <p>f) On 05 December 2006, Term Sheet of Emission Reductions for the project signed between Huadian Beijing Thermal Power Co., Ltd. and Global Carbon Capital Limited /41/</p> <p>g) Chinese LOA was issued by China's DNA on 22 March 2007</p> <p>The evidences were provided and verified by DNV.</p> <p>The CL is closed.</p>
<p>CL 8</p> <p>Some data source in IRR calculation spreadsheet need to be clarified, such as bus-bar tariff (excluding VAT), residual value, and natural gas price (excluding VAT).</p>	B.3.1	<p>Data source of bus-bar tariff, residual value, and natural gas price are provided. Revision is made to Section B.4 and Section B.5.</p>	<p>OK</p> <p>The data source in IRR calculation spreadsheet have been provided and verified by DNV. Residual value and natural gas price (excluding VAT) are sourced from FSR /6/. Bus-bar tariff (excluding VAT) is sourced from Circular on Transmitting Document of the National Development and Reform Commission on Issues Concerning Implementation of Coal and Electricity Prices' Linkage in North China Grid (Document No.JFG[2005]883)/42/. The relevant references have been checked by DNV.</p>

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
			The CL is closed.
CL 9 It needs to clarify the reason for the data difference between the FSR /7/ and the FSR Supplementary /8/	B.3.1	The project owner invested the Project and another three hot water boilers at the same time. Both of these project activities were complied in one FSR. Financial data provided in the FSR is the sum of the two. In order to do investment analysis for the Project, the project owner contact North China Power Engineering (Beijing) Co., Ltd., author of the FSR, asked for detailed data for the Project. FSR supplementary is the response letter which provided detailed data of the FSR.	OK FSR and FSR Supplementary have been checked by DNV and FSR supplementary is the response letter which provided detailed data of the FSR for three hot water boilers and other parts of the project. The CL is closed.
CL 10 In sensitivity analysis, the value for each parameter which will make the IRR exceed the benchmark should be calculated and give the reason why it is unlikely to happen.	B.3.1 B.3.2 B.3.3	Revision is made in Section B.5 of PDD and relevant policy papers are provided as evidences.	OK The sensitivity analysis has been verified by DNV, in which the values for each parameter which will make the IRR exceed the benchmark have been calculated and have given the reason why it is unlikely to happen. The CL is closed.
CL 11 It needs to be clarified why Beijing is chosen as the region for the common practice analysis. At least North China Power Grid should be chosen for the common practice analysis.	B.3.1 B.3.2 B.3.3	As per “Tool for the demonstration and assessment of additionality” (V05.2), “projects are considered similar if they are in the same country/region and/or rely on a broadly similar technology, are of a similar scale, and take place in a	OK DNV has verified that Beijing is provincial area in China and key economic parameters (such as bus-bar tariff and fuel price) were regulated by provincial government generally. For

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
		<p>comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.”</p> <p>Beijing is provincial area in China. In China, key economic parameters (such as bus-bar tariff and fuel price) were controlled by government at provincial level. Document NDRC[2006]1228/9/ is provided as evidence.</p> <p>Consider of comparable environment with respect to regulatory framework and investment climate, Beijing, as the provincial level that covers the location of the Project, is selected as the region for common practice analysis.</p>	<p>example, as per Notice on the Adjustment of Electricity Price of North China Grid issued by the National Development and Reform Commission on 28 June 2006/9/, it was clearly pointed out that the bus-bar tariffs of the provinces within North China Power Grid(NCPG) were different on provincial level. The bus-bar tariff of coal fired power plant located in Beijing area is different from the bus-bar tariff of coal fired power plant located in other provinces in NCPG. So it is reasonable that Beijing is chosen as the region for the common practice analysis.</p> <p>The CL is closed.</p>
<p>CL 12</p> <p>It needs to be proven that the common practice for peak load power plant is not natural gas power plant.</p>	<p>B.3.1</p> <p>B.3.2</p> <p>B.3.3</p>	<p>Common practice for peak load power plants involves coal fired power plants and pumped-storage power plant.</p> <p><i>As per Notice on Grid-connecting Operation and Management of Power Plants</i> issued by the State Electric Regulation Commission on 22/07/2003FF, coal fired power plants with installed capacity of more than 100</p>	<p>OK</p> <p>DNV has verified that the common practice for peak load power plant is coal fired power plants (http://baike.baidu.com/view/131512.htm).</p> <p>Relevant website has been checked</p> <p>The CL is closed.</p>

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
		<p>MW could provide peak load balancing services no less than 50% of the rated capacity.</p> <p>As pointed out by the website (http://baike.baidu.com/view/131512.htm), "Peak load power plants in Beijing Power Grid were mainly coal fired power plants prior to the construction of Pumped-storage Power Plant".</p>	
<p>CL 13</p> <p>The starting date of the project is defined with the evidence, such as the first investment for the project.</p> <p>The operational lifetime of the project is 20 years. The evidences are required to supply.</p>	<p>B.3.1 B.3.2 B.3.3 B.3.4 C.1.1</p>	<p>Evidences are provided including <i>Permission of Construction Start, Equipment Procurement Contract of turbines and generators, Equipment Procurement Contract of boilers and Civil Engineering Contract</i>. Relevant revision is made to Section B.5 and Section C.1.1 of the PDD.</p> <p>According to Referred Cost Index for Quota Design of Electric Power Engineering (2005) compiled by China Power Engineering Consulting Group Corporation and published by China Electric Power Press, "The life time for an NG power plant is 20 years" (P233). Therefore, in the FSRs of NG power plants in China, the operation period is</p>	<p>OK</p> <p>DNV has assessed and verified the evidence and timeline for the starting date of the project activity as follows:</p> <p>On 28 February 2006, Equipment Procurement Contract of Turbines and Generators was signed between Huadian Beijing Thermal Power Co., Ltd. and Shanghai Electric Group Co. Ltd. /34/</p> <p>On 03 April 2006, Equipment Procurement Contract of Boilers was signed between Huadian Beijing Thermal Power Co., Ltd. and Wuhan Boiler Co. Ltd. /35/</p> <p>In April 2006, Civil Engineering Contract signed between Huadian Beijing Thermal Power Co., Ltd. and</p>

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
		20 years.	<p>Tianjin Power Construction Company/36/.</p> <p>On 08 June 2006, Construction Permit was issued by Hebei Power Supervision Co. Ltd.</p> <p>Therefore, DNV was able to verify and confirm that the signature of Equipment Procurement Contract of Turbines and Generators on 28 February 2006 /34/ was the earliest real action for the project, which is deemed as the starting date of the project activity.</p> <p>DNV has also verified that the operational time for an NG power plant is 20 years according to FSR and Referred Cost Index for Quota Design of Electric Power Engineering (2005)</p> <p>The CL is closed.</p>
<p>CL 14</p> <p>The OM and BM are not exactly the same as the values of NDRC and it needs to be justified.</p>	<p>B.5.1</p> <p>B.5.2</p>	<p>Revision is made to update the OM and BM.</p>	<p>OK</p> <p><i>Calculation of the BM emission factor</i></p> <p>Because plant specific fuel consumption and electricity generation data is not publicly available in China, the EB answer to DNV's request for deviation of Chinese project activities from AM0005 /13/, the build margin is calculated with the following parameters:</p>

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
			<ul style="list-style-type: none"> - The capacity addition from the years 2001 to 2004 is chosen and represents 25.69% of total installed capacity/11/ - The weight of installed capacity additions for thermal power plant is accounted for 99.58% of total installed capacity additions./11/ - The standard coal consumption of 336.66 gSCE/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 by the DNA of China /20/. - The local net calorie value of each kind of fuel, the local carbon content of each kind of fuel and the IPCC 2006 default value of carbon oxidization factor are used to calculate the BM /14/. - The BM is calculated as 0.9253 tCO₂/MWh <p><i>Calculation of the OM emission factor</i> The simple OM emission factor</p>

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
			<p>calculation method is selected because low cost must run projects constitute less than 50% of the total grid generation and data is not available for applying the dispatch data analysis. The aggregated generation and fuel consumption data are used as more disaggregated data are not available in the NCPG. Country specific data for the net calorific value (NCV_i) of each type of fossil fuel, which can be obtained from the China Energy Statistical Yearbook /12/, the IPCC 2006 default values/14/ for the oxidation factor of each type of fossil fuel and the total electricity delivered to the NCPG selected are deemed reasonable. Vintage data for the years 2002, 2003 and 2004 are used for the OM emission factor calculation, which were the most recent data available at the time of submission of the PDD for validation. The electricity generation data are sourced from China Electric Power Yearbooks 2003-2005 /11/. The OM is calculated to be 1.0798tCO₂/MWh as a generation-weighted average for the three years.</p>

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
			<p>The most recent data are used to calculate the OM emission factor. The OM emission factor is derived from the China Energy Statistical Yearbooks 2000-2005/12/; the BM calculation is derived from the China Power Electric Power Yearbooks 2003, 2004, and 2005/11/</p> <p>The CL is closed.</p>
<p>CL 15</p> <p>It needs to be stated in PDD why 13.4 tCH₄/kt coal(for underground mining) is chosen as the default value for $EF_{BL, upstream, CH_4}$</p>	B.6.1	<p>Baseline scenario of the Project is to construct a sub-critical coal fired power plant with a unit capacity of 600 MW (see Section B.4 for details). Therefore $EF_{BL, upstream, CH_4}$ for the Project is $EF_{coal, upstream, CH_4}$. In China, coal supplied to generate electricity are dominated by underground mining, especially in North China. Since the reliable and accurate national data on fugitive CH₄ emissions associated with the production of coal is not available, as per the guidance on P8 of methodology AM0029 version 03, "the default values provided in Table 2" of methodology AM0029 version 03 was adopted. Therefore, 13.4 tCH₄/kt coal (for underground mining) provided in Table 2 of methodology AM0029 version 03</p>	<p>OK</p> <p>In China, the coal is mainly sourced from underground mining, especially in North China. According to Table 2" of methodology AM0029 version 03, 13.4 tCH₄/kt coal(for underground mining) is chosen as the default value for $EF_{BL, upstream, CH_4}$, which is reasonable.</p> <p>The CL is closed.</p>

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
		is chosen.	
CL 16 In the PDD, it is required to refer to that all the relevant data records will be kept for 2 years after the end of the crediting period or the last issuance of CERs, for the project activity, whichever occurs later.	B.8.2	Revision is made to Section B.7 to reflect this requirement.	OK The revision has been checked by DNV The CL is closed.
CL 17 The procedures need to be identified for emergency preparedness for cases where emergencies can cause unintended emissions	B.13.3	Revision is made to Section B.7 of PDD	OK The procedures have been identified for emergency preparedness for cases where emergencies can cause unintended emissions The CL is closed.
CL 18 The procedures need to be identified for corrective actions in order to provide for more accurate future monitoring and reporting.	B.13.5	Revision is made to Section B.7 of PDD.	OK The procedures have been identified for corrective actions in order to provide for more accurate future monitoring and reporting. The CL is closed.
CL 19 The expected start date of the crediting period is 1 January 2009, which is not reasonable.	C.1.2	The expected start date of the crediting period is revised to 1 January 2010 or the date of registration, whichever is later..	OK The project selects a renewable crediting period of seven years, starting on 1 January 2010 or the date of registration, whichever is later. The CL is closed.
CL 20 The stakeholder comments questionnaire need	E.1.4	The stakeholder comments questionnaires are provided.	OK The stakeholder comments

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 be provided			questionnaires are provided and checked by DNV. The CL is closed.
<p>CL 21</p> <p>One comment was received during the period. DNV requests a reply from the project participant.</p>		<p>Project owner's response:</p> <p>Although the Project will supply certain amount of heat in heating season besides power generation, there are neither regulations forbidding electricity generation using coal nor regulations forbidding heat generation using coal in Beijing. When drafting the FSR for the Project in 2005, there are only power sources of coal fired power plants and hydropower plants in Beijing. Meanwhile, the network supplying heat for Beijing had been integrated and the heat supply is centrally controlled (From P9 of the FSR). The heat sources for Beijing comprise four coal fired co-generation power plants and three heat supply plants using natural gas boilers (From P8 of the FSR). Under such circumstances, without consideration of CERs sales revenues, the reasonable option for the project owner could be to give up construction of the Project, or to generate energy with one of the following options</p>	<p>OK</p> <p>DNV checked the FSR of the project and can confirm that the heat sources of Beijing was mainly by coal fired co-generation power plants or heat supply plants using natural gas boilers at the time of FSR preparation and natural gas fired cogeneration power plant was not a common options. Moreover, the project owner is an independent company who operates and takes responsibility for its profits and losses by itself.</p> <p>(http://www.chdc.com.cn/about.asp?typencode=1), so the project did not obtains the investment or any preferential policy support in the aspect of loans from the government. The interest rate of loan is the same as the normal interest rate, which is evidenced by Loan Agreement for Huadian Beijing Natural Gas based Power Generation Project signed between Huadian Beijing Thermal Power Co., Ltd. and bank group in March 2007. The bus-bar tariff</p>

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
		<p>· using coal as fuel for power/heat generation; or</p> <p>· constructing coal/natural gas fired boilers which solely meet the heat demand.</p> <p>Moreover, there is a misunderstanding regarding “key project” or “government project”. There are no regulations or policies issued by the government implying that “key project” or “government project” is or should be implemented by the government. As per the FSR approval, the EIA approval and relevant documents of the Project, the project owner is a company who operates independently and assumes sole responsibility for its profits and losses, not a government department. Moreover, the Project obtains neither any investment from the government nor any preferential policy support in the aspect of loans. For example,</p> <p>a. In the Loan Agreement, it is clearly defined that “the interest rate is 6.84%, the same as the normal interest policy issued by the People’s Bank of China”.</p> <p>b. The bus-bar tariff of the Project is</p>	<p>for the project was approved by government is 0.452RMB, which is the same as the bus-bar tariff of natural gas fired power plants in Beijing /49/. Moreover, natural gas price for the project is fluctuating by the market/47/.</p> <p>The CL is closed.</p>

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
		<p>controlled by the government as 0.452 RMB/kWh in Circular on Enhancing the Electricity Tariff of North China Gird by the National Development and Reform Commission (Document No.NDRCElectricity[2008]1677), which is lower than that expected by the Project Owner . The same bus-bar tariff has been approved by the government in the same document for all the other natural gas fired power plants located in Beijing .</p> <p>c. The natural gas price of the Project fluctuates according to the market. The natural gas price in 2004 was 1.40 RMB/m³. By the end of 2007, the natural gas price increased to 1.95 RMB/m³ for all the industrial consumer of natural gas within Beijing, including the Project Owner. Relevant invoices have been provided as evidences.</p> <p>From the above, the Project is a purely commercial action implemented by the project owner. Without consideration of CERs sales revenues, the Project will not be implemented.</p>	

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Michael Lehmann

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

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
<i>Landfill gas</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Hydro power</i>	Jan 2009	Jan 2009	Jan 2009		
<i>Renewables Wind power</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Other renewable</i>	Jan 2009	Jan 2009			
<i>Biomass</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Grid connection of isolated system</i>	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
<i>Cement</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Waste-heat / waste-gas recovery</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Efficiency of thermal power plants</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Coal mine methane</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Fuel switch</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Manure management</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Waste / wastewater treatment</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Energy efficiency</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>N₂O</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>HFCs</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Flare reduction</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>PFCs</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Charcoal</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>CO₂ recovery</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Transport</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Non-renewable biomass</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Biofuel</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Pipeline leakage reduction</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>SF₆</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann
Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

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

GHG Auditor:	yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
<i>Landfill gas</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Hydro power</i>	Jan 2009	Jan 2009			
<i>Renewables Wind power</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Other renewable</i>	Jan 2009	Jan 2009			
<i>Biomass</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Grid connection of isolated system</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Cement</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Waste-heat / waste-gas recovery</i>	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
<i>Efficiency of thermal power plants</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Coal mine methane</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Fuel switch</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Manure management</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Waste / wastewater treatment</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Energy efficiency</i>	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
<i>N₂O</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>HFCs</i>	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
<i>Flare reduction</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>PFCs</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Charcoal</i>	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
<i>CO₂ recovery</i>	Jan 2009	Jan 2009	Jan 2009	Jan 2009	Jan 2009
<i>Transport</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Non-renewable biomass</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Biofuel</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>Pipeline leakage reduction</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009
<i>SF₆</i>	Jan 2009	Jan 2009		Jan 2009	Jan 2009

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

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

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas	Jan 2009				
Hydro power	Jan 2009				
Renewables	Jan 2009	Jan 2009		Jan 2009	Jan 2009
Wind power					
Other renewable					
Biomass	Jan 2009				
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery	Jan 2009	Jan 2009	Jan 2009		
Efficiency of thermal power plants			Jan 2009		
Coal mine methane					
Fuel switch			Jan 2009		
Manure management					
Waste / wastewater treatment	Jan 2009				
Energy efficiency	Jan 2009	Jan 2009	Jan 2009		
N ₂ O					
HFCs	Jan 2009	Jan 2009			
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery			Jan 2009		
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

Høvik, 9 January 2009

Michael Lehmann

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CERTIFICATE OF COMPETENCE

zhi Ang (Walter) Tang

Qualification in accordance with DNV's Qualification Scheme CDM/JI (ICP-8-1-CDMJ1-i1)

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas					
Hydro power	Jan 2009				
Renewables	Jan 2009			Apr 2009	Apr 2009
Wind power					
Other renewable					
Biomass					
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery					
Efficiency of thermal power plants	July 2009	July 2009			
Coal mine methane					
Fuel switch					
Manure management					
Waste / wastewater treatment					
Energy efficiency					
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

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CERTIFICATE OF COMPETENCE

Hendrik Brinks

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

GHG Auditor:	Yes				
Technical Area	CDM Validator	CDM Verifier	Sector Expert	Methodology Expert	Technical Reviewer
Landfill gas	Jan 2009			Jan 2009	Jan 2009
Renewables					
Hydro power					
Wind power				Jan 2009	Jan 2009
Other renewable					
Biomass				Jan 2009	Jan 2009
Grid connection of isolated system					
Cement					
Waste-heat / waste-gas recovery				Jan 2009	Jan 2009
Efficiency of thermal power plants					
Coal mine methane				Jan 2009	Jan 2009
Fuel switch					
Manure management					
Waste / wastewater treatment				Jan 2009	Jan 2009
Energy efficiency				Jan 2009	Jan 2009
N ₂ O					
HFCs					
Flare reduction					
PFCs					
Charcoal					
CO ₂ recovery					
Transport					
Non-renewable biomass					
Biofuel					
Pipeline leakage reduction					
SF ₆					

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