



VALIDATION REPORT

“POWER GENERATION FROM COKING WASTE HEAT UTILIZATION PROJECT AT SHANXI SHOUYANG COUNTY BODA INDUSTRIES Co., LTD, CHINA”

REPORT No. 2007-1157

REVISION No. 01



VALIDATION REPORT

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DNV CERTIFICATION AS

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Client: EEA Fund Management Ltd.	Client ref.: Des Godson

Project Name: Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd, China

Country: China

Methodology: ACM0004

Version: 02

GHG reducing Measure: Waste heat recovery from the coking process for power generation

ER estimate: 78 756 tCO₂e per 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 "Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd, China" project as described in the PDD version 02 of 19 February 2008, meets all relevant UNFCCC requirements for the CDM and correctly applies the baseline and monitoring methodology ACM0004 version 2. DNV thus requests the registration of the project as a CDM project.

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Report title: "Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd" in China		
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Key words:
Validation
Climate Change
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Clean Development Mechanism

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEA	Central Electricity Authority
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
DRC	Development and Reform Committee
EB	Executive Board
GHG	Greenhouse gas(es)
GWh	Giga Watt Hour
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
IRR	Internal Rate on Return
kWh	Kilo Watt hour
MW	Mega Watt
MP	Monitoring Plan
NCPG	North China Power Grid
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change



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1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd, China” project. 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 the United Kingdom. Both Parties fulfil the participation criteria and have approved the project and authorized the project participants. The DNA from China confirmed that the project assists in achieving sustainable development.

The project correctly applies ACM0004 “Consolidated baseline/monitoring methodology for waste gas and/or heat and/or pressure for power generation”, version 2.

By utilising waste heat for power generation, instead of venting it, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.

The total emission reductions from the project are estimated to be on the average 78 756 tCO₂e per year over the selected 7 year renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate training and monitoring procedures will be implemented before the starting date of the crediting period.

In summary, it is DNV’s opinion that the “Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd, China”, as described in the PDD of 19 February 2008, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0004. DNV thus requests the registration of the project as a CDM project activity.



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2 INTRODUCTION

EEA Fund Management Ltd. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd, 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, ACM0004. The validation team has, based on the recommendations in the Validation and Verification Manual /4/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

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



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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/ Shanxi Shouyang County Boda Industries Co., Ltd: *CDM Project Design Document* - "Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd in China" version 1, dated 30 April 2007, final version 2 of 19 February 2008.
- /2/ Letter of approval, DNA of the Republic of China, of 26 August 2007.
- /3/ Letter of approval, DNA of United Kingdom, of 19 October 2007.
- /4/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual*.
<http://www.ieta.org/ieta/www/pages/index.php?IdSitePage=200>
- /5/ ACM0004: Consolidated methodology for waste gas and/or heat for power generation – version 2, of 03 March 2006.
- /6/ ACM0002: Consolidated baseline/monitoring methodology for grid-connected electricity generation from renewable sources - version 6, 19 May 2006.
- /7/ Revised Feasibility study report by Shanxi Taihua Chemical Engineering Design Company Limited dated May 2005.
Original Feasibility study report approval for coke plant and waste heat recovery by the Development and Reform Commission of Shanxi Province dated 10 January 2004.
- /8/ Invoices from the grid company for electricity imported prior to the project implementation, dated 26 October 2007.
- /9/ Notice on Adjustment on Electricity Price in Shanxi" issued by the Shanxi Provincial Pricing Bureau in 2004.
- /10/ Clarification letter from the Shanxi Province 21 Agenda Sustainable Development Office (under the Provincial Development and Reform Committee), April 2006.
- /11/ The EIA of power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd project dated December 2006, approval letter by the Environmental Protection Bureau of Shanxi on 9 July 2007.
- /12/ CDM Executive Board: Tool for the demonstration and assessment of additionality,

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version 4, EB 36 meeting.

- /13/ Revised 2006 IPCC Guidelines for National Greenhouse Gas Inventories.
- /14/ China Electric Power Yearbooks 2003-2006.
- /15/ China NDRC, the emission factor calculation for each power grid of China, published on 9 August 2007, NDRC official website:
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1364.pdf>
- /16/ CDM Executive Board, Guidance for request for deviation titled "Application of AM0005 and AMS-I.D in China" (<http://cdm.unfccc.int/Projects/Deviations>).
- /17/ The General Office of the State Council, *Notice on Strictly Prohibiting the Installation of Fuel-fired Generation with the Capacity of 135MW or below*, decree No. 2002.6
<http://www.chinavalue.net/wiki/showcontent.aspx?titleid=61180>
- /18/ Copies of the questionnaires distributed to the stakeholders, along with the responses.
- /19/ China energy statistical yearbook 2005, Page 214 - Energy balance of Shanxi-2004.
- /20/ IRR calculation spreadsheet for the project activity, of 18 January 2008.
- /21/ Revised IRR calculation spreadsheet for the project activity with updated sensitivity analysis and demonstrating that the depreciation values have been used in tax calculation towards cash flow, of 19 February 2008.
- /22/ Shanxi Coking Installations Category of the Provincial Governmental Document [2005].
- /23/ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1052.xls>
- /24/ <http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1051.xls>
- /25/ The regulation on management of Electricity Safety production and The regulation on management of commercial operation for new power plant:
<http://www.cec.org.cn/news/showc.asp?id=24443> &
<http://www.cec.org.cn/news/showc.asp?id=95680>
- /26/ The National Development And Reform Committee and State's Planning Department, 2006 the *Economic Assessment Method and Parameters for Project Construction* 3rd edition.

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

- Emission reduction estimates have been updated using correct emission factors,
- The sensitivity analysis in section B.5 of the PDD has been updated to reflect variation in each of the main parameters that is required to reach the benchmark of 12% and the likelihood of that change to occur,
- Date of operation of the coking plant, date of consideration of the waste heat recovery project, and the date of construction of the proposed project activity were added in section B.5 of the PDD,
- Discussion on barrier analysis has been removed in section B.5 of the PDD,
- Starting date of project activity in section C.1.1 was updated from 1 January 2008 to 1 March 2008 which reflects the date of planned construction of project activity,



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- Starting date of the first crediting period in section C.2.1.1 was updated from 1 January 2008 to 15 May 2008, and
- The monitoring equipment in section B.7.2 was updated from “ammeter” to “electricity meter”.

3.2 Follow-up Interviews with Project Stakeholders

On 21 July 2007, DNV performed interviews with representatives of Trading Emissions PLC, the project developer, the local representative from the Development and Reform Commission in Shanxi and local stakeholders to confirm selected information and to resolve issues identified in the document review. DNV also visited the coking plant on the same date.

Furthermore, all issues identified by DNV during the subsequent stages of validation have been clarified through continuous communications with Trading Emissions PLC. The project participants have also provided underlying documentation for review by DNV, confirming selected information and resolving issues identified in the validation. An overview of the reviewed documentation is listed in the references in section 3.1 above.

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified prior to DNV’s positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the 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 “Power generation from coking waste heat utilization project at Shanxi Shouyang County Boda Industries Co., Ltd, China” project is enclosed in Appendix A to this report.

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

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

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

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

3.5 Validation Team

Role/Qualification	Last Name	First Name	Country
Team leader, CDM Validator	Rescalvo	Miguel	Norway
CDM Validator	Kutty	Mathsy	India
CDM Validator	Yue	Mindy	China
GHG Auditor (Trainee)	Khawaja	Rafi	Norway
Sector expert	Lehmann	Michael	Norway
Technical reviewer	Brinks	Hendrik W.	Norway

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 2 of 19 February 2008 /1/.

4.1 Participation Requirements

The project participants are Shanxi Shouyang County Boda Industries Co., Ltd from China and Trading Emissions PLC from the United Kingdom. The host Party China and the Annex I Party United Kingdom meet all the requirements to participate in the CDM.

The DNA of China has issued the letter of approval (LoA) on 26 August 2007 /2/, authorizing Shanxi Shouyang County Boda Industries Co., Ltd as project participant and confirming that the project contributes to the sustainable development in China. United Kingdom has issued the LoA on 19 October 2007 /3/, authorizing Trading Emissions PLC as project participant.

The project will not receive any public funding from Parties included in Annex I of the UNFCCC. The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funds towards China.

4.2 Project Design

The project activity involves utilization for power generation of the waste heat generated during the coke production at an existing coking facility in Boda Industries, for power generation. The coking facility is located at Jinzhong City in the middle of Shanxi Province, 58 km away from Taiyuan City in China. The power generated from the plant is exported to the North China power grid (NCPG).

The project activity is located at a clean type non-chemical-recovery coke production facility, which has been in operation since 2004. In the absence of the proposed CDM project activity the coking plant met all its electricity requirements from the grid, while the waste heat was directly emitted into the atmosphere.

The project envisages installation of three waste heat boilers of 35 tonnes steam per hour capacity each and two steam turbines coupled with two generators of capacities 6 MW each, in total 12 MW. The project is expected to generate a net electricity of 76.44 GWh per annum after meeting the auxiliary needs for the project. This will entirely be exported to the Shanxi Power Grid which is a constituent of the North China power grid (NCPG). The electricity demand for coke washing, molding, conveying and quenching as well as the electricity needs of other auxiliary facilities will be imported from the grid. DNV was able to confirm the estimated total electricity generation against the feasibility study report (FSR) /7/.

The starting date of the project activity is 1 March 2008. This corresponds to the planned date of construction for the project activity and has been confirmed by DNV during validation. The expected operational lifetime of the project activity is 30 years. Due to uncertainties in future market demand, technical development, inflation and change in policy etc; the project proponent has used a 20 years project lifetime that was found reasonable to DNV. The project

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proponent has selected a renewable crediting period of 7 years with the starting date 15 May 2008.

4.3 Baseline Determination

The project activity applies the approved consolidated baseline methodology ACM0004 version 2 “Consolidated baseline methodology for waste gas and/or heat and/or pressure for power generation” /5/. This methodology is applicable to the project activity since

- i) The current practice is release of the waste heat into the atmosphere. During the site visit carried out as part of the validation process, it has been confirmed that the waste heat is released in the atmosphere without the existence of any boiler in the proximities,
- ii) The electricity generated by the project will displace part of the electricity in the North China power grid (NCPG).
- iii) No fuel switch activity is taking place in the coking process after the implementation of the project. Coal remains the main fuel used in the coke production facility and the project will not increase the coal consumption for other purposes than coking. The electricity consumption of the coking plant will after the implementation still be purchased from the grid.

The project’s system boundaries include the following:

		<i>GHGs involved</i>	<i>Description</i>
<i>Baseline emissions</i>	Grid electricity generation	CO ₂	Fossil fuel intense electricity generation in the grid.
<i>Project emissions</i>	None	-	The proposed project does not have on-site fossil fuel consumption

The project boundary includes the coking oven, boiler, steam turbines and the generator in addition to all the power plants connected physically to the electricity grid.

The plausible baseline scenarios discussed for the project include:

- a. The proposed project activity not undertaken as a CDM project activity: waste heat utilization and net export of electricity to the grid;
- b. Import of electricity from the grid and release of waste heat;
- c. Existing or new captive power generation on-site, using other energy sources than waste heat and/or gas, such as coal, diesel, natural gas, hydro, wind and release of waste heat;
- d. A mix of options (b) and (c), in which case the mix of grid and captive power should be specified;
- e. Other uses of the waste heat and import of electricity from the grid;
- f. The continuation of the current situation: release of waste heat and import of electricity from the grid.

Alternative (a) is not financially attractive as discussed in section 4.4 below. Hence, this alternative scenario has been eliminated from the baseline scenario analysis.

Alternative (c) includes existing or new captive power generation onsite using energy sources other than waste heat and/or gas, such as coal, diesel, natural gas, hydro, wind. The installation of a coal, diesel or natural gas based small scale power plant would not comply



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with the Chinese regulations. DNV was able to confirm against the *Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators* /17/, that the installation of fossil fuel-fired power units with a capacity of less than 100 MW are strictly prohibited. Furthermore, utilization of the hydro and wind resources for power generation as a baseline scenario is not an option to the project developer, given the unavailability of hydro and wind resources at the project site. The same was confirmed by the China energy statistical yearbook, energy balance for Shanxi /19/.

Alternative (d), which is a combination of alternative (b) and (c) has been excluded from the analysis since, alternative (c) is not a plausible scenario for the project activity.

Alternative (e) has been excluded from the baseline study because there are no other applications of the waste heat currently, since the project is not located at the vicinity of other facilities or accommodations, to which the waste heat can be sold to. The usual practice for the waste heat is to be emitted into the atmosphere without being utilized for any purposes. DNV was also able to confirm the same with the local representatives of the National Development and Reform Commission in Shanxi, during the follow-up interviews.

Alternatives (b) is the continuation of the current situation, which is the generation of an equivalent amount of electricity by grid connected sources and import of power from the grid for internal uses, combined with release of the waste heat from the clean-type non-recovery coking furnaces. This alternative faces no barriers as compared to other alternatives identified. This alternative does not require the project developer to make any additional investments unlike in the case of the implementation of the project activity.

The baseline scenario thus selected for the project activity is an equivalent amount of grid based electricity generation. In the baseline scenario the electricity delivered from the project activity to the NCPG would have been generated by fossil fuel grid-connected power plants and by the addition of new generation sources. NCPG is dominated by coal-fired power plants. It is deemed likely that coal-fired power plants will continue to dominate the power sector due to the local availability of low-cost coal. It is expected that renewable capacity additions will not have significant effects on the mix of the North China power grid during the crediting period.

The baseline determination is considered transparent and reasonable by DNV.

4.4 Additionality

The project proponent has demonstrated the additionality of the project by applying the “Tool for demonstration and assessment of additionality” version 4 /12/, as follows:

The feasibility study report (FSR) for the coking plant including the waste heat recovery was approved by Shanxi Development and Reform Committee /7/ on 10 January 2004. Based on this, Shanxi Shouyang County Boda Industries decided to build the coking plant without the waste heat recovery. The revised FSR from May 2005 only covers the waste heat recovery project. This was prepared by an independent body accredited for preparation of FSRs. The updated financial analysis clearly indicates that the project is financially unattractive and the FSR point to the fact that if considering CDM revenues, this will further improve the financial conditions for the project activity. Hence, DNV confirms that CDM incentives were seriously considered in the revised FSR. The construction of the project had not started at the start of CDM validation.

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Step 1: Identification of alternatives to the project activity consistent with current laws and regulations:

Identified alternatives to the proposed project activity include:

- a. The proposed project activity not undertaken as a CDM project activity: waste heat utilization and net export of electricity to the grid;
- b. Import of electricity from the grid and release of waste heat;
- c. Existing or new captive power generation on-site, using other energy sources than waste heat and/or gas, such as coal, diesel, natural gas, hydro, wind and release of waste heat;
- d. A mix of options (b) and (c), in which case the mix of grid and captive power should be specified;
- e. Other uses of the waste heat and import of electricity from the grid;
- f. The continuation of the current situation: release of waste heat and import of electricity from the grid.

Amongst the identified alternatives, thermal based power generation (coal, diesel and natural gas) under alternative (c) is not compliant with the regulations in China, which does not allow for the installation of fossil fuel-fired power units with a capacity of less than 100 MW /17/. Hydro, wind power and other uses of waste heat (alternative e) are not available to the project participants. Alternative (d), which is a combination of alternative (b) and (c) has also been excluded since, alternative (c) is not a plausible scenario for the project activity. In addition alternative (f) is the same as the alternative (b) with import of electricity from the grid.

Hence, only a) the proposed project activity not undertaken as a CDM project activity and b) the continuation of the current situation with import of electricity from the grid are realistic alternatives.

Step 2: Investment analysis:

The benchmark analysis is adopted in the investment analysis for the project since revenues are generated by the project and there are no investment alternatives.

The benchmark chosen for the project activity is the benchmark financial IRR for the coking industry as per the *Economic Assessment Method and Parameters for Project Construction* 03 edition (2006). The benchmark considered for the project activity is deemed conservative and acceptable since the core business of the project developer remains coke production. From an investors' perspective, the sectoral benchmark of 12%, is thus acceptable in DNV's view, since if in case the return expected from the project activity is less than that of the coking sector benchmark, the project proponent would rather invest in further coking production units, as opposed to investing in the project activity.

The investment analysis is mainly based on the revised feasibility study report of May 2005 developed by Shanxi Taihua Chemical Engineering Design Company Limited. In China, a feasibility study report (FSR) is developed by a third party who is accredited for this task directly by the government. The FSR is only approved after public assessment of the sector experts designated by the government. In this case the original FSR included both the coking plant and the waste heat recovery. The financial analysis was updated in a revised FSR by an accredited party to determine the feasibility of the waste heat recovery project alone with the most recent information available. The original and revised FSRs are considered reliable



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information from an independent and recognized source.

During assessment of this project, the parameters used in the IRR analysis were compared with the FSR and found to be consistent. All taxes were confirmed to be correctly applied. The electricity prices were in addition checked independently against electricity purchase invoices. For this purpose, DNV reviewed the “Notice on Adjustment on Electricity Price in Shanxi” issued by the Shanxi Provincial Pricing Bureau in 2004 /9/. Also the reasonableness of the other parameters used in the IRR was analyzed. The investment per MW and operating cost as a fraction of investment costs were found to be in line with similar projects validated by DNV. The capacity factor of 79.9% is conservative. The IRR calculation spreadsheet has been provided and checked by DNV. DNV was thus able to verify the IRR calculations, to verify that the parameters used in the IRR were consistent with the parameters used in the FSR and to confirm that the parameters used in the IRR are reasonable.

An investment analysis for the project activity showed that the project IRR is 9.46% as compared to the benchmark of 12%.

It has been demonstrated by the project proponent that the IRR of the project will exceed the benchmark of 12% if the total investment drops by 15.57%, the O&M cost drops by 24.52%, the electricity price increases by 13.25% and the operating hours increase by 13.36%. A breakdown in total cost has been reviewed by DNV to assess the likelihood of variations in total investment and the O&M costs. In DNV’s opinion, it is unlikely that these costs will vary to the extent that the IRR would exceed the benchmark.

Projected increase in unit price of electricity sold to grid is very unlikely to change by 13.25% since establishing and modifying electricity tariff is highly regulated and controlled by the central government in China and the values used in the investment analysis are taken from the feasibility study report. In addition, the electricity tariff used in the investment analysis was in line with the value listed in “Notice on Adjustment on Electricity Price in Shanxi” issued by the Shanxi Provincial Pricing Bureau in 2004.

An increase in operating hours by 13.36% is also very unlikely that would correspond to a capacity factor of 90.68% which is unrealistic.

Based on the details above, DNV was thus able to confirm that the project activity is not the most financially attractive option to the project developer.

Step 3: Barrier analysis: This step has not been chosen.

Step 4: Common practice analysis:

The coke production can either result in a waste heat or a waste gas generation. The coke production technology which results in only waste heat is called a clean-type technology. As per the Chinese regulations, there are certain mandatory requirements for coking units to utilize waste gas from the coke production. However, there are no mandatory requirements for coking units to utilize the waste heat.

Shanxi Province is the largest producer of coke in China. Of the total 717 coking units in Shanxi province /22/, only 35 use the clean-type technology for coke production, as opposed to the traditional technologies used by other plants. Out of these 35 coking units in Shanxi province, 10 are utilization waste heat, or are in the process of planning to utilize waste heat, for electricity generation including the proposed project activity. DNV was able to confirm this against a clarification letter from the Shanxi Province 21 Agenda Sustainable



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Development Office (under the Provincial Development and Reform Committee). This letter lists the projects utilizing the clean-type technology for coke production and lists the projects that are in the CDM pipeline for electricity generation projects /10/. The remaining 25 clean-type coke production facilities in Shanxi province are either emitting the waste heat in the atmosphere or are in the early stage of planning to utilize waste heat for electricity generation. However, through communication with representative of Shanxi Development and Reform Committee (DRC), it has been confirmed that the common practice in Shanxi province is to release waste heat in the atmosphere without its utilization for electricity generation. It has also been stated by the representative of the Shanxi DRC that many clean-type coke producers have received approvals for their feasibility study reports to utilize waste heat for electricity generation. However, they have not initiated the process and are only producing coke due to financial constraints. In addition, the letter from the Shanxi Province 21 Agenda Sustainable Development Office referred above encourages the projects developers that are at planning stage to apply for CDM. All of the 10 projects currently utilizing waste heat for power generation and applying for CDM are being validated by DNV.

The consideration of only the clean-technology coking units has been accepted by DNV due to the fact that the two technologies are governed by different regulatory requirements. In addition, the two types of project technologies apply different types of boilers, viz.: the clean type technology uses waste heat recovery boilers, while the power generation in traditional technology type is using combined gas and steam turbines.

In conclusion, based on the investment barrier and the common practice analysis provided, it is demonstrated that the project faces financial and common practice barriers and that the emission reductions from the project can therefore be deemed additional.

4.5 Monitoring

The project applies the approved monitoring methodology, ACM0004 “Consolidated methodology for waste gas and/or heat and/or pressure for power generation”, version 2 /5/. The selected monitoring methodology is justifiably applicable for the project activity as it involves power generation using waste heat generated at the coking facility and there is no change in the process from which the waste heat is generated.

4.5.1 Parameters determined ex-ante

The grid emission factor of NCPG has been fixed *ex-ante* for the first crediting period of seven years. The estimation has been done in a transparent and conservative manner by the combined margin approach outlined in the ACM0002 methodology.

4.5.2 Parameters monitored ex-post

The parameters that will be monitored in the project activity include the total electricity generation, auxiliary consumption and the net electricity exported to the NCPG. This data is continuously monitored using the meters installed at the project site and recorded on a monthly basis. The data can be cross-checked against the recorded reading through a remote control system at the grid company. The electricity meter will be automatically recorded by remote control system. Receipts from electricity sales will also be obtained for cross checking. All data will be archived for a period of two years following the end of the crediting period.

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4.5.3 Management system and quality assurance

The authority and responsibility of the project management has been clearly described to include a CDM manager for the overall supervision of the monitoring plan, a technical department for the calibration, maintenance of equipments in addition to checking and archiving of data. The financial department will be mainly involved in the checking of data like the electricity sales records, copies of electricity sales receipt and ammeter reading records. The responsibility of the data monitoring will involve monitoring data through the distributed control systems (DCS) which will be installed in the proposed project and can measure online, check and collect the meter data. Individual electricity meters are installed at proper locations for monitoring of the auxiliary energy consumption, (EG_{aux}) and for total electricity generated (EG_{gen}). The electricity sold to the grid or the external entities if any, is also monitored. The monitored data can be further verified against the receipts from the grid company. The local power grid also uses a remote control system to for measurement of the metered data.

The electric metering system will be equipped, installed and operated in line with the requirements of the *Technical Administrative Code of Electric Energy Metering* (DL/T448-2000). All meters will be calibrated in line with the relevant standards and regulation for the power sector. On calibration of the meters, the meters are sealed in the presence of both the project developer and the grid company. The sealed meters are not allowed to be opened, without both the parties being present.

The monitoring section will collect the information and data required by the monitoring plan. The collected information will be documented on a monthly basis, further to which the data is written stored electronically and a print out of the same is also taken. The copies of the electricity sales receipts from the grid company are also stored for the cross-verification.

4.6 Estimate of GHG Emissions

The emission reductions ER_y due to the project activity during the crediting period is estimated as the difference between the baseline emissions due to grid electricity generation with fossil fuels (BE_y) and project emissions (PE_y) and leakage (L_y) as follows:

Project emissions (PE_y): There is no auxiliary fuels utilized at the project site due to the project activity, and hence the project emissions are regarded as zero.

Leakage (L_y): No leakage effects are required to be considered for the project activity as per the methodology. Hence leakage is taken as zero.

Baseline emissions (BE_y): Baseline emissions in tCO_2 is computed as a function of the baseline emissions factor of the North China regional power grid (EF_y in tCO_2/MWh) and the net electricity exported to the grid by the project activity.

The baseline emission factor for the project is determined *ex-ante* as a combined margin, consisting of combination of the operating margin (OM) and build margin (BM) in line with ACM0002 version 6.

For calculation of the OM emission factor, the simple OM emission factor calculation method is selected because data are not available for applying the dispatch data analysis and low-cost/must-run projects constitute less than 50% of the total grid generation. The aggregated generation and fuel consumption data are used due to the more plant specific data are not available for the NCPG. Country specific data for net calorific value (NCV_i) of each type of

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fossil fuel, the default values from 2006 revised IPCC guidelines /13/ for oxidation factor, national emission factors of fossil fuel and the total electricity delivered to the NCPG selected are deemed reasonable /15/. Data for the years 2003, 2004 and 2005, which is the latest data available at the time of submission of the PDD for validation have been used for the estimation the OM emission factor. The OM is estimated to be 1.1208 tCO₂e/MWh. DNV was able to confirm all assumption used for the OM estimation against the relevant data sources.

Because plant specific fuel consumption and electricity generation data is not public available in China, the EB guidance on the request for deviation titled “Application of AM0005 and AMS-I.D in China” /16/ has been applied as follows:

- Use of capacity additions from one year to another for estimating the build margin emission factor for grid electricity
- Use of weights estimated using installed capacity in place of annual electricity generation
- Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM).

The application of the above deviation is acceptable to the concerned project activity, since the AM0005 has now been replaced and incorporated into ACM0002.

The capacity additions from the years 2003 to 2005 are chosen and reach 23.78% of total installed capacity. The weight of installed capacity additions for thermal power plant is accounted for 99.3% of total installed capacity additions.

The standard coal consumption of 343.33 gSCE/kWh is used to determine the BM emission factor, which is deemed conservative. The coal consumption efficiency of 35.82% is defined as the best technology commercially available in China by the DNA of China /25/.

Country specific data for net calorific value (NCV_i) of each type of fossil fuel, the default values from 2006 revised IPCC guidelines /13/ for oxidation factor, national emission factors of fossil fuel are deemed reasonable.

The BM thus applying the deviation and as published by the DNA of China /25/ is estimated to be 0.9397 tCO₂e/MWh. The combined margin thus works out to be 1.0303 tCO₂e/MWh. The project is expected annually export 76.44 GWh electricity on complete implementation of the project /7/ to the grid. The project is expected to result in an estimated emission reduction of 78 756 tCO₂e per year and a total of 551 292 tCO₂e in the first crediting period from 2008 to 2014.

4.7 Environmental Impacts

An environmental impact assessment (EIA) was conducted according to Chinese law & regulation, and was approved by the Environmental Protection Bureau of Shanxi /11/ on 9 July 2007.

The potential environmental impacts have been sufficiently identified and adequate environment management measures have been defined. No significant environmental impacts are envisaged in the project activity.



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4.8 Comments by Local Stakeholders

In addition to the stakeholder consultation process stipulated in the Chinese EIA regulation, the project developer conducted an additional stakeholder consultation process. Between 20 April 2007 and 29 April 2007, the project proponent sent out letters inviting comments from the local public and in addition to the questionnaires distributed to the identified stakeholders. The identified stakeholders included, 10 people as representatives from the government, organizations and 30 others from the representing the locals from the nearby villages. The related governments and organizations included Shouyang County Development and Reformation Bureau, Shouyang County Environment Protection Bureau, the Office of People's Government of Shouyang County, Shouyang County Economy and Trade Bureau, the People's Government of Wenjiazhuang Town etc. The villager's representative was from Wenjiazhuang Village.

There were no adverse comments on the project activity and all comments were supportive of the project. A summary of comments was provided and reviewed by DNV /18/.

4.9 Comments by Parties, Stakeholders and NGOs

The PDD of 30 April 2007 was made publicly available on DNV's climate change website and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 5 May 2007 to 3 June 2007.

No comments were received during the 30 day commenting period.



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APPENDIX A

CDM VALIDATION PROTOCOL



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Table 1 Mandatory Requirement 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	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	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 No public funding involved in the project.
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK China DNA - National Development and Reform Commission of the People's Republic of China DNA of United



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Requirement	Reference	Conclusion
		Kingdom: DEFRA, Department for Environment, Food and Rural Affairs.
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK China and United Kingdom are Parties to the Kyoto Protocol and have ratified the same on 30 August 2002 and 31 May 2002, respectively.
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 anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43	OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits	Kyoto Protocol Art. 12.5b	OK



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Requirement	Reference	Conclusion
related to the mitigation of climate change.		
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 & 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



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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



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Table 2 Requirements Checklist

CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
A. General Description of Project Activity <i>The project design is assessed.</i>					
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	Yes, the project's spatial boundaries have been clearly defined. The project is sited in Shouyang County of Jinzhong City in the middle of Shanxi Province, 58km away from Taiyuan City. The geographical coordinates are east longitude 110°35' ~ 111°55', and north latitude 37°21' ~ 37°42'. Figure 1 shows the location of the proposed project.		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR	The projects' system boundaries are defined clearly to include the waste heat recovery system, i.e.: waste heat boiler, electricity generation facilities such as the steam turbine and the generator, captive power generating equipment, any equipment used to provide auxiliary heat to the waste heat recovery process and all the power plants connected to		OK



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CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
			North China Power Grid.		
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	Shanxi Shouyang County Boda Industries Co., Ltd from the host country China and Trading Emissions PLC from the United Kingdom, the annex I Party are project participants for this project activity.		OK
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	The letter of authorisation and the letter of approval for the project and its participants from the DNA of China and United Kingdom need to be submitted.	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	The Republic of China has ratified in Kyoto Protocol on 30 August 2002, and established a DNA; National Development and Reform Commission of the People's Republic of China. United Kingdom has also established a DNA "DEFRA, Department for Environment, Food and Rural Affairs" on ratification of the	CAR-1	OK

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CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview		Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
				Kyoto Protocol on 31 May 2002. The voluntary participation of the project needs to be confirmed against the letter of approval from the DNA.		
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		The initial validation of the project activity does not reveal any information indicating that the project can be seen as diversion of any ODA funding towards China. The same needs to be confirmed against the DNA approval letter.	CAR-1	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>	/1/	DR				
A.3.1. Does the project design engineering reflect current good practices?	/1/	DR		Yes, the project design engineering reflects current good practices.		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		The project activity does not result in any technology transfer from other countries.		OK



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CHECKLIST QUESTION * MoV = Means of Verification, DR= Document Review, I= Interview	Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/	DR	Provisions for identifying and meeting training and maintenance requirements need to be established.	CL-09	OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>	/1/				
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/	DR	The letter of approval from the DNA confirming that the project assists in achieving sustainable development needs to be submitted.	CAR-1	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project activity will help in contributing to the sustainable development in the region by utilization of the waste gas for energy purposes, reducing the dependency on the fossil fuels for power generation thereby also reducing environmental pollution due to avoidance of emission of SO _x , NO _x and total suspended particles and creation of employment for the locals in the region.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and</i>					



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<i>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 rightly applies ACM0004, version 02, the approved consolidated baseline methodology for waste gas and/or heat and/or pressure for power generation.		OK
B.1.2. Are the applicability criteria in the baseline methodology all fulfilled?	/1/	DR	The chosen methodology ACM0004 is applicable to the proposed project since it meets all the applicability criteria laid down by the methodology. The project involves utilization of the waste heat from the coking process with clean-type heat recovery coke ovens to generate electricity, and supply to the NCPG. No fuel switch is envisaged in the waste heat production process, after the implementation of the proposed project, thus meeting all the applicability criteria. What was the fuel involved in the coking process, prior to the project implementation? The same needs to be included in the PDD.		OK



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				The PP needs to clearly state in the PDD if a coking facility had a captive power plant in order to meet the electricity requirements for the entire coking facility before the implementation of the project activity and which other energy resources are used in the plant. Furthermore, it needs to be justified how the energy demand will be satisfied after the project implementation for all energy sources.	CL-02	
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 baseline scenario arrived at is that an equivalent amount of energy would have been imported from the grid.		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/	DR		The project proponent has identified the following alternatives to the project activity to arrive at the baseline scenario: (a)The proposed project activity not		OK

CHECKLIST QUESTION		Ref.	MoV *	COMMENTS	Draft Concl.	Final Concl.
* MoV = Means of Verification, DR= Document Review, I= Interview				<p>undertaken as a CDM project activity;</p> <p>(b) Import of electricity from the grid and release of waste heat;</p> <p>(c) Existing or new captive power generation on-site, using other energy sources than waste heat and/or gas, such as coal, diesel, natural gas, hydro, wind;</p> <p>(d) A mix of options (b) and (c), in which case the mix of grid and captive power should be specified</p> <p>(e) Other uses of the waste heat and waste gas</p> <p>(f) The continuation of the current situation, whether this is captive or grid-based power supply (if not already included in the options above)</p> <p>Option (a) has been eliminated based on the barriers faced by the project as discussed in the section B.3: additionality of the protocol.</p> <p>The project developer needs to justify to what extend electricity shortages (due to the lack of proper electricity supply) at the project site currently affect the plant's operations.</p>	<p>CL-02</p> <p>CL-01</p>	<p>OK</p> <p>OK</p>



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			<p>It is argued that option (c) is not the most probable baseline scenario since the project site is not ideal for tapping hydro power resources or wind power. Power generation using coal has been eliminated from being one of the plausible baseline scenarios since the regulations in the Republic of China do not allow for the construction of a coal fired captive power plant with same capacity.</p> <p>Construction of a captive power plant of the same capacity using diesel oil or natural gas has been ruled out due to high operation costs and poor economic benefits. The same needs to be justified with data.</p> <p>No current uses of the waste heat recovery and utilisation have been identified. Also, it is stated that there are no regulatory obligations for recovery and utilisation of this waste stream. Hence, this scenario is eliminated from being the plausible baseline scenario. However, the same is contradicted while discussing additionality by stating that in cases where there is residential demand for gas, part of the waste gas is utilised as</p>	CAR-02	OK



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			civilian gas. The same needs to be justified. Accordingly, the baseline scenario arrived at is that in the absence of the project activity, an equivalent quantity of power would have been imported from the grid.		
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/	DR	Yes. The project proponent has determined baseline scenario as per the methodology which is the most economically attractive alternative amongst the alternative that faces no prohibitive barriers, emissions from a technology that represents economically attractable course of action, taking into account barriers to investment”.		OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	Some clarifications as raised in section B.2.2 need to be addressed.	CL-01 CAR-02	OK
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	See section B.2.2 The project developer is requested to justify the regulatory framework for coking plants and the different obligations for utilizing waste gas and heat.	CAR-02	OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and	/1/	DR	See section B.2.2.		

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sources clearly referenced?					
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	Any risks associated with the chosen baseline needs to be addressed.	CL-02	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	Yes, the project applies tools of additionality (TOA), version 03 as per the methodology. <u>Step 1: Identification of alternatives:</u> All the plausible alternatives to the project activity have been identified as mentioned in section B.2.2 above. Only option (c), utilisation of the coal for captive power generation, does not meet the requirements as per the law and hence is eliminated. <u>Step 2: Investment Analysis:</u> The project proponent has chosen benchmark analysis for the demonstration of the financial barriers to the project. The IRR for the project activity is stated to be 8.38% as opposed to the		OK



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				<p>benchmark of 12.0% (sector specific benchmark for coking industries) considered for the project activity. The IRR shows an improvement to 16.02% with the CDM revenues.</p> <p>The first version of the PDD included a sensitive analysis for maximum variation of $\pm 10\%$ of the total investment, the operation and maintenance costs and income from the sale of the electricity generated.</p> <p>However, the project developers were requested to calculate variation required in these parameters to reach the benchmark instead of using a default variation of $\pm 10\%$. Furthermore it was required to access how likely it is that the variation in these parameters would result in reaching or exceeding the benchmark and that the amount of electricity generated should be included as a variable in the analysis.</p> <p>Also, the values considered for the IRR calculation for total investment cost, annual O&M costs, electricity tariff need to be substantiated with data. In the case of the</p>	CL-03	



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			<p>electricity price, the project developer is requested to justify the price of the electricity displaced based on the historical electricity price paid by Shanxi Shouyang County Boda Industries Co., Ltd and independent sources of price forecast.</p> <p>In addition, the source for the benchmark considered needs to be provided.</p> <p><u>Step 3: Barrier analysis:</u> The project proponent has discussed barrier analysis using financial barriers, technological barriers and other barriers.</p> <p><i>Financial Barrier:</i> It is argued that owing to the Government’s decision to clear up and regulate investments and production of coking industry, the project proponent faced barriers in obtaining finances for the project activity. Documentary evidences for difficulties faced in obtaining loans for the project activity along with the Government’s decision for clear ups and regulating investments in the coking industry need to be provided. (e.g.: loan rejection letters, etc)</p> <p><i>Technology Barrier:</i> It is argued that the</p>	CL-04	



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			<p>change in the type of coal used in the coking plant results in changes in the waste gas parameters such as pressure and temperature, which eventually affect the boiler operation.</p> <p><i>Other Barrier:</i> The project proponent faces additional barriers since they utilize clean type heat recovery coke ovens, which do not result in production of waste water, waste residue or chemical products. These chemicals produced in the traditional coke ovens can be sold to acquire additional revenue. Also, it is argued that the traditional coking facilities are established technologies and that many companies refuse investing in the clean type due to higher risks and initial investment involved. It remains to be justified how this would be a barrier to the project activity since the project activity only involves utilisation of the waste heat generated from the coking process, irrespective of the technology using which the waste heat is produced.</p> <p><u>Step 4 Common practice analysis:</u> It is stated that the Shanxi Province is the largest</p>	CL-05	



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			producer of coke in China. The common practice in the region till now is stated to flaring of the gases. In cases where the coking facility is near a residential area, parts of the waste gas are utilized as civilian gas. It has been stated that the common practice in the region does not involve use of the waste gas for electricity generation. In view of this, the following information needs to be provided: How many coking facilities are present in the region or province? How many of them utilize the waste gas from the process for any purposes at all? How many among them use the same for electricity generation? <i>Comments on additionality of project activity are reserved till the above stated clarifications are addressed.</i>		
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/	DR	Refer to section B.3.1		OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/	DR	Refer to section B.3.1		OK



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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 start date of the project activity is 1 March 2008. The project developer is requested to clarify the status of implementation of the project (contracted, construction started, etc). In case the project is already under development, it shall be justified that the incentive from the CDM was seriously considered in the decision to proceed with the project activity.	CL-11	OK
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/	DR	It is stated in the PDD that the project does not use any auxiliary fuels for the generation start ups, emergencies or additional heat gain before entering the waste heat recovery boiler. Hence, no project emissions have been included for emission reduction calculation. It needs to be clarified as to what provisions	CL-06	OK



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			have been made to meet the fuel requirements during emergencies and start ups.		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/	DR	Same as above.		OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/	DR	Same as above.		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	The baseline emissions are calculated in line with the methodology, ACM0004 and ACM0002 (for emission factor calculation). The baseline emission factor is fixed ex-ante. The project has considered the North China power grid for the estimation of the emission factor. The emission factor is estimated as an average of the operating margin and the build	CL-07	OK



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			<p>margin. The operating margin is estimated as the simple operating margin of 1.0585 tCO₂e/MWh and is fixed ex-ante during the entire crediting period.</p> <p>Because plant specific fuel consumption and electricity generation data is not public available in China, the project proponent adopts the deviation method as approved by the CDM EB as follows, which are deemed to applicable for this project.</p> <ul style="list-style-type: none">- Use of capacity additions for estimating the build margin emission factor for grid electricity- Use of weights estimated using installed capacity in place of annual electricity generation- Use the efficiency level of the best technology commercially available in the provincial/regional or national grid of China, as a conservative proxy, for each fuel type in estimating the fuel consumption to estimate the build margin (BM).		

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			The BM thus has been calculated to be 0.9066 tCO ₂ e/MWh. Hence, the emission factor for the North China power grid has been worked out to be 0.9826 tCO ₂ e/MWh.		
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/	DR	The values considered in the emission factor calculation needs to be revised to use the latest IPCC 2006 values, for the oxidation factors.	CL-07	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/	DR	Yes.		OK
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>					
B.6.1. Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	No leakage effects need to be addressed as per this methodology.		OK
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/	DR	Not applicable		OK

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B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/	DR	Not applicable		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	The project activity is estimated to result in a total of 551 292 tCO ₂ e emission reductions over the 7 year renewable crediting period.		OK
B.8. Monitoring Methodology <i>It is assessed whether the project applies an appropriate monitoring methodology.</i>					
B.8.1. Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/1/	DR	Yes, the monitoring methodology adopted for the project activity is in accordance with approved methodologies ACM0004 version 02. The monitoring plan has been documented in a 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,	/1/	DR	Yes		OK

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for this project activity, whichever occurs later?						
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	No auxiliary consumption of fuels is involved in the project activity and hence no parameter needs to be included in the monitoring plan. However, it needs to be confirmed how the energy requirements are met during emergencies and start ups.	CL-06	OK
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 monitoring plan provides for collection and archiving of most of the necessary data for estimation of GHG emissions within project boundary. However, the net electricity delivered to the different facilities needs to form a part of the	CL-08	OK

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			monitoring plan.		
B.10.2. Are the choices of baseline GHG indicators reasonable and conservative?	/1/	DR	Yes.		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 measurement method has been clearly stated for each baseline parameter.		OK
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	Procedures for dealing with erroneous measurements are in place. However, the measurement accuracy for meter readings needs to be addressed.	CL-09	OK
B.10.6. Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Yes.		OK
B.10.7. Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	Yes, procedures for registration, monitoring, measurements and reporting have been defined.		OK
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the	/1/	DR	Procedures for maintenance of monitoring equipments and installations need to be	CL-09	OK



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calibration intervals being observed?			identified. Calibration of the various meters is carried out as per the regulations issued by the China Government.		
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, procedures for handling of the day to day records have been addressed in the PDD.		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 necessary for determining leakage?	/1/	DR	No leakage effects need to be addressed as per the methodology, ACM0004.		OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR	Not applicable		OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR	Not applicable		OK



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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	It needs to be clarified if the host country laws require for the monitoring of sustainable development indicators / environmental impacts for the project activity.	CL-10	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	Same as above.		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR	Same as above.		OK
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	/1/	DR	Yes, the authority and responsibility of the		OK



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project management clearly described?			overall project management has been clearly defined.		
B.13.2. Are procedures identified for training of monitoring personnel?	/1/	DR	Procedures for identifying training needs of the monitoring personnel need to be defined.	CL-09	OK
B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	Procedures for emergency preparedness during situations that can lead to unintended emissions need to be defined.	CL-09	OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	Procedures for review of the reported data need to be defined.	CL-09	OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	Procedures for corrective actions in order to provide for more accurate future monitoring and reporting need to be clearly defined.	CL-09	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 project's starting date is 1 March 2008 with an operational lifetime of the project activity of 21 years. It needs to be confirmed if the start date is the commissioning date and proof for start date	CL-11	OK



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C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	of the project activity need to be provided. The project proponent has chosen a renewable crediting period of 7 years with the start date of the crediting period being 15 May 2008.		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/	DR	Yes, the project proponent has sufficiently described the environmental impacts of the project activity in the PDD.		OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/	DR	The EIA study has been conducted for the project activity in line with the host Party requirements. The EIA and the feasibility study report in addition to their letters of approval need to be submitted.	CL-12	OK
D.1.3. Will the project create any adverse environmental effects?	/1/	DR	The main environmental impact due to the project implementation is the noise generated and the waste water. The other environmental impacts include the waste gas from the process the SO ₂ and the gypsum from the		OK



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			desulphurisation plant.		
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/	DR	Yes.		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/	DR	The plant has implemented a desulphurisation unit (with 80% SO ₂ reduction rate) and dust removal unit for removal of SO ₂ and dust respectively before the gas is emitted into the atmosphere. Also, waste water generated is treated in the septic tank. The gypsum generated in the desulphurisation plant and the solid wastes generated are collected and transported outside the power plant to be treated. It needs to be confirmed how the gypsum and solid waste generated and finally disposed.	CL-12	OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Approval for the project activity from the Department of Environment may be submitted. The various consents for establishment and/or operation of the project from the pollution control agencies in China need to be submitted. Approvals for the use and operations of the boiler need to be	CL-12	OK



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			reviewed. These approvals or licenses need to be submitted.		
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	The project proponent has identified relevant stakeholders to this project. The stakeholders identified include government bodies and local population as below: Shouyang County Development and Reformation Bureau, Shouyang County Environment Protection Bureau, the Office of People's Government of Shouyang County, Shouyang County Economy and Trade Bureau, the People's Government of Wenjiazhuang Town etc. The villager's representative is from Wenjiazhuang Village. Documentary evidence for the stakeholder consultation process conducted for the project activity needs to be provided.	CL 13	OK
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR	Between 20 April 2007 and 29 April 2007, the project proponent sent out letters and	CL 13	OK



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			questionnaires to all identified stakeholders to opine on the project activity. Copies of the letter sent out need to be provided.		
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	It needs to be confirmed during the follow up interviews, if a stakeholder consultation process is mandated by the laws of the host Party, and if applicable, has it been conducted as per the requirements of the law.	CL-13	OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/	DR	Yes, the comments received from the stakeholders have been sufficiently addressed in the PDD.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/	DR	No negative or adverse comments were received for the project activity.		OK

VALIDATION REPORT

Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR.1 The letter of authorisation and the letter of approval for the project and its participants from the DNA of China and United Kingdom need to be submitted.	A.2.2 A.2.3 A.4.1	Please find the attached LOA from China and UK.	OK. The LoA for China and United Kingdom have been submitted. This CAR is closed.
CAR 2 No current uses of the waste heat recovery and utilisation have been identified and hence, this option is eliminated from being the plausible baseline scenario. However, the same is contradicted while discussing additionality by stating that in cases where there is residential demand for gas, part of the waste gas is utilised as civilian gas. The same needs to be clarified.	B.2.2	The PDD has been revised accordingly for clarification. Refer to section B.4 and B.5. Firstly it is clarified that there is no residential demand for gas in the surrounding area of project. Secondly, it is technically infeasible for waste heat collection until the installation of the project's recovery system (Section A.4.3 has been revised to clarify this matter).	OK. DNV was able to confirm that the regulatory requirements for utilization of the waste gas are applicable to the coking units using the traditional coking ovens, where the by-product recovery, (i.e. utilization of waste "gas") is possible. Since the project activity only involves utilization of waste "heat" and not the waste "gas", this requirement does not apply. DNV was also able to confirm this with the local representative of the Development and Reform commission, Shanxi. This CAR is closed.

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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
CL 01: <u>Baseline Determination:</u> Construction of a captive power plant of the similar capacity as the project using diesel oil or natural gas has been ruled out from being the baseline scenario due to high operation costs and poor economic benefits. The same needs to be justified with data .	B.2.2	It is clarified that construction of a captive power plant using diesel oil or natural gas is ruled out due to legal reason. According to <i>Interim Rules on the Installation and Management of Small-scale Fuel-fired Generators</i> (issued in August 1997) ¹ , the fossil fuel-fired power units with less than 100MW is strictly regulated for installation. So building a coal-fired, or diesel oil-fired, or natural gas-fired power plant of the same capacity as the proposed project is prohibited by the national regulation. It is revised in section B.4 of the PDD.	DNV was able to confirm against the interim rules on Installation and Management of small-scale fossil fired generator, that installation of new thermal power plants with capacity less than 100 MW is strictly prohibited in China. OK. This CL is closed.
CL 2 Any risks associated with the chosen baseline needs to be addressed. Also, the following points need to be addressed:	B.2.7	1) There are no regulatory requirements for the clean-type <i>non-chemical-recovery</i> coking facilities to make use of the waste heat, unlike the traditional <i>by-product</i> coking plants which are	1) OK. The coking units imported power from the grid. The same was confirmed by DNV against the invoices from the grid company.

¹ <http://www.chinavalue.net/wiki/showcontent.aspx?titleid=61180>

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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 project participants need to clearly explain in the PDD how the client was meeting his energy needs (for the entire coking facility) before the implementation of the project activity: import from grid or captive power plant. Also, if they had a captive power plant already, what was the fuel used in the captive plant? The different energy sources of the plant in the current configuration need to be elaborated in the PDD. Furthermore, it needs to be justified how the energy demand will be satisfied after the project implementation for all energy sources. The project developer needs to justify to what extent electricity shortages (due to the lack of proper electricity supply) at the project site affects the plant's operations. 		<p>required to utilize the waste gas to maximize resource utilization and economic performance.</p> <p>2) The coking facility has been importing from the North China Power Grid. It is clarified there is no captive power plant in the baseline scenario;</p> <p>Section B.2 of the PDD is revised to clarify the above.</p> <p>3) The grid electricity expense record is provided to demonstrate that the energy demand of coking plant is met from grid electricity. Waste heat was emitted to atmosphere directly before the project. After the project is implemented waste heat will be captured and utilized for power generation. Moreover, the waste heat collection was technically infeasible until the installation of the project. Further clarification on 'no fuel switch' has been elaborated in Section A.4.3 of PDD.</p>	<p>2) OK. All electricity used at the coking plant for processes that include coal washing, molding, conveying, quenching, and other auxiliary activities has been imported from the grid.</p> <p>3) OK. The plant utilizes the electricity from the grid for all operations in the plant since its operation in Oct 2004.</p> <p>OK. This CL is closed.</p>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 03</p> <p>1) The calculation sheets for the IRR calculation and the sensitivity analysis need to be submitted.</p> <p>2) Also, the values considered for the IRR calculation for total investment cost, annual O&M costs, electricity tariff need to be substantiated with independent data and evidences.</p> <p>3) The project developer is requested to justify the price of the electricity displaced for internal use based on the historical electricity price paid by Shouyang County Boda Industries Co., Ltd and independent sources of price forecast.</p> <p>4) In cases where the source is not the approved Feasibility Study Report, the deviation from the approved values needs to be explained and substantiated.</p>	B.3.1	<p>1) The IRR spreadsheet has been submitted for review.</p> <p>2) The values are quoted from the official feasibility study report (FSR). The FSR has been prepared by Shanxi Zhenghe Thermal and Electric Power Industry Design Company. The relevant approval has been obtained from the Shanxi Economic and Trade Committee. Please find the FSR in the attachment.</p> <p>3) The electricity purchase invoices were sampled during the validation site visit. The invoice is attached.</p> <p>4) All the values are quoted from the official feasibility study report (FSR).</p>	<p>1) The IRR calculation has been reviewed by DNV. OK when the points as addressed in “CL 03 continued” need to be substantiated with documentary evidence.</p> <p>2) OK. The specific data source and the documentary evidence for the assumptions used for the IRR calculations were provided to DNV. The IRR calculations were also revised to include the parameters “disposal of liquid assets, recovery of scrap value of fixed assets.</p> <p>3) OK. The electricity purchase invoices were submitted to DNV.</p> <p>4) OK. The approval for the project was reviewed by DNV.</p>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 3 contd.</p> <p>It is not possible for DNV, to reproduce financial analysis and get the same results as provided in the financial analysis spreadsheet (please refer to the additionality tool and requests from the EB).</p> <p>The project proponents are requested to specify the depreciation method applied, in order to confirm the taxes considered for the proposed project activity.</p> <p>The following inputs used for the investment analysis need to be justified:</p> <ul style="list-style-type: none"> - Investment required. - Operation and maintenance costs. - Taxes considered. - Timeframe of the investment analysis. - Electricity price at the time of decision making that was used as an input in the FSR 	B.3.1	<p>The design institute has been consulted to clarify the cashflow. In the FSR depreciation was not included in the cashflow model.</p> <p>As per DNV's request, the model is revised to include depreciation in the calculation of taxable income. This results in lower tax charges and these lower charges improve the net cashflow for the project.</p> <p>This adjustment has resulted in an increase in the project IRR to 8.38%</p> <p>Depreciation is over a 20 year period on a straight line basis. Chinese regulations allow for depreciation over a minimum of 10 years with common practice in the energy sector ranging from 12 to 20 years.</p> <p>Investment-</p> <p>The total investment costs include the equipment, installation and construction</p>	<p>OK. Revised financial analysis of 19 February 2008 has been reviewed by DNV and it has been confirmed that the depreciation was included in tax calculations. In addition DNV is able to reproduce the financial analysis with same results.</p> <p>OK. DNV compared parameters used in the investment analysis with parameters that have been used for other similar project activities. This comparative analysis was based on investment cost per MW of electricity generated, ratio between the O&M cost and the investment cost, electricity price per kWh, and the load factor. The results were found within a reasonable range of these values for other similar projects.</p> <p>However, a more realistic approach is required towards the sensitivity analysis. This has been described</p>

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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>costs. The breakdown is provided in the FSR, which has been prepared Shanxi Taihua Chemical Design Company in line with the governing regulations and the according procedural manuals. Shanxi Taihua Chemical Design Company is an accredited agency for feasibility studies. The estimation is made based on the following reference:</p> <ul style="list-style-type: none"> • <i>National Machinery and Electric Devices Price Index</i> (2001); • <i>Non-Standardised Equipment Production Costing Guidance and Shanxi Engineering Development Standard Pricing Index</i>; and • <i>Shanxi Construction and Installation Costing Index</i> (2003). <p>O&M cost-</p> <p>The O&M cost is estimated by the accredited design institute, which prepared the FSR in line with the</p>	<p>further in detail when “CL 03 continued” below.</p>

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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>governing regulations and procedural manuals. Estimates are made in accordance with the requirements of the <i>Electric Power Project Development Financial Analysis Detailed Rules and Regulations</i> and the <i>Economic Assessment Method and Parameters for Project Construction</i> (2006).</p> <p>Tax- Source: the <i>Economic Assessment Method and Parameters for Project Construction</i> (2006) and the State's Corporate Income Tax Regulation (http://www.tax.sx.cn/zstax/main/News.asp?News_ID=349&ClassParent=9)</p> <p>VAT: 17%</p> <p>For this specific project, the project revenue is estimated based on net tariff price, exclusive of VAT. Therefore it is not included as a part of the taxation in the outflow.</p>	

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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>Urban maintenance: 5%</p> <p>Education added: 3%</p> <p>These taxes are both based on the expected VAT. For simplification, these two tax items are presented as one taxation item in the outflow.</p> <p>Income tax: 33%</p> <p>Income tax is deducted from the net revenue, i.e. the revenue less the costs including depreciation and other taxes.</p> <p>Timeframe-</p> <p>The main WHR equipments' average operational life is expected to be 20 to 25 years.</p> <p>However the lifetime of the coke ovens (i.e. the source of the waste heat) is more difficult to estimate. The ovens are necessary to produce the waste heat but must be kept operating throughout</p>	

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>their life as the cooling of them causes significant contraction and damage. Therefore 20 years is used to take into account the risk associated with the coking plant while also reflecting the lifetime of the WHR equipment.</p> <p>Electricity price- Reference: Notice on Adjustment on Electricity Price in Shanxi issued by Shanxi Provincial Pricing Bureau 2004.</p>	

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 3 contd.</p> <p>Sensitive Analysis: The PDD includes a sensitive analysis for maximum variation of $\pm 10\%$ of the total investment, the operation and maintenance costs and income from the sale of the electricity generated.</p> <p>The project developers are requested to calculate variation required in these parameters to reach the benchmark instead of using a default variation of $\pm 10\%$. Furthermore it is required to assess how likely it is that the variation in these parameters would result in reaching or exceeding the benchmark.</p> <p>The electricity generated should be included as a variable in the analysis.</p>	B.3.1	<p>The variation in the total investment, O&M costs and electricity sales revenue for the IRR to reach the benchmark is added in the PDD.</p> <p>The electricity output is discussed as one of the factors affecting the electricity sales revenue.</p>	<p>OK. It has been demonstrated by the project proponent that the IRR of the project will exceed the benchmark of 12% if the total investment drops by 15.57%, the O&M cost drops by 24.52%, the electricity price increases by 13.25% and the operating hours increase by 13.36%. A breakdown in total cost has been reviewed by DNV to assess the likelihood of variations in them.</p> <p>In DNV's opinion, it is unlikely that these costs will vary to the extent that the IRR would exceed the benchmark. Moreover, projected increase in the sale revenue of the electricity produced to exceed benchmark of 12% is also unlikely since the annual electricity output of the project is based on a higher capacity factor of 79.9% and establishing and modifying the electricity tariff is highly regulated and controlled by the central government in</p>



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>China.</p> <p>The electricity tariff used in the investment analysis was in line with the value listed in “Notice on Adjustment on Electricity Price in Shanxi” issued by the Shanxi Provincial Pricing Bureau in 2004.</p> <p>OK. This CL is closed.</p>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 4 <i>Additionality:</i> Documentary evidences for difficulties faced in obtaining loans for the project activity along with the Government's decision for clear ups and regulating investments in the coking industry need to be provided. (e.g.: loan rejection letters, etc). Also, it is stated that the project proponent is one of the pathfinders in adopting clean-type and heat recovery coke ovens for electricity generation. The same needs to be elaborated	B.3.1	1) The proposed project has adopted the investment analysis in line with the tool to demonstrate the additionality. It is sufficient to demonstrate the additionality of the project. As per the tool's instruction, the barrier approach can therefore be optional. To avoid confusion, the discussions on barriers have been removed from the PDD. 2) Please refer to section B.5 in the PDD.	OK. The barrier approach has been removed from the PDD. Therefore, the financial barriers have been excluded from the additionality discussion. OK. This CL is closed.
CL 5 <i>Common Practice analysis:</i> It remains to be justified how this use of clean type heat recovery ovens as opposed to traditional coke ovens would be a barrier to the project activity since the project activity only involves utilization of the waste heat generated from the coking process, irrespective of the technology through which the waste heat is produced Also, it has been stated that the common practice in the region does not involve use of	B.3.1	The popularity of traditional oven over the clean-type oven is removed from the barrier analysis from the PDD. According to the additionality tool (version 04), "projects are considered similar if they are in the same country/region and/or reply on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment	<ul style="list-style-type: none"> OK. The technological barriers discussed for additionality have been excluded from the PDD. It is discussed in the PDD that there are 717 coking units in Shanxi province. Currently only 35 of them, which use clean-technology, have been considered for the common practice analysis. The consideration of only the clean-technology coking units has been justified and accepted

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>the waste gas for electricity generation. In view of this, the following information needs to be provided: How many coking facilities are present in the region or province? How many of them utilize the waste gas from the process for any purposes at all? How many among them use the same for electricity generation.</p>		<p>climate, access to technology, access to financing, etc.”</p> <p>Waste heat recovery projects affiliated to the traditional coke oven cannot be considered similar to the project activity that recovers waste heat from the clean-type coke oven. Firstly, different regulatory requirement is applied. This also determines the use of the technology used for recovery process and power generation. Below is a summary of the difference.</p> <p>Technical difference:</p> <ul style="list-style-type: none"> - The traditional technology that uses waste gas from coke production to produce the electricity is affiliated to the traditional coke production. It has been widely used in Shanxi province. The outflow from the traditional coke oven is the combustible gases containing CH₄, H₂, CO etc. with much higher heat value. So the process of power generation for traditional technology 	<p>by DNV due to the fact that the two technologies are governed by different regulatory requirements. It is mandated by law in Shanxi province that all coking units utilize the waste gas generated from coking unit. The coking units using clean type technology however, do not generate waste gas but only waste heat and there are no expectations for the waste heat utilization in the region. In addition, technically speaking the two types of coking units apply two different types of waste heat recovery system.</p> <p>DNV was also able to confirm against a clarification letter from the Shanxi Province 21 Agenda Sustainable Development Office (under the Provincial Development and Reform Committee) the list of 10 projects utilizing the clean type technology and that are in the pipeline depending on CDM</p>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>includes gas turbine or combined cycle turbine.</p> <ul style="list-style-type: none"> - The technology applied by proposed project activity is affiliated to the clean-type oven. There is no combustible gas from clean type oven except waste heat steam with lower heat value comparing to waste gases. So the technology applied by proposed project is using waste heat through installation of the waste heat recovery boilers. <p>Regulatory difference:</p> <ul style="list-style-type: none"> - Waste gas recovery is mandated for traditional oven. - There is no mandatory requirement for waste heat recovery. <p>It is demonstrated that waste heat recovery from traditional coke oven cannot be considered similar activity to the project. The activities that are considered similar to the project activity include only the recovery of waste heat from the clean type coke ovens.</p>	<p>revenues for their electricity generation initiative.</p> <p>However, further clarification is requested in this regard when “CL 5 continued” below.</p>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>Furthermore, according to the Annex 2 table of the <i>Shanxi Coking Installations Category of the Provincial Governmental Document [2005] no.13</i>, there are 35 clean type <i>non-chemical-recovery</i> coke plants, 10 of them are in the process of CDM application. Of these, 25 coking plants are still under planning and 10 plants are either in operation or under construction. The 10 plants with active operation/construction are all planning to utilize waste heat as CDM projects. Please refer to Section B.5 of PDD.</p> <p>The official statistical report of Shanxi Coking Installations Category of the Provincial Governmental Document [2005] can be found at the below website:</p> <p>http://www.shanxigov.cn/gb/zgsx/zwgk/zcfg/szfwj/jzf/userobject1ai33002.html</p> <p>A clarification letter from the Shanxi Province 21 Agenda Sustainable</p>	



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>Development Office (under the Provincial Development and Reform Committee) is submitted for review.</p> <p>The list of coking units that utilize the waste heat (all for power generation) and apply for CDM has been provided in section B.5 of PDD and the information is from Shanxi DRC.</p>	

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 5 contd.</p> <p>With regards to common practice, it has been observed by DNV that the technology provider claims that all WH projects using this technology either produce electricity or recover the waste heat (refer to the provider webpage) without releasing it in the atmosphere. Therefore, it needs to be clarified what heat recovery method is being implemented currently at the coking plant.</p> <p>In addition justification is needed if the scenario with current heat recovery system in place is not included in the possible alternative scenarios that could be implemented in the absence of the proposed CDM project activity.</p>	B.3.1	<p>The common practice analysis is conducted in accordance with the additionality tool. According to the additionality tool (version 04), “projects are considered similar if they are in the same country/region and/or reply on a broadly similar technology, are of a similar scale, and take place in a comparable environment with respect to regulatory framework, investment climate, access to technology, access to financing, etc.”</p> <p>Similar projects are identified in Shanxi Province are taken into consideration, given the similarity of local regulations, access to resources/technology and income level, etc. The similar projects have been identified based on official source (A clarification letter from the Shanxi Province 21 Agenda Sustainable Development Office has been submitted for review).</p>	<p>Out of 35 clean-type coking units in Shanxi province, 10 are utilization waste heat for electricity production including the proposed project activity. DNV was able to confirm this against a clarification letter from the Shanxi Province 21 Agenda Sustainable Development Office (under the Provincial Development and Reform Committee). The remaining 25 clean-type coke production facilities in Shanxi province are either emitting the waste heat in the atmosphere or are in the early stage of planning to utilize waste heat for electricity generation. However, through communication with representative of Shanxi Development and Reform Committee (DRC), it has been confirmed that the common practice in Shanxi province is to release waste heat in the atmosphere without its utilization for electricity generation.</p>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>10 projects were identified with the said information accessible to the project participant at the time of PDD development. In addition to these 10 projects, the webpage indicates another 6 coke plants with electricity generation capacity in Shanxi.</p> <p>Given DNV's concern, the Shanxi Development and Reform Committee (DRC) has been consulted to clarify the list of existing projects in Shanxi. It has been confirmed by the representative that these 6 coking plants with clean-type ovens are at the early planning stage to start installing waste heat recovery with CDM development (without official submission to the local government). The contact details of the Shanxi DRC representative is provided as follows for reference: Ms Pan Jun Xiang, telephone/fax: +86 351 319 4604.</p>	OK. This CL is closed.

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 6 It is stated in the PDD that the project does not use any auxiliary fuels for the generation start ups, emergencies or additional heat gain before entering the waste heat recovery boiler. It needs to be clarified as to what provisions have been made to meet the fuel requirements during emergencies and start ups	B.4.1 B.9.1	It has been confirmed there are no auxiliary fuels in the project boundary. The waste heat is continuously supplied to boiler to produce steam by heat exchanging, and then power the steam turbines and generators. It does not need other fuels for start up.	OK. This CL is closed.
CL 7 1. The values considered in the emission factor calculation needs to be revised to use the latest IPCC 2006 values, for the oxidation factors. 2. The data vintage for the calculation of the OM and BM are the China Electric Power Yearbook 2003-2005 and the 2002-2005. At the time of the PDD submission for validation most recent data for year 2005 was available. The project developer is requested to modify the calculations accordingly.	B.5.1 B.5.2	The oxidation factors have been revised according to the IPCC 2006 values in the PDD. Most recent published data has been used for the grid emission coefficient calculation. Please refer to Annex 3 of the revised PDD.	1. The oxidation factors have been revised to be in line with the latest IPCC 2006 guidelines. 2. OK. The PDD has now been revised to include the latest data for the emission factor estimation. OK. This CL is closed.
CL 8 The net electricity exported to the different	B.10.1	The net electricity exported is revised to be included in the monitoring plan.	OK. The section B.7.1 of the PDD has been revised to include EG _{sales} .



VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
facilities also needs to form a part of the monitoring plan		Refer to section B.7.1 in the PDD. The values of EG_{AUX} and $EG_{sales,i}$ have been filled up.	OK. This CL is closed.

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 9 Procedures for the following need to be identified: <ol style="list-style-type: none"> 1. Procedures for maintenance of monitoring equipments and installations. 2. The measurement accuracy for meter readings needs to be addressed. 3. Provisions for identifying and meeting training and maintenance requirements need to be established 4. Procedures for emergency preparedness during situations that can lead to unintended emissions need to be defined Procedures for review of the reported data and corrective actions need to be clearly defined.	B.10.5 B.10.8 B.13.3 B.13.5	The detailed monitoring plan and procedures will be ready prior to the start of crediting period.	The monitoring plan in the PDD must be supplemented with the updated procedures before the monitoring period starts. OK. This CL is closed.
CL 10 It needs to be clarified if the host country laws require for the monitoring of sustainable development indicators / environmental impacts for the project activity.	B.12.1	There is no requirement on monitoring of sustainable development indicators or environmental impacts for the project activity. The project will be implemented strictly comply with the State regulations.	OK. This CL is closed.
CL 11 It needs to be confirmed if the start date is the	C.1.1	OK. The PDD has further been revised.	A detailed timeline on various activities is required. This has been described

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
commissioning date and proof for start date of the project activity need to be provided.			further in detail when “CL 11 continued” below.
CL 11 contd. Please provide a timeline on the following events: <ol style="list-style-type: none"> 1. Construction start date of coking plant 2. Operation start date of coking plant 3. Planned Installation date of the WHR system Planned start date of the WHR system		<p>The coking plant has been operational since 2004. The construction of the coking facility started one year prior to the operation.</p> <p>The construction of the project will start in March 2008. The operation of the WHR system is planned to start in January 2009.</p>	<p>OK. The choice of the start date of the project activity as the date of construction has been found acceptable to DNV.</p> <p>OK. This CL is closed.</p>
CL 12: The EIA and the feasibility study report in addition to their letters of approval need to be submitted. Also, it needs to be confirmed how the gypsum and solid waste generated and finally disposed Additionally, the approval for the project activity from the Department of Environment is requested. The various consents for establishment and/or operation of the project from the pollution control agencies in China	D.1.2 D.1.5	<ol style="list-style-type: none"> 1. The documents have been submitted. The project is delayed because of lack of funding even the project owner has obtained the approval for EIA early. Revised in the PDD. 2. Minimum amount of the wastes are expected from the process. Measures have been studied in the EIA and will be implemented for the waste treatment. The EIA approval has been granted. 3. The approvals for the FSR and the 	<ol style="list-style-type: none"> 1. The EIA and the FSR have been submitted to DNV. 2. OK. 3. All the applicable consents have been submitted to DNV. <p>OK. This CL is closed.</p>

VALIDATION REPORT

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
need to be submitted. Approvals for the use and operations of the boiler need to be submitted.		EIA have been submitted to the validator.	
CL 13: Documentary evidence for the stakeholder consultation process conducted for the project activity needs to be provided, e.g. copies of the letter sent out need to be provided. Also, it needs to be confirmed, if a stakeholder consultation process is mandated by the laws of the host Party, and if applicable, has it been conducted as per the requirements of the law.	E.1.2 E.1.3	Evidence is attached. It is confirmed the stakeholder consultation has been conducted according to the requirements of the Chinese law. The requirement of Chinese law is that in the required procedure of EIA it needs to do the stakeholder consultation.	OK. A stakeholder consultation as required for EIA, has been carried out by the project proponent. Since the EIA approval is part of the LOA issuance process and LOA has been issued by DNA of China on 26 August 2007, it can be concluded that the stakeholder consultation process has been carried out per the requirements of the law. OK. This CL is closed.

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Miguel Rescalvo

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

GHG Auditor:	Yes		
CDM Validator:	Yes	JI Validator:	--
CDM Verifier:	--	JI Verifier:	--
Industry Sector Expert for Sectoral Scope(s):	--		
Technical Reviewer for (group of) methodologies:			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes		
ACM0002, AMS-IA-D, AM0019, AM0026, AM0029, AM0045	Yes		
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes		

Høvik, 3 July 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Mindy (Ming) Yue

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

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

Høvik, 5 January 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Mathsy Kutty

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

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

Høvik, 26 September 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Michael Lehmann

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

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

Høvik, 5 February 2007

Einar Telnes
Director, International Climate Change Services

Michael Lehmann
Technical Director



CERTIFICATE OF COMPETENCE

Hendrik Brinks

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

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

Høvik, 30 October 2007

Michael Lehmann

Michael Lehmann

Technical Director, International Climate Change Services