



VALIDATION REPORT

“SHANXI YUNCHENG 25 MW BIOMASS POWER PLANT PROJECT” IN CHINA

REPORT No. 2008-9108

REVISION No. 05

DET NORSKE VERITAS



VALIDATION REPORT

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Client: FC2E GESTION S.L.		Client ref.: Miguel WINKELS	

Project Name: Shanxi Yuncheng 25 MW Biomass Power Plant Project

Country: China

Methodology: ACM0006

Version: 9

GHG reducing Measure/Technology: Renewable energy generation.

ER estimate: 129 038 tCO_{2e} per year (average).

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 Det Norske Veritas Certification AS (DNV)'s opinion that the "Shanxi Yuncheng 25 MW Biomass Power Plant Project" in China, as described in the PDD of version 06 dated 27 January 2011, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and correctly applies the baseline and monitoring methodology ACM0006 version 9. Det Norske Veritas Certification AS (DNV) thus requests the registration of the proposed project as a CDM project activity.

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Report title: Shanxi Yuncheng 25 MW Biomass Power Plant Project in China		
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Key words:

- ☒ No distribution without permission from the Client or responsible organisational unit
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VALIDATION REPORT

Abbreviations

BE	Baseline Emission
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification Request
CH ₄	Methane
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent
DNA	Designated National Authority
DNV	Det Norske Veritas
DOE	Designated Operational Entity
EB	Executive Board
EF	Emission Factor
EF _{BM}	Build Margin Emission Factor
EF _{OM}	Operating Margin Emission Factor
EIA	Environmental Impact Assessment
ER	Emission Reduction
GHG	Greenhouse gas(es)



VALIDATION REPORT

TABLE OF CONTENTS

1	EXECUTIVE SUMMARY – VALIDATION OPINION	1
2	INTRODUCTION	2
2.1	Objective	2
2.2	Scope	2
3	METHODOLOGY	3
3.1	Desk Review of the Project Design Documentation	3
3.2	Follow-up Interviews with Project Stakeholders	6
3.3	Resolution of Outstanding Issues	7
3.4	Internal Quality Control	10
3.5	Validation Team	10
4	VALIDATION FINDINGS	11
4.1	Participation Requirements	11
4.2	Project Design	11
4.3	Application of selected baseline and monitoring methodology	12
4.4	Baseline determination	13
4.5	Additionality	14
4.6	Monitoring	25
4.7	Estimate of GHG Emissions	26
4.8	Environmental Impacts	29
4.9	Comments by Local Stakeholders	29
4.10	Comments by Parties, Stakeholders and NGOs	30

Appendix A: Validation Protocol

Appendix B: Certificates of Competence



VALIDATION REPORT

1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the “Shanxi Yuncheng 25 MW Biomass Power Plant Project” 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. UNFCCC criteria refer to Article 12 of Kyoto Protocol, the CDM modalities and procedures and the subsequent decision by the CDM Executive Board.

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

The host Party is People’s Republic of China and the Annex I Party is Spain. Both countries fulfil the participation criteria and DNA of China has approved and authorized the project and project participants. The DNA from China issuing the Letter of Approval confirmed that the project assists in achieving sustainable development.

The project correctly applies the methodology ACM0006 version 9 “Consolidated methodology electricity generation from biomass residues”. By burning biomass residues which are currently left to decay/burnt in a uncontrollable manner, to generate electricity and replace fossil fuel based electricity in the grid, 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 annual emission reductions from “Shanxi Yuncheng 25 MW Biomass Power Plant Project” are estimated to be on the average 129 038 tCO₂e per year over the selected 7 years 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.

In summary, it is DNV’s opinion that the “Shanxi Yuncheng 25MW Biomass Power Plant Project” in China as described in the PDD of version 06 dated 27 January 2011, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly apply the baseline and monitoring methodology ACM0006 version 09. DNV thus requests the registration of the proposed project as a CDM project activity.



VALIDATION REPORT

2 INTRODUCTION

FC2E GESTION S.L. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Shanxi Yuncheng 25 MW Biomass Power Plant Project” in China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

2.1 Objective

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

2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0006 version 9. The validation team has, based on the recommendations in the CDM Validation and Verification Manual /2/ 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.



VALIDATION REPORT

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 lists the documentation that was reviewed during the validation:

- /1/ CDM Centre of Excellence Ltd., CDM-PDD for the “Shanxi Yuncheng 25MW Biomass Power Plant Project”, Version 5 dated 19 October 2010 and previous versions.
- /2/ CDM Executive Board – Clean Development Mechanism Validation and Verification Manual, Version 1.2 (Annex 3 EB44).
- /3/ CDM-Executive Board – ACM0006 - Consolidated methodology electricity generation from biomass residues - Version 9 of 25 March 2009.
- /4/ The National Development and reform Commission of the People’s Republic of China NDRC – Letter of Approval for Shanxi Yuncheng 25 MW Biomass Power Plant Project as a Clean Development Mechanism Project – April 2008.
- /5/ Shandong Engineering Consulting Institute and Shanxi Electric Power designing Institute – Feasibility Study Report for the Shanxi Yuncheng 25 MW Biomass Power Plant Project of February 2007 and approved by the National Development and Reform Commission of the People’s Republic of China on 28 September 2007.
- /6/ Shanxi Jianghe Chemical Silicon Co. Ltd – Training Plan – March 2008
- /7/ CDM-Executive Board – Combined tool to identify the baseline scenario and demonstrate additionality – Version 02.2
- /8/ CDM-Executive Board – ACM0002 Consolidated baseline methodology for grid connected electricity generation from renewable sources – Version 10 of 28 May 2009.
- /9/ Contracts for biomass supply agreements signed in 2007.
- /10/ General Office of the State Council – Notice on strictly prohibiting the installation of coal-fired generator with the capacity of 135 MW or below – Decree No. 2002-6.
- /11/ Interim Rules on small scale fired generator construction and management – August 1997.
- /12/ Loan application report – 3 January 2008.
- /13/ Spreadsheet Investment Analysis – “IRR-yuncheng-02.xls”
- /14/ Spreadsheet Emission Reduction calculation – “Shanxi-Emission Reduction-03.xls”
- /15/ CDM-Executive Board – Methodological Tool “Tool to calculate project or leakage



VALIDATION REPORT

CO2 emissions from fossil fuel combustion” version 02 of 2 August 2008.

- /16/ CDM-Executive Board – Methodological Tool “Tool to calculate the emission factor for an electricity system” version 2 of 16 October 2009.
- /17/ The State Electric Industry Yearbook – years from 2003 to 2005
- /18/ China Energy Statistical Yearbook - years from 2003 to 2005
- /19/ Shanxi Province Environmental Science Institute – Environmental Impact Assessment, July 2007 and approved by the Shanxi Environment Protection Bureau on 7 August 2007.
- /20/ Stakeholder questionnaires dated 8 June 2007
- /21/ Jiang County Government – About the investment of biomass power plant of Shanxi Jianghe Chemical Silicon Co. Ltd, dated 6 May 2009 (Office document No. 31 in 2009).
- /22/ Jiang County Government – Stop building the coal power plant, dated 16 May 2005 (Office document No. 22 in 2005)
- /23/ Shanxi Jianghe Chemical Silicon Co. Ltd – Board Meeting Report dated 6 May 2008
- /24/ Jiang County Statistic Bureau of Shanxi Province - Straw resources survey and evaluation report in Jiang County and its surrounding areas, dated February 2007.
- /25/ Condition and problem of biomass power plant
website: <http://www.chinapower.com.cn/article/1123/art123981.asp>
- /26/ Investment/Technological barriers – National Development and Reform Commission
website: http://www.sdpc.gov.cn/zjgx/t20071123_174054.htm
- /27/ The National Development and reform Commission of the People’s Republic of China NDRC – Report regarding the risks associated to Biomass Generation, dated 2007
- /28/ Shanxi Province Commission – Construction permission, dated 12 November 2007
- /29/ Shanxi Development and Reform Commission – Reply for the application of Shanxi Jianghe Chemical Silicon Co. Ltd. for the biomass power generation project, dated 9 March 2007.
- /30/ Shanxi Jianghe Chemical Silicon Co. Ltd – Board Meeting dated 18 April 2007
- /31/ Shanxi Power Co. Ltd – Intent approval of the 25MW biomass power plant of Shanxi Jianghe Chemical Silicon Co. Ltd connecting to the local power grid, dated 25 April 2007 (No. 478 in 2007).
- /32/ Cooperation agreement signed between the project owner, Shanxi Jianghe Chemical Silicon Co. Ltd, and the consulting company, CDM Center of Excellence Ltd, dated 11 May 2007.
- /33/ Term sheet signed between Shanxi Jianghe Chemical Silicon Co. Ltd and FC2E Gestion, dated 6 November 2007.
- /34/ National Development and Reform Commission (Construction Department) - The Economic Assessment Method and Parameters for Construction Project (version 3),



VALIDATION REPORT

dated 3 July 2006.

- /35/ Static total investment
Website: <http://www.jsnj.gov.cn/njhlt/njhlt/200804/8406.shtml>
- /36/ NDRC Energy – Tentative Management measures for price and sharing of expenses for electricity generation from renewable energy, document No. NDRC Energy 2006.
- /37/ Shandong Engineering Consulting Institute – Explanation on Feasibility Study Report, dated 29 July 2007.
- /38/ Project supervision office – Project commencement order, dated 15 November 2007
- /39/ Ministry of Environment Protection of China – 2008
website: http://mep.gov.cn/info/bgwbwj/200805/t20080504_122059.htm
- /40/ Taiyuan Boiler Group Co. Ltd – Boiler purchase contract, dated 6 September 2008.
- /41/ Shandong Jinan Power Plant – Generator purchase contract (contract No. JHFD080923), dated 23 September 2008
- /42/ Qingdao Jieneng Steam Turbine Group Co. Ltd – Steam purchase contract, dated 8 August 2008.
- /43/ Shanxi Power Co. Ltd – Connection approval to the Shanxi power grid (2009 – No. 664), dated 4 May 2009.
- /44/ Power Purchase Agreement signed between the project owner, Shanxi Jianghe Chemical Silicon Co. Ltd Biomass Power Plant and the Yuncheng Power Supply Branch Company of Shanxi Power Co. Ltd, dated 11 May 2009.
- /45/ Shanxi Yangqu 2x12MW biomass power plant project
website: http://xnyfg.com/news_1.asp?ida=60&nid=1&WorksID=8889
- /46/ Shanxi Fuhua 2x12MW Biomass Power Plant Project
website: <http://219.26.168.126:82/n16/n1398/n2108/n5731/n29907/6964987.html>
- /47/ China National Centre for Quality Supervision and Test of Coal – Analysis Report for Coal and Coke.
- /48/ CDM Executive Board – Guidance for request for deviation “Application of AM0005 and AMS-I.D in China (<http://cdm.unfccc.int/Projects/Deviations>)
- /49/ Spreadsheet Emission Factor calculation – “Emission Factor-03.xls”
- /50/ The Spain’s Designated National Authority – Letter Of Approval for project “Shanxi Yucheng 25 MW Biomass Power Plant Project”, dated 9 October 2009.
- /51/ Baseline scenario B2
website: <http://www.cityphotos.cn/picture/albumpic.aspx?aid=5512>
- /52/ Shanxi Provincial Development and Reform Committee – Doc. 2008-54
- /53/ Shanxi Province Branch of China Development Bank – Loan Note on Shanxi Jianghe Chemical Silicon Co. Ltd - October 2007.
- /54/ Shanxi Zhengda Certified Public Accountants Office – Proof on Investment of 25 MW



VALIDATION REPORT

Biomass Generation Project of Shanxi Jianghe Chemical Silicon Co. Ltd, dated 30 September 2009.

- /55/ CDM-Executive Board – Methodological Tool “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” version 01 of 16 May 2008.
- /56/ National Environment Committee – Notice on further strengthen the management on the environment impact assessment of biomass power project, [2008] 82 of 4 September 2008.
- /57/ CDM-Executive Board – Guidance on the Assessment of Investment Analysis version 02
- /58/ National People's Congress of the People's Republic of China - Enterprise Income Tax Law of the People's Republic of China, promulgated 16 March 2007 and effective on 1 January 2008
- /59/ Shanxi Provincial Development and Reform Commission: Notification about the tariff in coal-fired power plants in Shanxi Province – Document Fagaijiage [2006] No.1228
- /60/ Shanxi Changqing Biomass residues-fired Cogeneration Project
<http://cdm.unfccc.int/Projects/Validation/DB/CBF8PEZSK4OVJKOFBTUPICYX6NF M4J/view.html>
- /61/ Chinese National Environmental Protection Agency, Regulation on the paper making industry relative to reducing pollutant emissions of the 22 of August 2007
- /62/ 12MW Guoyi Biomass power generation project in Pu County,,
<http://www.sxsqxj.gov.cn/show.aspx?id=43116&cid=56>

Main changes between the version 01 of 15 November 2007 published for the 30 days stakeholder commenting period and the final version 05 dated 19 October 2010 submitted for registration, are:

- included details related to the project design;
 - updated emission reductions calculation;
 - included details on the baseline scenario and determination;
 - included details related to the additionality of the proposed project design;
 - included CDM consideration;
 - review based on methodology ACM0006 version 9.
- After reviewing the revised PDD, DNV issued this final validation report and opinion.

3.2 Follow-up Interviews with Project Stakeholders

On 17 April 2008, DNV performed interviews with project stakeholders at the site of Shanxi Jianghe Chemical Silicon Co. Ltd located at Dongfeng Village, An'yu Town, Jiang County, Yuncheng City, to confirm selected information and to resolve issues identified in the document review. Representatives of Shanxi Jianghe Chemical Silicon Co. Ltd (project owner) and representatives of CDM Center of Excellence Ltd (consulting company) were interviewed. The main topics of the interviews are summarised in table below.



VALIDATION REPORT

	Date	Name	Organization	Topic
/a/	2008-04-17	Yang Yunlai Board of Director	Shanxi Jianghe Chemical Silicon Co. Ltd. (project owner)	<ul style="list-style-type: none"> ➤ The status of the project construction; ➤ The Feasibility Study Report
/b/	2008-04-17	Zhao Qiming General Manager	Shanxi Jianghe Chemical Silicon Co. Ltd (project owner)	<ul style="list-style-type: none"> ➤ The approval of the FSR; ➤ The technical issues; ➤ The additionality of the project; ➤ CDM consideration and real action to secure the implementation of the CDM ➤ The Environment Impact Assessment; ➤ The approval letter of the EIA; ➤ The consulting process on the stakeholder's comments;
/c/	2008-04-17	Nie Yanpeng Project Supervisor	CDM Center of Excellence Ltd (consulting company)	<ul style="list-style-type: none"> ➤ PDD process ; ➤ The consulting process on the stakeholder's comments; ➤ The additionality of the project; ➤ The GHG emission calculation; ➤ The methodology justification ➤ The monitoring plan

3.3 Resolution of Outstanding Issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNVs 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 Shanxi Yuncheng 25 MW Biomass Power Plant Project is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:



VALIDATION REPORT

- (a) the project participants have make mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- (b) the CDM requirements have not been met;
- (c) there is a risk that emission reductions cannot be monitored or calculated.

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

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.



VALIDATION REPORT

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

Validation Protocol Table 2: Requirement checklist				
Checklist Question	Reference	Means of verification (MoV)	Comment	Draft and/or Final Conclusion
<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



VALIDATION REPORT

3.4 Internal Quality Control

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

3.5 Validation Team

<i>Role/Qualification</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>					
				Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Expert input
CDM validator / Technical team leader	Chandrashekara	Kumaraswamy	India	x			x		
Project Manager GHG auditor (Resigned)	Valoroso	Rita	Italy	x		x	x		
Project Manager GHG Auditor	Francisco	Zamarron	Italy			x			
GHG auditor	Guo	Kang	China	x	x				
Sector expert	Costa	David	Brazil						x
Technical reviewers (Draft)	Astakala	Vidyacharan	India					x	
Technical Reviewer (Final)	Kakaraparthi	Venkata Raman	India					x	

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



VALIDATION REPORT

4 VALIDATION FINDINGS

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

The final validation findings relate to the project design as documented and described in the revised and resubmitted project design documentation version 05 dated 19 October 2010.

4.1 Participation Requirements

The project's host Party is the People's Republic of China and the Annex I Party is Spain. China and Spain fulfil the requirements to participate in the CDM. Both have ratified the Kyoto Protocol and established a DNA as the participating requirements for CDM under the Kyoto Protocol. The project participants are the Shanxi Jianghe Chemical Silicon Co. Ltd as the project owner from China and the FC2E GESTION S.L. from Spain. A letter of approval including authorization of Shanxi Jianghe Chemical Silicon Co. Ltd as the project participant issued by the DNA of China in April 2008 has been granted confirming also that the proposed project activity assists China in achieving sustainable development /4/. The Environmental Ministry of Spain, as Spain's Designated National Authority has approved the proposed project activity on 9 October 2009, confirming the voluntary participation of FC2E GESTION S.L. /50/. The proposed project does not involve public funding from an Annex I Party. The validation did not reveal any information that indicated diversion of official development assistance (ODA) funding for the project. The Jiang County Government on 6 May 2009 confirmed that the project is a *self-financing and borrowing* project to cover all the investment, given that the project has not received any foreign financial assistance, the project needs loan from the banks /21/.

4.2 Project Design

The project activity is a green field power project given that it involves, as confirmed in the approved FSR /5/, a new biomass residue fired power generation at the site where currently no power generation occurs. The power generated by the project plant is fed into the North China Power Grid (NCPG).

The objective of the proposed project activity is to generate electricity using biomass residues (cereal stalks) through the installation and operation of a 25 MW power plant. The project is located in the production area of the Shanxi Jianghe Chemical Silicon Co. Ltd in Shanxi Province. The project geographic coordinates are East longitude of 110°24'17" and North latitude of 35°20'50".

DNV observes that, earlier the project proponent had started the construction of a small coal fired power plant having an installed capacity of 25 MW at the project site, without considering the CDM benefits. The construction was halted / stopped on 16 May 2005, following directive from the Jiang County Government as it was not in line with the Chinese laws and regulation /22/.

The present project involves the installation and operation of a power generation system that consists of two 75 t/h medium temperature and pressure fluidized bed boilers and a 25 MW steam turbine and generator unit. All the equipments are manufactured indigenously. The applied technology comprises of direct combustion of biomass residues in the two boilers to



VALIDATION REPORT

generate steam which is subsequently expanded through the turbine. As stated in the approved FSR /5/, the project activity is expected to consume 141 120 tons of cereal stalks biomass residues with 10.38% water content. The project activity includes the stalk collection substations which collect biomass from local farmers located within 50 km around the power plant, the biomass storage at the project site, the power plant and the North China Power Grid to which the project is connected. The total installed capacity of the proposed project activity is 25 MW. It is expected that the proposed project activity will operate 5 500 hours per year with a gross generation of 137 500 MWh and 121 000 MWh net electricity export to North China Power Grid (NCPG). As stated by the Shandong Engineering Consulting Institute /37/ the annual electricity generated by the biomass power plant is calculated according to *Technical Requirements of Feasibility Study about Cogeneration Project* (published in 2001) which consider the rated power of steam generator and the operational hours. The installation capacity of generator of the proposed project activity is 25 MW which is the rated power and according to *Technical Requirements of Feasibility Study about Cogeneration Project*, the 5 500 hours is usually chosen as parameter for operational hours. The electricity supplied to the power grid is the difference of the electricity generated and the electricity consumed by the project and import from the grid. The electricity consumption rate of the project is 12% which is referring to the parameter of similar power plants. The electrical load is designed to 3125 kW and considering simultaneous coefficient as 0.96, the 3000 kW is chosen as the electrical load of the project; thus the electricity consumption rate is 12%.

Being a renewable electricity project, the project activity will generate GHG emission reductions by avoiding CH₄ emissions from uncontrolled burning or decay of biomass residues and CO₂ emissions from electricity generation by fossil fuel power plant in the grid.

The project activity starting date has been defined as 15 November 2007, which was verified to be the date of commencement of construction as evidenced by the Project Commencement Order /38/. DNV has also evidenced that the steam turbine purchase contract was placed on 8 August 2008 /42/ and the generator purchase contract was placed on 23 September 2008 /41/, and hence the commencement of construction on 15 November 2007 is the earliest date when financial commitment was made and hence the start date is in line with the EB guidance. The project is expected to commence operations in March 2010.

As stated in the approved FSR /5/ the expected operational lifetime of the proposed project activity is 20 years. This is reasonable considering that the project has sourced new equipment as verified from the Board Meeting Report of 6 May 2008 /23/. A renewable crediting period of 7 years has been chosen for the project, starting on 15 December 2010 or the date of registration of the CDM project activity. The annual average emission reductions are estimated to be 129 038 tCO₂e.

DNV was able to verify all the documented evidences listed above during the validation process and confirms that the data and consideration are complete and accurate.

4.3 Application of selected baseline and monitoring methodology

The project correctly applies the approved consolidated baseline and monitoring methodology ACM0006 “Consolidated methodology electricity generation from biomass residues”, version 9 /3/. The proposed project activity meets all the criteria stipulated in the baseline methodology as it has been demonstrated and ensured that:

- cereal stalks (biomass residues) from the local agricultural activities will be used in the proposed project activity and represents the predominant fuel used in the project plant (it



VALIDATION REPORT

is expected to use 141 120 tonnes of cereal stalks per year). As assumed in the approved FSR /5/ only 30 tons of diesel per annum will be used for boiler start-up operation;

- the stalk used by the project are by-products of agriculture crops, not from production process.;
- given the stock rotation regulation for the warehouse to ensure first-in-first out, the storage time of the biomass will not exceed more than one year; moreover as stated in approved FSR /5/ the quantity stored in the biomass warehouse at the project site can satisfy the demand of five days production;
- except for transportation and boilers start-up operation, no other consumption of fossil fuel is envisaged in the proposed project activity. The energy consumption for transportation and preparation of biomass will be monitored during the power plant operation.

DNV was able to verify the above information through the on-site visit and through the documented evidences provided by the PP.

4.4 Baseline determination

The following baseline scenario is selected in accordance with the methodology ACM0006, version 9 for project scenario 2:

Power Generation: P4 – the generation of power in existing and/or new grid-connected power plants.

Use of Biomass: B1 – the biomass residues are dumped or left to decay under mainly aerobic conditions.

The detailed analysis for the selection of the baseline is provided in the section 4.5.2 below.

The project activity is a green field power project given that it involves, as confirmed in the approved FSR /5/, a new biomass residue fired power generation at the site where currently no power generation occurs and it complies with the project scenario 2 of the ACM0006 version 9. The power generated by the project plant is fed into the North China Power Grid (NCPG).

Emission sources included in the project boundary are as follows:

	<i>GHGs involved</i>	<i>Description</i>
<i>Baseline emissions</i>	CO ₂	Emissions from electricity generation in grid connected fossil fuel fired power plants that are displaced.
	CH ₄	Emissions from uncontrolled burning of surplus biomass residues.
<i>Project emissions</i>	CO ₂	Emissions from the on-site fossil fuel and electricity consumption and from off-site transportation of biomass residues
	CH ₄	Emissions from uncontrolled burning of surplus biomass residues included in the baseline scenario.



VALIDATION REPORT

<i>Leakage</i>	No leakage emissions are accounted for the proposed project activity.
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The selected sources and gases are justified for the proposed project activity. The spatial extent of the project boundary includes the power plant at the project site, the means for transportation of biomass residues to the project site, all power plants connected physically to the electricity system of the North China Power Grid that the proposed project activity is connected to for which the geographical and system boundaries are clearly identified and information on the characteristic of this grid are available. The NCPG system includes Beijing City, Tianjin City, Hebei Province, Shandong Province, Inner Mongolia Autonomous Region and Shanxi Province power grid. The defined project boundary is in line with the methodology ACM0002 version 10 “Consolidated baseline methodology for grid connected electricity generation from renewable sources” used for determining the emission associated with grid electricity generation /8/ /16/.

4.5 Additionality

The project additionality has been demonstrated applying the methodological tool “Combined tool to identify the baseline scenario and demonstrate additionality” version 02.2 /7/.

4.5.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

The project’s starting date has been considered as 15 November 2007, and was verified to be the date of project commencement order /38/. The selection of this as the starting date is in line with the EB guidance on start date, as the date “*on which the project participant has committed to expenditures related to the implementation or related to the construction of the project activity*”. DNV has verified by the scrutiny of the date of issue of purchase orders for the equipments in August/September 2008 /42/ & /41/, that the selected start date was the earliest. The project owner received on November 2007 the construction permission issued by Shanxi Province Commission /28/.

DNV has assessed and verified the evidence related to timeline for serious CDM consideration and to the real and continuing action to attain CDM status of the project activity in line with Annex 61 of EB48 as follows:

- the Feasibility Study Report was prepared and completed in February 2007 by the Shandong Engineering Consulting Institute and Shanxi Electric Power designing Institute /5/
- On 9 March 2007 the Shanxi Development and Reform Committee, approved the project since it is in compliance with the national industry policy and agreed the construction of the biomass power plant /29/.
- During the Board Meeting of Shanxi Jianghe Chemical Silicon Co. Ltd, on 18 April 2007, due to lower IRR than the benchmark and higher investment costs, the Board in order to guarantee the project development, decided to seek CDM benefits and authorized all the relative works about applying CDM project and the negotiation about emission reductions purchase agreement /30/.
- The FSR was approved by the National Development and Reform Commission of the People’s of China on 28 September 2007 /5/. The project is stated to be unattractive as the



VALIDATION REPORT

project IRR is lower than the selected benchmark. DNV confirms that the IRR stated in the approved FSR is the same as stated in the PDD.

- On 25 April 2007 the grid company, Shanxi Power Co. Ltd, issued the intent approval of the 25 MW biomass power plant of Shanxi Jianghe Chemical Silicon Co. Ltd connecting to the local power grid /31/.
- On 11 May 2007 the project owner signed the CDM cooperation agreement with the consulting company CDM Center of Excellence Ltd /32/.
- On 6 November 2007 the Term Sheet was signed between the project participants, Shanxi Jianghe Chemical Silicon Co. Ltd and FC2E Gestion, related to the CERs sale /33/.
- On 12 November 2007 the project owner received the construction permit issued by the Shanxi Province Construction Commission /28/.
- 15 November 2007, date of project commencement order /38/ - the start date of project.
- On 8 August 2008 the project owner signed the steam turbine purchase contract with Qingdao Jieneng Steam Turbine Group Co. Ltd /42/.
- On 6 September 2008 the project owner signed the boiler purchase contract with Taiyuan Boiler Group Co. Ltd /40/.
- On 23 September 2008 the project owner signed the generator purchase contract with Shandong Jinan Power Plant /41/.
- On 4 May 2009 the project owner received from the Shanxi power grid the approval of the biomass power plant electrical scheme and the approval to connect to the power grid /43/.
- On 11 May 2009 the power purchase agreement was signed between the project owner, Shanxi Jianghe Chemical Silicon Co. Ltd Biomass Power Plant, and the Yuncheng Power Supply Branch Company of Shanxi Power Co. Ltd /44/.

The project will be expected to start operation in 2010.

CDM was therefore seriously considered in the decision to proceed with the project activity in compliance with EB48 Annex 61. DNV considers satisfactory actions were undertaken to secure CDM status in parallel with the physical implementation of the project activity.

4.5.2 Identification of alternatives to the project activity.

The project uses the “Combined tool to identify the baseline scenario and demonstrate additionality”, version 02.2 /7/. According to the “Identification of the baseline scenario” of ACM0006 methodology, the following realistic and credible alternatives were analysed separately regarding power generation and use of biomass residues. The project being a stand alone power plant has no requirement of heat. Hence the heat component has not been considered in the baseline scenario determination.

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

Power

Through the on-site visit, it was confirmed that there is no existing biomass residue fired power plant or a co-fired cogeneration plant at the project site, thus alternatives P2, P7, P8 and P11 are not realistic and credible alternatives. It was also confirmed during the visit that there is no existing captive power plant using only fossil fuel, hence alternative P3 is not realistic and hence eliminated. Alternative P10 cannot be considered a realistic alternative



VALIDATION REPORT

since the co-firing with fossil fuel in a new biomass power plant is forbidden by the Notice issued on 2008 /56/. In conclusion, the realistic and credible alternatives for the proposed project activity are P1, P4, P5, P6 and P9. Identifying the alternative consistent with the current laws and regulation, the alternative P9 can be excluded given that in China coal-fired plants with a capacity of 135 MW or less are strictly prohibited in large grids such as provincial grid /10/. Alternative P1 is not a financially attractive option as detailed in the benchmark analysis, with the project IRR at 4.13% which is lower than the 8% project benchmark. The installation of a new biomass fired power plant with a lower efficiency of electricity generation than the project plant not undertaken as a CDM project activity is not financially attractive and is not common practice in China. DNV has verified from the article “conditions and problem of biomass power plant” /25/ that biomass generation technology is under initial development and application stage and therefore it is not common practice in China. Thus, alternatives P5 and P6 cannot be considered realistic and credible alternatives.

Hence the credible alternatives for power generation in the absence of the project activity are P1 and P4.

Biomass

DNV has verified that the first landfill in the Yuncheng region started operation in December 2008 /51/, at a distance of 102 km from the proposed project activity, and therefore not a financially attractive option for the farmers to transport and dump the biomass residues in the landfill.. Thus alternative B2 is not realistic. There is no heat or power generation at the project site that uses biomass residues as fuel and therefore alternative B4 is excluded. Similarly, it has been verified during the site visit that there is no generation or cogeneration project using biomass residues as fuel close to the proposed project activity. Considering the restrictions by the national industry policy that there should be no new construction of biomass power projects around 50-80 km of an existing biomass user /24/, exclusion of alternative B5 is deemed justified. It has also been verified during the site visit that there are no boilers using biomass residues as fuel close to proposed project, therefore the alternative B6 is excluded. As stated by the Shanxi Provincial Development and Reform Committee, the proposed project activity is the first straw power generation project in Shanxi Province /52/. Due to the constraining by the national industrial policy, after the proposed project activity put into operation, there will no new construction of biomass power projects around 50-80 km range. Based on this information there would be no other energy production that needs the surplus of biomass residues used by the proposed project activity, thus the alternative B7 is not eligible. There is no use of biomass residues for non energy-purpose such as fertilizers; therefore the alternative B8 is excluded.

In conclusion, the realistic and credible alternatives for the use of biomass residues are B1 and B3. However, the burning of biomass residues in an uncontrolled manner is forbidden by the Ministry of Environment Protection of China /39/; therefore the alternative B3 could be excluded.

Hence the only remaining credible alternative is B1, that is the biomass residues are dumped or left to decay under mainly aerobic conditions, for example, dumping and decay of biomass residues on fields itself. The biomass when dumped or left to decay in the fields does not have any value. The biomass attains a value due to the implementation of the project activity, and the demand for it. The procurement of biomass by the project participant is done through suppliers for which the costs involved is in terms of the logistic and transformation operations



VALIDATION REPORT

(collection, transformation, handling and transport) until the residues reach the final destination of the project plant. This has been verified by DNV through existing reports about the local sector /24/ /25/.

Heat

Since the project activity does not use the heat energy, the same has not been considered for determining the baseline scenario.

Step 2 – Barrier analysis.

The remaining alternative scenarios: P4 (generation of power in a new grid-connected power plants) and P1 (The proposed project activity not undertaken as a CDM project activity) will be analyzed using financial analysis (see section 4.5.3 of the report) in order to determine the baseline scenario and to demonstrate the additionality of the project activity as per the combined baseline-additionality tool /7/.

However DNV observes that the project does face the following barriers:

Biomass power generation technology is new to China and Shanxi region in particular, and the equipment performance is unstable. The main barriers for biomass generation as evidenced from the NRDC website “Investment/Technological barriers” /26/ are a) uncertainty of technology which is imported b) Absence of a procurement chain that needs to be built up as this is the first biomass based power plant in the region c) large one-off investment and high fuel costs d) lack of market competitiveness; generally the installed capacity of the biomass power plant is small, and e) supply of fuels is strongly seasonal and specialized fuel storage stations facilities and transportation equipment are required. This was verified from the investigation of NDRC, which indicates that the straw price may have a sharp fluctuation which brings a big risk to the proposed project activity /27/.

Given that the initial investment is much higher than the investment for coal-fired power plant, and that the technology brings risks to the operation and maintenance of the project, the banks are reluctant to provide loans for such project activities, so the financing channels are limited as verified from the Investment/Technological barriers document on the National Development and Reform Commission website /26/. Biomass projects having a higher credit risk and long periods of investment recovery, and the loan sanction by banks is not fast and easy, as verified from the loan rejection note of Shanxi Province Branch of China Development Bank /53/.

DNV was able to verify all the documented evidences listed above during the validation process and confirms that the data and consideration are complete and accurate. Moreover DNV considers the list of realistic and credible alternatives to be complete and the application of the baseline methodology to be transparent and reasonable.



VALIDATION REPORT

4.5.3 Investment analysis.

Choice of approach

The only two alternatives for the project are a) implementation of the project without considering CDM revenues and b) generation of equivalent power from the grid connected thermal power plants. The alternative (a) involves investment to the project proponent and the alternative (b) does not involve any investment to the project proponent. As the project generates revenues, in addition to any CDM income, by selling the electricity to the grid, the benchmark analysis has been selected for the demonstration of the investment barrier and the project IRR has been selected as the financial indicator.

Benchmark selection

The project participant has compared the project financials against the benchmark of 8% which is regarded as benchmark for investment in power industry in China according to *The Economic Assessment Method and Parameters for Construction Project* published on 3 July 2006 /34/. DNV has verified and confirmed, the benchmark to be valid at the date when the investment decision was made in November 2007.

Input parameters

DNV has validated the input parameters used according to the “*Guidance of EB38 paragraph 54 (c)*”. The following steps have been followed to assess the investment analysis:

Step 1: assessment of the sources used for input parameters.

All input parameters (installed capacity, gross annual electricity generated, annual power generation, operational lifetime, static total investment, electricity price, annual operation and maintenance cost) used in the financial analysis have been sourced from the FSR developed in February 2007 by an independent officially accredited entity, Shandong Engineering Consulting Institute and Shanxi Electric Power Designing Institute /5/ and approved by the National Development and Reform Commission of the People’s Republic of China on September 2007. Hence the input parameters can be considered as information provided by independent recognized source.

Step 2: confirmation that the values used in the PDD and investment analysis are fully consistent with the FSR.

DNV compared the input parameters for the financial analysis included in the PDD with the parameters stated in the approved FSR /5/ and confirms that the values applied are consistent with the values stated in the documents mentioned before.

Step 3: assessment of the period between of time the finalization of the FSR and the investment decision.

The FSR was prepared in February 2007 /5/ and the decision to go ahead with the project considering CDM revenues was taken on 18 April 2007 in the board meeting of the Directors /30/. The investment decision (start date) to proceed with the project activity was taken on 15 November 2007 /38/ which was eight months after the FSR preparation date. Thus it is reasonable to assume that the FSR has been the basis of the decision to proceed with the investment in project activity.

Step 4: cross check of the mains input parameters used in the financial analysis with parameters used by other similar projects.



VALIDATION REPORT

Since the project activity is the first biomass (corn and wheat stalk based) power generation project in Shanxi Province, as verified from the Shanxi Provincial Development and Reform Committee document /52/ the input parameters used in the financial analysis were compared with data reported in other similar projects developed in different provinces in China.. The projects selected for the comparison are the most recent (2009) UNFCCC registered large scale projects with installed capacity between 15 MW to 50 MW.

<i>UNFCCC Project name</i>	<i>Ref #</i>	<i>Installed Capacity (MW)</i>	<i>Investment / Capacity (Million RMB/ MWh)</i>	<i>Biomass Price (RMB/t)</i>	<i>O&M (excluding fuel cost) (Million RMB)</i>	<i>Power tariff RMB/kWh (VAT included)</i>
<i>Jiangsu Rudong Biomass Power Generation Project – Jiangsu Province</i>	<i>2230</i>	<i>25</i>	<i>11.248</i>	<i>258.75</i>	<i>17.31</i>	<i>0.636</i>
<i>Straw-fired Power Generation Project in Chuzhou District, Huaian City, Jiangsu Province</i>	<i>2161</i>	<i>33</i>	<i>8.235</i>	<i>290.00</i>	<i>13.26</i>	<i>0.640</i>
<i>Anhui Anqing 30MW Biomass Power Generation Project – Anhui Province</i>	<i>2440</i>	<i>30</i>	<i>8.789</i>	<i>248.00</i>	<i>17.26</i>	<i>0.619</i>
<i>Jiangsu Longyuan Donghai Biomass Power Project – Jiangsu Province</i>	<i>1892</i>	<i>24</i>	<i>10.033</i>	<i>220.0</i>	<i>19.95</i>	<i>0.636</i>
<i>Shanxi Changqing Biomass residues-fired Cogeneration Project</i>	<i>N.A.</i>	<i>15</i>	<i>15.549</i>	<i>260.0</i>	<i>N.A.</i>	<i>0.523</i>
<i>Project Activity Shanxi Province</i>	<i>N.A.</i>	<i>25</i>	<i>10.781</i>	<i>190.00</i>	<i>6.57</i>	<i>0.524</i>

Total Investment: The investment cost of the project activity has been sourced from the approved FSR. DNV has verified that the investment cost/MWh of recently registered projects in different provinces vary between 8.235 to 11.248 million RMB/MWh. In comparison, the investment/MWh for the project activity is 10.781 million RMB/MWh. Considering that investment cost would vary across regions, this is considered reasonable. DNV has also verified that the actual investment incurred on the project as of date (plant is not yet commissioned) to be 256.89 million RMB from the Shanxi Zhengda Certified Public



VALIDATION REPORT

Accountants Office /54/, and hence the project investment of 269.52 million RMB is reasonable.

Biomass Price: The biomass price for the project activity is considered at 190 RMB/t. This is below the range of 220 to 290 RMB/t as seen in the recently registered projects. The price considered in the FSR is based on contracts for biomass supply agreements signed in 2007 /9/ which were verified by DNV during the site visit. The difference in the biomass prices can be due to the different type of biomass used in the project activity when compared to the other projects (corn straws and shrub twigs compared to rice and wheat straws). However since considering a lower biomass price in the financial analysis is conservative, this is accepted. The price of the biomass at 190 RMB/t (though lower than the other projects) may appear to be contradicting as the baseline alternative is that of B1, that is the biomass residues are dumped or left to decay under mainly aerobic conditions, for example, dumping and decay of biomass residues on fields itself. It is DNV opinion that the biomass when dumped or left to decay in the fields does not have any value, but attains a value due to the implementation of the project activity, and the demand for it. This is an opportunity cost for the farmers and the suppliers. The procurement of biomass by the project participant is done through suppliers for which the costs involved is in terms of the logistic and transformation operations (collection, transformation, handling and transport) involved until the residues reach the final destination of the project plant, have been verified by DNV through existing reports about the local sector /24/ /25/.

O&M costs: The annual O&M costs (excluding biomass cost) for the project activity, at 6.57 million RMB, as sourced from the FSR, is seen to be below the range 13 to 19 million RMB (averaging at 17 million RMB). However this has been accepted, as considering a lower O&M cost is conservative.

Tariff: The tariff used in the financial analysis as sourced from the FSR is lower than that for the other projects analysed. This is due to the fact that in China, the tariff for biomass projects is regulated by the local Government and has, consequently, relevant variations in function of the Province where the project is located. The “Tentative management measures for price and sharing of expenses for electricity generation from renewable energy” /36/, fixes the biomass power generation tariff for the project activity for 15 years from the date in which the project start operations and comprises the 2005 benchmark tariff for the desulphurized coal fired generation plants in the Shanxi province plus a fixed standard subsidized tariff of 0.25 RMB/kWh. DNV has verified that the 2005 benchmark tariff (VAT included) for desulphurized coal fired plants for the Shanxi province to be 0.259 RMB/kWh from the Fagaijiage[2006]No.1228 Notice /59 /.

Therefore, according to the “Tentative management measures” /36/ the tariff (VAT included) for the project activity is fixed for 15 years at 0.509 RMB/kWh (0.25 RMB/kWh + 0.259 RMB/kWh). Hence the consideration of a tariff of 0.524 RMB/kWh in the financial analysis is conservative.

The tariff of the project activity is perfectly aligned with the other existing project / 60 / in the Shanxi Province, that is Shanxi Changqing Biomass residues-fired Cogeneration Project, which also applies a tariff of 0.523 RMB/kWh (including VAT).



VALIDATION REPORT

Net Annual Electricity Supply to the Grid:

As stated earlier, the project activity is the first biomass (straw based) power generation project in Shanxi Province, as verified from the Shanxi Provincial Development and Reform Committee document /52/. Hence the input parameters used in the financial analysis were compared with data reported in other similar projects developed in different provinces in China, to assess the suitability in line with the VVM (paragraphs 111 & 112) requirements.

This parameter is calculated as

Capacity Installed (MW) x Annual Operating Hours (h) x (1- % Electricity Self-consumption)

Therefore, also the parameters annual operating hours and the electricity self-consumption rate used by the project participant have been cross-checked with the reference projects.

<i>Project Name</i>	<i>UNFCCC Ref</i>	<i>Annual Operating Hours (h)</i>	<i>Electricity Self-consumption rate (%)</i>
<i>Jiangsu Rudong Biomass Power Generation Project – Jiangsu Province</i>	<i>2230</i>	<i>6 975</i>	<i>10</i>
<i>Straw-fired Power Generation Project in Chuzhou District, Huaian City, Jiangsu Province</i>	<i>2161</i>	<i>5 455</i>	<i>8</i>
<i>Anhui Anqing 30MW Biomass Power Generation Project – Anhui Province</i>	<i>2440</i>	<i>6 500</i>	<i>10</i>
<i>Jiangsu Longyuan Donghai Biomass Power Project – Jiangsu Province</i>	<i>1892</i>	<i>6 000</i>	<i>12</i>
<i>Project Activity Shanxi Province</i>	<i>NA</i>	<i>5 500</i>	<i>12</i>

The operating hours and the auxiliary consumption figures for the project activity have been sourced from the approved FSR. DNV observes that the operating hours of 5500 considered for the project activity is on the lower side of the range and the auxiliary consumption at 12% on the higher side. Consequently, the comparison analysis has been extended to other biomass projects even if older than 2009 and located outside the Shanxi Province, with the following result



VALIDATION REPORT

<i>Project Name</i>	<i>UNFCCC Ref</i>	<i>Annual Operating Hours (h)</i>	<i>Electricity Self-consumption rate (%)</i>
<i>Shandong Yucheng Xinyuan Biomass Heat & Power ("Yucheng Biomass CHP")</i>	<i>811</i>	<i>6 000</i>	<i>20</i>
<i>Henan Luyi 25MW Biomass Cogeneration Project</i>	<i>825</i>	<i>5 500</i>	<i>12</i>
<i>Zhongjieneng Suqian 2*12MW Biomass Direct Burning Power Plant Project</i>	<i>819</i>	<i>6 500</i>	<i>15</i>
<i>Zhongjieneng Jurong 2*12MW Biomass Direct Burning Power Plant Project</i>	<i>820</i>	<i>6 500</i>	<i>15</i>
<i>Shandong Shanxian 1*25MW Biomass Power Plant Project</i>	<i>1032</i>	<i>6 000</i>	<i>15</i>
<i>Shandong Wudi Biomass Generation Project</i>	<i>1263</i>	<i>5 500</i>	<i>15</i>
<i>Heilongjiang Tangyuan Biomass Cogeneration Project</i>	<i>1293</i>	<i>6 000</i>	<i>14</i>
<i>Shandong Gaotang 30MW Biomass Power Generation Project</i>	<i>1375</i>	<i>5 500</i>	<i>12</i>
<i>Biomass generation project, in Sheyang county, Jiangsu province, P.R. China</i>	<i>1366</i>	<i>5 500</i>	<i>8</i>
<i>Straw generation project in Wei county Hebei province, P.R. China</i>	<i>1546</i>	<i>5 500</i>	<i>8</i>
<i>Shandong Kenli Biomass Generation Project</i>	<i>2526</i>	<i>5 500</i>	<i>12</i>
<i>Guodian Liaocheng Biomass Power Project</i>	<i>2963</i>	<i>5 500</i>	<i>16</i>
<i>Jianli Kaidi Biomass Power Project</i>	<i>3044</i>	<i>6 000</i>	<i>12</i>

From the extended comparison it is observed that average operating hours to be in the range of 6500 and the electricity self consumption rate varying between 8 to 20 %. DNV also observes that even on considering a higher operating hours of 6500 hours (18% more than the FSR figure), the IRR of the project at 6.23% would still be below the benchmark. The project IRR would only be 7.33% and still below the benchmark on considering 6500 operating hours and 8% auxiliary power consumption. Hence DNV accepted the operating hours of 5500 hours and 12% auxiliary consumption.



VALIDATION REPORT

Income Tax Rate: DNV checked the approved FSR and the relative investment analysis and verified that the income tax rate applied was 33 %. DNV confirms that the income tax rate of 33% was applicable at the time of the FSR completion in 2 February 2007. The FSR was approved by National Development and Reform Commission of the People's Republic of China. DNV also observed that, in 16 March 2007 the National People's Congress approved a new Enterprise Income Tax Law of the People's Republic of China /58/ which contemplated a reduction of the income tax rate from 33 % to 25 %. However, DNV accepted the higher rate of 33%, which is in line with the Guidance on the Assessment of Investment Analysis /57/, which states that "*input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant.*" The investment decision was taken on the November 2007 and the reduced income tax rate came into effect in start of 2008. DNV also observes that even if the reduced income tax rates of 25% is considered, the project IRR would only increase from 4.13 % to 4.18 %. Thus, the Tax Income rate does not have a major impact on the project IRR.

Calculation and conclusion

The IRR calculations provided in the spreadsheet /13/ were verified and found to be correct by DNV. As stated above, the assumptions used in the calculation were deemed to be correct. The project IRR without CDM revenues is 4.13% which confirms that the proposed project activity in absence of CDM benefits and compared to the benchmark IRR of 8% is not financially attractive.

Sensitivity analysis

A sensitivity analysis has also been carried out on critical parameters to demonstrate the robustness of the financial analysis. Reasonable variations of the static total investment, annual O&M cost (including the biomass price), electricity tariff and annual electricity output were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen.

Total Static investment. The project IRR reaches the benchmark of 8% if the static investment decreases by 28.4%. DNV has verified from available sources /35/ that the investment required for 1 kW to be about 10,000 RMB, which translates to a theoretical investment of 250 million RMB. Hence the investment of 269 million RMB in the approved FSR is reasonable. DNV has also verified that the actual investment as of date (plant is not yet commissioned) to be 256.89 million RMB /54/, as stated by the Shanxi Zhengda Certified Public Accountants Office, which also demonstrates the project investment of 269.52 million RMB/Yuan to be reasonable and that it is unlikely to reduce by 28.4%.

Annual O&M cost. The project IRR touches the benchmark if the annual operation and maintenance cost decreases by 28.4%. The costs of biomass fuel accounts for about 80% of the total annual operating cost. As evidenced from the "Condition and problem of biomass power plant" report /25/, the local biomass resource price shows an increasing trend to 300 RMB Yuan/ton. Compared to the biomass price of 190 RMB/t considered in the approved FSR, the present price of 300 RMB/t is a 57% increase. Hence it is unlikely that the over all O&M cost of the project (comprising 80% from biomass price) reduces by 28.4%.



VALIDATION REPORT

Electricity tariff: The grid tariff should increase by 17.8% to reach the 8% of IRR benchmark. The tariff used in the financial analysis account to 0.524 RMB Yuan/kWh. The electricity tariff is strictly regulated by the Chinese Government and according to Tentative management measures for price and sharing of expenses for electricity generation from renewable energy /36/ the feed in tariff of biomass power generation comprises of the benchmark tariff for the desulphurized coal fired generation and subsidized tariff (standard is 0.25 RMB Yuan/kWh); when the project plant will start the operation, the subsidized tariff is fixed for 15 years. Hence the grid price will not increase during the project crediting period.

Net electricity output: The project IRR reaches the benchmark of 8% if the annual net electricity supplied to the grid increases by 17.8%. The net annual electricity that could be supplied to the grid is 121,000 MWh, which is an estimate derived from the approved FSR /5/ considering operational hours of 5,500; only if the operational hours will be 7,881 the electricity output could be reached the 8% of IRR benchmark. As stated in explanation issued by Shandong Engineering consulting Institute, the operational hours of 5,500 has been chosen according to *Technical Requirements of Feasibility Study about Cogeneration Project*. Under the above assumption, the increase in net electricity output by 17.8% is deemed unlikely.

The financial analysis and sensitivity analysis indicate that without the income from CERs sale, the proposed project activity is unlikely to be the most financially attractive option.

Hence the baseline scenario is selected is in accordance with the methodology ACM0006, version 9 for project scenario 2:

Power Generation: P4 – the generation of power in existing and/or new grid-connected power plants.

Use of Biomass: B1 – the biomass residues are dumped or left to decay under mainly aerobic conditions.

4.5.4 Common practice analysis

In Shanxi Province there are three biomass power generation projects approved by the local government until the end of 2008, Shanxi Yangqu 2 x 12 MW biomass power plant project /45/, Shanxi Fuhua 2 x 12 MW Biomass Power Plant Project /46/ and the 12 MW Guoyi Power generation retrofit and fuel switch project. The first two are applying for CDM. The Guoyi project in Pu County is a retrofit and fuel switch project, based on an existing 18 MW (2 groups of 3 MW and 2 groups of 6 MW) fossil fuel power plant /62/. The retrofit to biomass of a part of a fossil fuel fed power plant is a different type of project than a fully biomass fed green field power plant as it is the case of the proposed project activity. Since the project construction started the on November 2007 /38/, it was not a common practice in China at the time of project start to develop biomass power generation projects.

In conclusion the assessment of the arguments presented above is deemed to sufficiently demonstrate that the proposed project activity is not a likely alternative, and that emission reductions resulting from the project are additional.



VALIDATION REPORT

4.6 Monitoring

The approved baseline and monitoring methodology ACM0006 “Consolidated methodology electricity generation from biomass residues” version 9 /3/, is correctly applied. This methodology also refers to the “Tool to calculate the emission factor for an electricity system” version 01.1 /16/ and to the “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” version 02 /15/.

The monitoring plan description in the PDD is found conforming with the approved methodology and in a complete and transparent manner.

4.6.1 Parameters determined ex-ante

The following parameters are determined ex-ante and verified by DNV.

The Operating Margin (OM), Build Margin (BM) and the Emission Factor for the North China Power Grid were calculated based on the latest valid methodology and publicly available data at the time where the PDD was submitted for validation for the first time.

Data and parameters	Unit	Value applied	Source of data used
Operating margin of North China Power Grid (OM)	tCO ₂ /MWh	1.1208	The State Electric Industry Yearbook—years from 2003 to 2005 /17/ China Energy Statistical Yearbook - years from 2003 to 2005 /18/.
Build margin of North China Power Grid (BM)	tCO ₂ /MWh	0.9397	The State Electric Industry Yearbook – years from 2003 to 2005 /17/ China Energy Statistical Yearbook - years from 2003 to 2005 /18/.
Emission factor of the North China Power Grid	tCO ₂ /MWh	1.0302	The State Electric Industry Yearbook – years from 2003 to 2005 /17/ China Energy Statistical Yearbook - years from 2003 to 2005 /18/.
Global warming potential for methane	tCO ₂ /tCH ₄	21	IPCC 2006 Guidelines
Average technical transmission and distribution losses	%	20	Tool to calculate baseline, project and/or leakage emissions from electricity.

4.6.2 Parameters determined ex-post

The following data and parameters need to be monitored; these are considered appropriate.

- (i) electricity generation by the project (gross);
- (ii) electricity consumed by the project (Auxiliary)



VALIDATION REPORT

- (iii) net electricity supplied to the NCPC by the project (exports-imports);
- (iv) quantity of biomass residue type k combusted in the project plant;
- (v) moisture content of the biomass residue;
- (vi) average round trip distance (from and to) between biomass fuel supply sites and the project site;
- (vii) average truck load of the trucks carrying biomass to the project plant;
- (viii) fossil fuels combusted in the biomass fired plant;
- (ix) net calorific value of the biomass type k;
- (x) net calorific value of fossil fuel;
- (xi) methane emission factor for uncontrolled burning of biomass;
- (xii) methane emission factor from biomass combustion
- (xiii) average CO₂ emission factor for transportation of biomass with trucks.

4.6.3 Management system and quality assurance

The monitoring parameters proposed are consistent to the approved methodology ACM0006, details data to be collected, the recording frequency, proportion and control forms are described and deemed appropriate. A monitoring structure will be in charge as a CDM department which will be led by a CDM Project Director and will include a CDM Manager and a Monitoring Team. The CDM Manager will be responsible for verification of the measurement and the calculation of the emission reductions, while the CDM Project Manager will have the overall responsibility for the monitoring process and will review the monitoring reports. All data recorded and collected will be archived electronically till two years after the crediting period is over.

The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurement of achieved emission reductions.

4.7 Estimate of GHG Emissions

The emission reduction ER_y by the proposed project activity during the crediting period is the difference between the emission reductions through substitution of electricity generation with fossil fuels ($ER_{electricity}$), project emissions (PE_y), emissions due to leakage (L_y), baseline emissions due to natural decay of anthropogenic sources of biomass ($BE_{biomass}$) as follows /14/.

Baseline emissions.

- Baseline biomass emissions ($BE_{biomass}$). The baseline emissions due to natural decay of anthropogenic sources of biomass residues are calculated, applying the approved methodology ACM0006, as the product of the amount of biomass residues, the biomass net calorific value, methane emission factor and global warming factor. The quantity of biomass residues are determined as a result of the project activity and hence 124,472 tons on dry basis (141,120 tons the annual consumption of biomass having moisture content of 10.38% /47/). Default value of 21 tCO₂/tCH₄ has been used as per the decisions under UNFCCC and the Kyoto Protocol for GWP. NCV value of coal has been considered at 0.01568 TJ/tons and has been sourced from the Analysis Report for Coal and Coke /47/ issued by China National Centre for Quality Supervision and Test of Coal. The 2006



VALIDATION REPORT

IPCC default value of methane factor of 0.0027 tCH₄/t biomass is used. The uncertainty can be deemed to be greater than 100%, resulting in a conservativeness factor of 0.73, thus the emission factor of 0.001971 tCH₄/t is used. The biomass baseline emissions are calculated as 8 208 tCO₂/year.

- Emission reductions due to displacement of electricity is calculated as the product of the net electricity exported to the grid by the project activity during the year and the CO₂ grid emission factor. In line with the methodology ACM0006, the emission factor is calculated as a combined margin (CM) following the methodology ACM0002 /8/ "Consolidated baseline methodology for grid-connected electricity generation from renewable sources". The methodological tool "Tool to calculate the emission factor for an electricity system" version 2 /16/ has been applied to calculate the grid's emission factor. The electricity will be supplied to North China Power Grid (NCPG) which has been selected as the project boundary as per the Chinese DNA's guidance for the determination of region power grid.

Consideration about the EF_{OM} : since, data for dispatch analysis are not available, low-cost-must-run power plants during the past four years from 2002 to 2005 are lower than 50% of the total grid power generation (0.89%, 0.86%, 0.76% and 0.75% respectively) /17/, simple operating margin was selected to calculate the Operating Margin. The ex-ante vintage data will be employed for the OM calculation of the proposed project. The PDD was web-hosted on 3 February 2008 and the latest available data, the State Electric Industry Yearbook published on 2004/2005/2006/ /17/ and China Energy Statistical Yearbook published on 2004/2005/2006 /18/, are used for operating margin calculation. The EF_{OM} are calculated as a three years full generation weighed average based on the net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system, consequently the Operating Margin Emission Factor (EF_{OM}) is determined to be 1.1207 tCO₂/MWh.

Consideration about the EF_{BM} : because plant specific fuel consumption and electricity generation data is not public available in China, the EB's guidance to determine the build margin in China /48/ is determined as follows: the capacity additions from years 2003 to 2005 is chosen and represent 23.78% of total installed capacity; the weight of installed capacity additions from thermal power plants is accounted for 33.28% of total installed capacity additions; the standard coal consumption of 343.33 gce/kWh which is defined as the best technology commercially available in China and which is equivalent to 35.82% of power supply efficiency, is used to determine the BM emission factor EF_{BM} and resulting to be 0.9397 tCO₂/MWh

The emission factor is weighted average value of the EF_{OM} and EF_{BM} with a default value of weight 50%. The combined grid emission factor of NCPG taking into account is equal to 1.0302 tCO₂/MWh. The net annual power generation account to 121,000 MWh hence the emission reductions due to displacement of electricity is calculated as net quantity of electricity generated by the proposed project activity are calculated as 124 654 tCO₂/year.

The annual total baseline emission are 132 866 tCO₂/year.

Project emissions.

Project emissions include emissions from transportation of biomass residues to the project site, emissions from on-site consumption of fossil fuels due to the project activity, emissions from consumption of electricity and methane emissions from the combustion of biomass residues.



VALIDATION REPORT

- CO₂ emissions from combustion of fossil fuels for transportation of biomass residues to the project plant are calculated on the basis of distance and the average truck load. The straws supply sites are within 50 km away around the project site, a conservative value of 100 km is chosen to calculate; the average truck load applied account to 10 tons and a default value of 0.001011, taken from 2006 IPCC Guidelines, has been used as the average CO₂ emission factor for the heavy duty diesel vehicle. The project emissions are calculated as 1 279 tCO₂/year.
- CO₂ emissions from on-site consumption of fossil fuels is calculated using the lasted approved version of the methodological tool “Tool to calculate project or leakage CO₂ emissions from fossil fuel combustion” version 02 /15/. The combustion process uses diesel oil. Since the data is not available for calculation of CO₂ emission coefficient by option A, option B of the methodological tool based on net calorific value and CO₂ emission factor of the fuel type used has been adopted. The NCV value used is 0.042652 TJ/t /17-18/ and CO₂ emission factor of the fuel type used is 20.20 tCO₂/TJ /17-18/. The project emissions are calculated at 96 tCO₂/year.
- CO₂ emissions from electricity consumption: is calculated using the latest approved version of the methodological tool “Tool to calculate baseline, project and/or leakage emissions from electricity consumption” version 01 /55/. It has been estimated that electricity consumption per day at each straw collecting sub station is 50 kWh. Considering 30 sub station within the project boundary the total electricity consumption is calculated as 600 MWh per year (the value is conservative since has been considered that the substation will work 365 days per year). The project emissions are calculated at 741 tCO₂/year.
- CH₄ emission from combustion of biomass residues: according to the approved methodology ACM0006 the IPCC default values of methane emission factor for other solid biomass residues of 30 kg CH₄/TJ is selected as the methane emission factor of the proposed project; a conservativeness factor of 1.37 is considered thus the CH₄ emission factor used is 0.0000411 tCH₄/GJ. The project emissions due to combustion of biomass residues are calculated as 1 712 tCO₂/year.

The annual total project emissions are 3 828 tCO₂/year.

Leakage emissions.

The probable source identified for leakage is that the project diverts biomass from other users and thus increases fossil fuel use. Leakage will be accounted if the biomass supply is not abundant around the power plant. To account for this option L₂ of the approved methodology ACM0006 is selected where if the quantity of available biomass in the Region is at least 25% larger than the biomass utilized, no leakage needs to be considered.

DNV has verified that, according to the *Straw resources survey and evaluation report in Jiang County and its surrounding areas* /24/, the biomass resources available within a 50 km radius of the project plant amount to 1 904 760 tons per year. The biomass losses during operations (gathering, collecting and transporting, etc) and poor harvest years can be taken into consideration through a correction factor. The survey uses a correction factor of 30%, resulting in an actual availability of 571 430 tons per year of which 533 090 tons per year come from corn and wheat stalks. It is DNV opinion that this amount is deemed to be a



VALIDATION REPORT

conservative estimate of the annual corn and wheat stalks available in the area around the 50 km radius of the project activity.

Biomass is used mainly for power generation. The other possible use of the available biomass is in the pulp and paper industry but this usage has decreased in the Region due to the prohibition of the construction of small-scale paper mills by China regulations /61/. There are not other biomass powered plants in the 50 km radius of the proposed project activity as the nearest biomass plant is the 12 MW Guoyi Power Plant in the Pu County situated at 75 km from the project activity /62/. There is not public available information regarding the type of biomass and the annual consumption of this plant. Assuming that this plant procures biomass within the 50 km area of the project activity, and the annual consumption of this plant is the same than the 141 120 tons of the project activity, assumption that in DNV opinion is conservative as the installed capacity of the Guoyi plant is half of the one installed in the project activity, the available cereal stalk biomass in the 50 km area would be reduced to 391 970 tons.

Therefore, even accounting for the consumption of the plant situated at 75 km, the available quantity of cereal stalk biomass in region compared with the total use of cereal stalk of biomass is $533\,090 / (2 \times 141\,120) = 1.89$, that is to say 89% in excess compared to the 25% excess criterion contemplated in the applicable methodology. Thus no leakage needs to be considered.

Based on the above consideration, the emission reductions from *Shanxi Yuncheng 25MW biomass power plant project* have been determined to be 129 038 tCO₂ per year. The emission reductions estimated can be replicated using the data and parameter values provided in the PDD /1/ and supporting files submitted for registration /14/ /49/. The data sources mentioned have been verified by DNV.

In summary the GHG calculations are complete and transparent, and their accuracy has been verified.

4.8 Environmental Impacts

The Environmental Impact Assessment of July 2007 was approved by the Shanxi Environment Protection Bureau on 7 August 2007 /19/. The project will not have any significant environment impact and in addition during the construction and operation period a series of practical measures will be implemented.

4.9 Comments by Local Stakeholders

On June 2007 the project owner collected stakeholder's comments through a public survey. A survey of local residents in the area which probably affected by the proposed project activity, government department and experts using questionnaires was implemented. The 60 copies of questionnaires received by the project owner were verified by DNV during the site visit /20/. All the stakeholders have welcomed the project activity. No negative comments were received on the project, therefore no necessary due account has been taken. All the questionnaires available have been checked. DNV considers the local stakeholder consultation carried out adequately.



VALIDATION REPORT

4.10 Comments by Parties, Stakeholders and NGOs

The PDD version 01 of 15 November 2007 was made publicly available on DNV's climate change website¹ and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 3 February 2008 to 3 March 2008. No comments were received during this period.

¹ http://www.dnv.com/focus/climate_change/Projects/ProjectDetails.asp?ProjectId=1704

APPENDIX A

CDM VALIDATION PROTOCOL

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

Requirement	Reference	Conclusion
About Parties		
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.	Kyoto Protocol Art.12.2	OK
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR1
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	CL3
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	OK
9. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.	CDM Modalities and Procedures §31b	OK
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the	Kyoto Protocol Art. 12.5c,	CAR3

Requirement	Reference	Conclusion
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.	CDM Modalities and Procedures §43	CL7 OK
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	CAR2 CL4/5/6 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

Requirement	Reference	Conclusion
18. The project design document shall be in conformance with the UNFCCC CDM-PDD format.	CDM Modalities and Procedures Appendix B, EB Decision	OK
19. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements Checklist

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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	The project is located in the production area of the Shanxi Jianghe Cemical Silicon Co. Ltd, Dongfeng Village, An'yu Town, Jiang County, Yuncheng City, Shanxi Province. Its geographical coordinate is East longitude of 110°24'17" and North latitude of 35°20'50".		OK
A.1.2. Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?	/1/	DR I	Yes. As project boundary have been included, the power plant at the project site, the vehicles used for the transportation of the biomass to the project site and all the power plants connected to the NCP Grid, where the proposed project activity is connected. The electricity system of the NCPG includes Beijing City, Tianjin City, Hebei Province, Shandong Province, Inner Mongolia Autonomous Region and Shanxi Province. In the absence of the proposed project activity the biomass residues would have been uncontrollably burnt. <i>During the site visit it was checked that a waste coal power plant 25MW next to the project activity is under construction with the same project developer. The clarification is required from PP whether this coal based power plant would also be synchronised with the project activity or it is operated independently. Also the</i>	CL1	OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>collection station is not included as well as the warehouse of the biomass residual. The PP is requested to clarify the same.</p> <p>The PP is requested to include in the PDD a flow diagram to represents the emissions sources and the gases included in the project boundary and the monitoring variables.</p>	CL2	
A.2. Participation Requirements <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>					
A.2.1. Which Parties and project participants are participating in the project?	/1/	DR	The involved parties are the People's Republic of China as the host party and Spain as the Annex I party. The project participants are the Shanxi Jianghe Chemical Silicon Co. Ltd and the FC2E (Carbon Fund for Spanish Companies).		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/ /4/	DR	<p>The Letter of Approval from DNA of China was issued on April 2008 approving the Shanxi Yuncheng 25MW Biomass Power Plant as a CDM project and authorizing Shanxi Jianghe Chemical Silicon Co. Ltd as China's participant to voluntarily participate in and carry out the project activity.</p> <p><i>The letter of approval and the authorization for the Annex I party has not yet been received.</i></p>	CAR1	OK
A.2.3. Do all participating Parties fulfil the participation requirements as follows: - Ratification of the Kyoto Protocol - Voluntary participation	/1/ /4/	DR	<p>Yes. China has ratified the Kyoto Protocol on August 30, 2002 and Spain on May 31, 2002.</p> <p>Both Parties involved have designate national authority for CDM: China has designated the</p>		

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
- Designated a National Authority			<p>NDRC - National Development and Reform Commission; Spain has designated the Oficina Española de Cambio Climático, Ministerio de Medio Ambiente.</p> <p>China authorizing Shanxi Jianghe Chemical Silicon Co. Ltd as China's participant to voluntarily participate in and carry out the project activity.</p> <p><i>A formal letter of confirmation regarding the voluntary participation by the DNA of Spain is not yet available.</i></p>	CAR1	OK
A.2.4. Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.	/1/	DR	<p>No public funding from Annex I Parties has been sought for the project activity.</p> <p><i>The PP is requested to provide the documented evidence that there is no diversion of Official development assistance fund from the Annex-I Party i.e. Spain for the proposed project activity.</i></p>	CL3	OK
A.3. Technology to be employed <i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i>					
A.3.1. Does the project design engineering reflect current good practices? -	/1/ /5/	DR I	<p>Yes. For the proposed project activity has selected one boiler with 130t/h medium temperature and medium pressure fluidized bed, one steam turbine and one set of power generation with a unit capacity of 25MW, and the controlling equipment. The technology used is a local technology and it can be considered the current good technology available in China. The</p>		

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>technical specifications of the boiler are in accordance with the approved FSR but for the steam turbine and generator being second hand equipment no information were available during the site visit.</p> <p><i>However the PP is requested:</i></p> <ul style="list-style-type: none"> - to include a process flow diagram to represent the proposed project activity; - to clarify each type and quantity of biomass used; - to provide details about the second hand equipment (turbine and generator) as where it has been transferred from, the lifetime of this old equipment and the lifetime remaining to utilize in the proposed project activity; - to clarify the way of biomass collection, storage and transportation, including the relevant equipments information. During the site visit was checked that the PP will use combined harvest machinery and trucks to collect the biomass from farmland directly and this is explained differently in the approved FSR. - to specify the exact value of the boiler rated evaporating capacity, PDD mentioned different values at page 5 and 6; 	CL 4	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/ /5/	DR I	Yes. <i>Please refer to A.3.1.</i>	CL 4	OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
A.3.3. Does the project make provisions for meeting training and maintenance needs?	/1/ /6/	DR I	Yes. A training plan was available and verified during the follow-up interviews and site visit.		OK
A.4. Contribution to Sustainable Development <i>The project's contribution to sustainable development is assessed.</i>					
A.4.1. Has the host country confirmed that the project assists it in achieving sustainable development?	/1/ /4/	DR	The host Party confirmed the project's contribution to the sustainable development issuing the Letter of Approval; <i>while the confirmation from the Annex I Party is not yet available. Please refer to A.2.2.</i>	CAR1	OK
A.4.2. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	Yes. The proposed project activity will help in improving the development of local economy, will create employment opportunities and will mitigate the air pollution split order the living environment of local people.		OK
B. Project Baseline <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>					
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/ /3/ /7/ /8/	DR	Yes. The project applies the approved consolidated baseline methodology ACM0006 "Consolidated methodology electricity generation from biomass residues" version 09. In addition to this the project activity uses the methodological tool "Combined tool to identify the baseline scenario and demonstrate additionality" version		OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p><i>stored more than one year;</i></p> <ul style="list-style-type: none"> - <i>During the site visit it was checked that there was a waste coal power plant 25MW next to the project activity under construction with the same project developer. There is possibility to use coal as circulation in the fluidized bed boiler. Further clarification and details whether the project is planning to use coal as support fuel are requested. Please refer to A.3.1.</i> 	CL	
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/ /3/ /7/	DR I	<p>According to the approved methodology ACM006, Step 1 of the “Combined tool to identify the baseline scenario and demonstrate additionality” has been used to identify the realistic and credible alternatives.</p> <p>The baseline scenario identified is the generation of the power in the grid and the biomass residues are burn in an uncontrolled manner without utilizing it for energy purpose.</p>		OK
B.2.2. What other alternative scenarios have been considered and why is the selected scenario the most likely one?	/1/ /3/ /7/ /10/ /11/	DR I	<p>According to the approved methodology ACM006 the realistic alternatives has been identified considering how the power would be generated and what would happen to the biomass residues in the absence of the proposed project activity.</p> <p>According to the methodology nine alternatives</p>		OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

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			<p>have been considered for power generation. It has been demonstrated that the alternatives P2, P3, P7, P8 are in compliance with the local relevant laws and regulation but as project is a green field project they cannot be considered as a likely baseline alternatives.</p> <p>The alternatives P5 and P6 are financial unattractive and so cannot be considered as realistic and feasible baseline scenario.</p> <p><i>The PP is requested to provide further details in order to justify the financial unattractiveness as the installation of lower efficient boilers might attract lower investments.</i></p> <p>Step 2 and Step 3 of the combined tool demonstrating the additionality, confirmed that the alternative P1 is not a realistic scenario since revenue from electricity sale does not cover the investment and operating costs of power generation. Please refer to section B.3.</p> <p>The alternative P9 (the installation of a new fossil fuel fired captive power plant at the project site) is not in compliance with China's relevant laws and regulations that prohibited the construction of coal fired power plant less 135MW in the areas covered by the large grid as the North China Power Grid and have strictly regulation for the installation of fossil fuel power plant with capacity less 100 MW.</p> <p><i>During the site visit it was checked that the presence of a waste coal power plant 25MW next to the project activity under construction with the same project developer. Further clarification and</i></p>	CL6	
				CL6	

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p><i>details are requested to justify the exclusion of this alternative.</i></p> <p>According to the methodology eight alternatives for use biomass residues scenarios have been considered. It has been demonstrated that the alternatives B4, B5, B6 are in compliance with the local relevant laws and regulation but there is no existing of other biomass power plant and/or captive power generation therefore they cannot be considered as a likely baseline scenarios.</p> <p>The alternative B7 and B8 cannot be considered feasible baseline scenario because the biomass residues is not used for other energy purpose at the project site and for non-energy purpose. The alternative B1 result not a common practice and the alternative B2 need deep landfills with more than 5 meters involving high financial investment.</p> <p><i>The PP is requested to provide further details and documented evidences about:</i></p> <ul style="list-style-type: none"> - <i>the no existing of other biomass and captive power generation plant;</i> - <i>the using of biomass residues for other energy and non-energy purposes;</i> - <i>the alternative B1 to support the assumption made as this is not a common practice;</i> - <i>the assumption made in excluding the alternative B2.</i> <p><i>No evidence and details are available about the analysis on the consistency with mandatory applicable laws and regulations for the use of</i></p>	<p>CL6</p> <p>CAR2</p>	

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<i>biomass residues.</i>		
B.2.3. Has the baseline scenario been determined according to the methodology?	/1/ /3/ /7/	DR	<i>Please refer to B.2.1.</i>	CL6 CAR2	OK
B.2.4. Has the baseline scenario been determined using conservative assumptions where possible?	/1/	DR	<i>Please refer to B.2.1.</i>	CL6 CAR2	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	<i>Please refer to B.2.1.</i>	CAR2	OK
B.2.6. Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/	DR	<i>Please refer to B.2.1.</i>	CL6	OK
B.2.7. Have the major risks to the baseline been identified?	/1/	DR	<i>Please refer to B.2.1.</i>	CL6	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/ /3/ /7/ /12/ /5/ /9/	DR I	According to the approved methodology the project additionality was assessed applying the “Combined tool to identify the baseline scenario and demonstrate additionality” version 02.1. <u>Step 1 Identification of alternative scenarios.</u> <i>Please refer to section B.2.2.</i> <u>Step 2 Barrier analysis.</u> Investment barriers and	CL6 CAR2	OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
	/13/		<p>technological barriers are identified to assess alternatives that are prevented by these barriers. The financing is a key barrier to the realisation of biomass power plant due to the high initial investment that are much higher than for the construction of a coal fired power generation, then in China it results a new technology which can have risks to the operation and maintenance and finally the banks are reluctant to provide loan.</p> <p><i>The PP is requested to provide further details and documented evidence on the assumption made for the barrier analysis (i.e. high investment, new technology). Otherwise is requested to provide evidence on loan rejection; according to the site visit interviews, loan to the renewable energy project is encouraged and there is no evidence of rejection.</i></p> <p><i>About the technological barriers is requested :</i></p> <ul style="list-style-type: none"> - <i>To demonstrate the claim that the treatment of the ash during the biomass combustion is technological barrier when the proposed project activity utilize a fluidized bed technology boiler;</i> - <i>to clarify if the technology used in the project activity is not available in the relevant geographical area;</i> - <i>to clarify how the CDM revenues could alleviate claimed the barriers if the biomass power generation in China is not commercialized.</i> <p><i>It is not clear if the proposed project activity is</i></p>	CL7	

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p><i>the first of its kind.</i></p> <p><i>It is requested to provide further details and documented evidence on the fluctuation of the straw price as claimed in PDD.</i></p> <p>Step 3 Investment analyses. <i>To determine as the project activity is economically and financially attractive than the other alternatives, the PP used a benchmark analysis instead of an investment comparison analysis as requested by the combined tool.</i></p> <p>The input parameters used in the investment analysis are taken from the approved FSR (grid tariff, annual electricity supplied to the grid, VAT, education addition tax, income tax, biomass price, project lifetime, static total investment). A sensitivity analysis was conducted taking into account the total investment, the annual O&M cost and the electricity price.</p> <p><i>The PP is requested: :</i></p> <ul style="list-style-type: none"> - <i>why the amount of the total investment mentioned in the PDD is different between the amount used in the financial analysis. Need to provide also a break up of the investment cost as there are some common facilities utilised and second hand equipment are used;</i> - <i>to provide a break-up of the annual O&M costs;</i> - <i>to clarify how the depreciation period has not been applied in the investment analysis</i> - <i>why the project lifetime mentioned in the PDD at page 14 is different from the value of</i> 	<p>CAR3</p> <p>CAR3</p>	

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>page 36. Moreover the investment analysis has been made for 20 years;</p> <ul style="list-style-type: none"> - to provide the spreadsheet of the investment analysis presented in a transparent manner and it can reproduce the analysis made; - why in the sensitivity analysis the annual output has not been considered; - to justify for why 10% variation is chosen as reasonable variation and why it is not likely for each of the parameters to vary. - The analysis has to be in-line with recent guidance on Investment analysis <p>Step 4 Common practice analysis. In the Shanxi province there is another biomass power generation which faced the same barriers of the proposed project activity.</p> <p>The PP is requested::</p> <ul style="list-style-type: none"> - to clarify why the biomass power plant considered in the common practice analysis and for what can be considered similar to the proposed project activity; - to justify why this region is a appropriate region to do this analysis; - to provide documented evidence about the barriers faced by the similar project; 	CAR3	
B.3.2. Are all assumptions stated in a transparent and conservative manner?	/1/ /12/	DR	Please refer to section B.3.1.	CL7 CAR3	OK
B.3.3. Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /12/	DR	Please refer to section B.3.1.	CL7 CAR3	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.3.4. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	/1/	DR	The starting date of the project activity was fixed on November 2007. <i>Since the start date of the project activity is prior to the start of validation as required by the Annex 46 EB41, the PP is requested to demonstrate how the revenues from CDM were decisive factor in the decision to implement the project activity and how the continuous effort has been to secure the CDM status and to provide documented evidence.</i>	CAR4	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/ /14/ /5/ /15/	DR	CO ₂ emissions from transportation of biomass residues to the project site have been calculated using the approach based on distance and vehicle type. The annual amount of biomass is sourced from the approved FSR and the emission factor of the truck transportation is a default value from IPCC Guidelines. <i>It needs to be evidenced the number of truck trips during the year, the types of biomass residues used in the project activity and the data used to calculate the average distance from storage site to power plant.</i> CO ₂ emissions from on site consumption of fossil fuels due to the project activity have been calculated applying the “Tool to calculate project or leakage CO ₂ emissions from fossil fuel	CL8	OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<p>combustion” and using the Option B to calculate the CO₂ emission coefficient.</p> <p><i>It needs to be evidenced the data used to estimate the annual fuel consumption and provide documented evidence of the source used for the NCV of the fuel. During the site visit was checked that the PP will use combined harvest machinery for which has not been calculated the annual fuel consumption. The PP is requested to justify the application of Option B instead of the Option A.</i></p> <p>The electricity consumption is provided by the project activity itself so the CO₂ emissions from this have not been considered.</p> <p><i>The PP is requested to provide further details for what is used the electricity in the proposed project activity and which are the data used to estimate the consumption to calculate the net quantity of electricity generation in the project plant.</i></p> <p>Having included in the project boundary the combustion of biomass residues the CH₄ emissions from this activity have been calculated. The annual amount of biomass is sourced from the approved FSR, the CH₄ emission factor is sourced from the 2006 IPCC guidelines and it has been used the default value for other solid biomass residues assuming the estimated uncertainty of 300%.</p> <p><i>The PP is requested to justify the NCV of the biomass residues used in the calculation related to the different biomass combusted. During the site visit it was checked that the calculation based</i></p>		

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

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			<i>on corn but the PP used different biomass. Please provide the emission reduction calculation spreadsheet presented in a transparent manner and it can reproduce the calculation made;</i>		
B.4.2. Have conservative assumptions been used when calculating the project emissions?	/1/ /14/	DR	<i>Please refer to B.4.1.</i>	CL8	OK
B.4.3. Are uncertainties in the project emission estimates properly addressed?	/1/ /14/	DR	<i>Please refer to B.4.1.</i>	CL8	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/ /3/ /8/ /16/ /17/ /18/	DR	The emission factor for displacement of electricity has been calculated applying the “Tool to calculate the emission factor for an electricity system” as requested by the approved methodology ACM0002 version 10. Step 1 Identify the relevant electric power system. The proposed project activity will be connected to the North China Power Grid which consists of Beijing, Tianjin, Hebei, Shandong, Shanxi and Inner Mongolia power grids. The delineation of the grid boundaries is provided by the DNA of China. Step 2 Select an operating margin method. The		OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

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			<p>simple OM is used for calculating the EF_{OM} of the NCPG because the detailed data applying the dispatch analysis method is not available.</p> <p>Step 3 Calculate the operating margin emission factor according to the selected method. Option C has been used to calculate the simple OM emission factor because data of fuel consumption for each power plant (option A) and data of net electricity generation and average efficiency of each power plant (option B), in China are not available in public.</p> <p>Step 4 Identify the cohort of power units to be included in the build margin. Option 1 – ex ante, has been choose to calculate the build margin emission factor using the most recent information available at the time of the PDD publication (year from 2003 to 2005).</p> <p>Step 5 Calculate the build margin emission factor. The build margin emission factor is calculated as the generation-weighted average emission factor of the sample group of power units that have been built most recently (2003 - 2005).</p> <p>Step 6 Calculate the combined margin emission factor. The default values of 0.5 for W_{OM} and W_{BM} was used to determine the combined margin.</p> <p><i>The emission factor calculation spreadsheet need to be presented in a manner that it can reproduce the calculation of the operating margin and build, margin grid emission factor. It also needs to be in accordance with the tool to calculate the</i></p>	CL9	

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<i>emission factor for an electricity system. For the estimation of the CH₄ emissions for the use of biomass residues please refer to section B.4.1.</i>	CL8	
B.5.2. Have conservative assumptions been used when calculating the baseline emissions?	/1/ /3/ /8/ /16/ /17/ /18/	DR	<i>Please refer to section B.4.1. and B.5.1</i> The combined margin emission factor is calculated to 1.0284 tCO ₂ e/MWh where the EF _{OM} is calculated 1.1207 tCO ₂ e/MWh and the EF _{BM} is calculated 0.9361 tCO ₂ e/MWh.	CL8/9	OK
B.5.3. Are uncertainties in the baseline emission estimates properly addressed?	/1/ /3/ /8/ /16/ /17/ /18/	DR	<i>Please refer to section B.4.1. and B.5.1</i>	CL8/9	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/ /3/	DR I	According to the approved methodology ACM0006 option 2 has been used to demonstrate that the biomass residues used in the plant did not increase fossil fuel consumption. <i>The PP is requested to clearly define the geographical boundary of the region and to</i>	CL10	OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<i>provide documented evidence to support the surplus of the biomass residues in the region of the project which is not utilized. Please provide the emission reduction calculation spreadsheet presented in a transparent manner and it can reproduce the calculation made;</i>		
B.6.2. Have conservative assumptions been used when calculating the leakage emissions?	/1/ /3/	DR I	<i>Please refer to section B.6.1.</i>	CL10	OK
B.6.3. Are uncertainties in the leakage emission estimates properly addressed?	/1/ /3/	DR I	<i>Please refer to section B.6.1.</i>	CL10	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 emission reductions will be measured in line with the approved methodology ACM0006 version 09 requirements. Benefits are long term.		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/ /3/ /8/ /15/ /16/	DR	The project applies and it is in compliance with the approved monitoring methodology ACM0006. In addition has been employed the monitoring methodology ACM0002, the tool to calculate project or leakage CO2 emissions from fossil fuel combustion and the tool to calculate		OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.8.2. Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?	/1/	DR	the emission facto fro an electricity system. <i>Not for all monitored data required for verification and issuance of CERs is mentioned in the PDD the period that need to be kept. .</i>	CL11	OK
B.9. Monitoring of Project Emissions <i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>					
B.9.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?	/1/	DR	Yes, in line with the methodology, the monitoring plan provides for the collection and archiving of all necessary data. <i>The monitoring plan is not completely in compliance with the approved monitoring methodology:</i> <ul style="list-style-type: none"> - the quantity of the biomass residue type that has been transported to the project site during the year; - the monitoring should be for all type of biomass; in the PDD section B.7.1. has mentioned only the straw but in the PDD other type of biomass are considered. It has not been established monitoring frequency for the energy balance and the quantity to be cross-checked with the quantity of the electricity generated; - the monitoring frequency for the average round trip distance is not established; - the monitoring of the number of trucks trips or the average truck load used for 	CL12	OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

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			<i>transportation of biomass is not included;</i> - <i>it has not been established the cross-checked of the quantity of fuel used setups of the project with the annual energy balance;</i> - <i>the monitoring of the NCV is not in compliance with the approved methodology ACM0006;</i> - <i>the monitoring procedure and frequency for the CH₄ emission factor for uncontrolled burning of the biomass residue type is not in compliance with the approved methodology AMC0006;</i> - <i>the monitoring plan include the monitoring of the electricity imported from the grid but in the PDD it is stated that the on-site electricity consumption is provided by the proposed project activity itself.</i>		
B.9.2. Are the choices of project GHG indicators reasonable and conservative?	/1/	DR	Yes.		OK
B.9.3. Is the measurement method clearly stated for each GHG value to be monitored and deemed appropriate?	/1/	DR	<i>Please refer to section B.9.1.</i>	CL12	OK
B.9.4. Is the measurement equipment described and deemed appropriate?	/1/	DR	Yes. The appropriate measurement equipment is described in the PDD.		OK
B.9.5. Is the measurement accuracy addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	<i>No. The measurement accuracy and procedure how to deal with erroneous measurement are not established.</i>	CL13	OK

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CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
B.9.6. Is the measurement <i>interval</i> identified and deemed appropriate?	/1/	DR	No. The measurement interval is not identified.	CL13	OK
B.9.7. Is the <i>registration, monitoring, measurement and reporting</i> procedure defined?	/1/	DR	A CDM manual will be available establishing procedures for registration, monitoring, measurement and reporting.		OK
B.9.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	No. Procedure for maintenance of monitoring equipment and installation are not identified.	CL13	OK
B.9.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes.		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	Yes, in line with the methodology, the monitoring plan provides for the collection and archiving of all necessary data. <i>For the monitoring of the emissions from the uncontrolled burning of biomass residues please refer to section B.9.I.</i> <i>The monitoring plan is not completely in compliance with the approved monitoring methodology:</i> - the net quantity of electricity generated in the project plant during the year is not included; - in the monitoring of the electricity supplied to	CL12 CL14	OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<i>the grid is not established the monitoring frequency;</i> - <i>Monitored grid emission factor is not included as part of Section B.6.2 of PDD.</i> - <i>Auxiliary Power consumption is not made part of the monitoring plan.</i>		
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.		OK
B.10.4.Is the measurement <i>equipment</i> described and deemed appropriate?	/1/	DR	Yes. The quantity of the electricity supplied to the grid will be measured by meters installed in the substation, one installed by the project owner and one installed by the grid company. <i>Please refer to section B.10.1</i>	CL14	OK
B.10.5.Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?	/1/	DR	Yes. The accuracy of the metering equipment measuring the electricity supplied to the grid shall not exceed + 0.5% of full scale rating. <i>Please refer to section B.10.1</i>	CL14	OK
B.10.6.Is the measurement <i>interval</i> for baseline data identified and deemed appropriate?	/1/	DR	Yes. The metering equipment measuring the electricity supplied to the grid will be calibrated and checked annually. <i>Please refer to section B.10.1</i>	CL14	OK
B.10.7.Is the registration, <i>monitoring</i> , <i>measurement</i> and <i>reporting</i> procedure defined?	/1/	DR	The data of the electricity generated supplied to the grid will be monitored and recorded at the on site control system.	CL14	OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
			<i>Please refer to section B.10.1</i>		
B.10.8. Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?	/1/	DR	Yes.		OK
B.10.9. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes.		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	Yes, in line with the methodology, the monitoring plan provides for the collection and archiving of all necessary data. <i>The monitoring plan does not include the monitoring frequency of the quantity of biomass residues that are utilized in the defined geographical region and of the quantity of available biomass residue in the region.</i>	CL15	OK
B.11.2. Are the choices of project leakage indicators reasonable and conservative?	/1/	DR	Yes.		OK
B.11.3. Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?	/1/	DR	Yes.		OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

CHECKLIST QUESTION	Ref.	MoV*	COMMENTS	Draft Concl.	Final Concl.
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 I	It has been confirmed that there are no sustainable development indicators that need to be monitored according to the Chinese regulation.		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 I	The monitoring methodology does not require collection and archiving of relevant data concerning environmental, social and economic impacts. There is no such requirement in China that requires monitoring of sustainable development indicators.		OK
B.12.3. Are the sustainable development indicators in line with stated national priorities in the Host Country?	/1/	DR I	Yes.		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 project management clearly described?	/1/	DR	Yes. The project developer has defined the responsibilities for the monitoring process. A CDM department will be in charge with a CDM director, a CDM manager and a monitoring team.		OK
B.13.2. Are procedures identified for training of monitoring personnel?	/1/ /6/	DR	Yes. A training plan was available and verified during the follow-up interviews and site visit.		OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

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B.13.3. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	<i>No. Procedure for emergency preparedness for cases that can cause intended emissions need to be identified.</i>	CL16	OK
B.13.4. Are procedures identified for review of reported results/data?	/1/	DR	<i>No. Procedures for review of reported results and data need to be identified.</i>	CL16	OK
B.13.5. Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?	/1/	DR	<i>No. Procedure corrective actions need to be identified.</i>	CL16	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	<p>The starting date of the project activity was fixed on November 2007.</p> <p><i>Since the start date of the project activity is prior to the start of validation as required by the Annex 46 EB41, the PP is requested to demonstrate how the revenues from CDM were decisive factor in the decision to implement the project activity and how the continuous effort has been to secure the CDM status and to provide documented evidence.</i></p> <p>The expected operational lifetime of the project is 21 years.</p>	CAR4	OK
C.1.2. Is the start of the crediting period clearly defined and reasonable?	/1/	DR	A renewable crediting period has chosen and it will start on 15 December 2010.		OK
D. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will</i>					

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

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<i>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/ /19/	DR I	Yes. The analysis of the environmental impacts has been described.		OK
D.1.2. Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	/1/ /19/	DR I	The EIA was approved by the Shanxi Environment Protection Bureau on 7 August 2007.		OK
D.1.3. Will the project create any adverse environmental effects?	/1/ /19/	DR I	The project activity will not create any significant negative environmental effects.		OK
D.1.4. Are transboundary environmental impacts considered in the analysis?	/1/ /19/	DR I	The project activity will not have any transboundary effects.		OK
D.1.5. Have identified environmental impacts been addressed in the project design?	/1/ /19/	DR I	Yes. The impacts identified in the EIA have been addressed in the PDD. The EIA has also been verified during the site visit.		OK
D.1.6. Does the project comply with environmental legislation in the host country?	/1/	DR	Yes.		OK
E. Stakeholder Comments <i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i>					
E.1.1. Have relevant stakeholders been consulted?	/1/ /20/	DR	Yes. The project owner sent questionnaires to the local population in June 2007. <i>The PP is requested to justify why the stakeholder questionnaires was sent before the approval of the project (28 September 2007 approval of</i>	CL17	OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

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			<i>FSR</i>).		
E.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/ /20/	DR I	The questionnaires were sent to the local population and 60 persons were interviewed at random.		OK
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/ /20/	DR I	Yes. The stakeholder consultation process is in accordance with the Chinese EIA regulations.		OK
E.1.4. Is a summary of the stakeholder comments received provided?	/1/ /20/	DR I	Yes. A brief summary of the stakeholder comments is provided and it respects the content of the original feedback forms collected and verified during the site visit.		OK
E.1.5. Has due account been taken of any stakeholder comments received?	/1/ /20/	DR I	All comments received were positive and it has also been verified during the site visit.		OK

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 CDM Validation Protocol – Report No. 2008-9108, rev. 05

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

Checklist question	Ref	MoV	Comments	Draft Concl.	Final Concl.
A. Letter of approval	§49				
A.1. Is the LoA received directly from the DNA or through the project participant.	/4/	DR	The LoA from the DNA of China has been provided by the project participant. The LoA from the DNA of Spain is still waiting.	CAR1	OK
B. Project design	§64				
B.1. Does the PDD describe the CDM project activity with all relevant elements in a transparent and accurate way?	/1/	DR I	The PDD describe the CDM proposed project activity in accurate way and in transparent manner.		OK
B.2. Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or equipment?	/1/ /38/	DR I	The proposed project activity is an installation of 25MW power plant using biomass residues and it started the construction on November 2007. The project has not start to operate, it will be expected to start operation in the end of October 200.		OK
B.3. Is the project a large scale project, a small scale project with average annual emission reductions above 15 000 tonnes or a bundled small scale project? Has on-site visit been carried out?	/1/	DR I	The proposed project activity having average annual emission reductions of 129,158 tCO ₂ is considered a large scale project. The on-site visit was carried out from 17 April 2008.		OK
B.4. Does the project activity involved alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR I	No. The proposed project activity is an installation of a new power plant.		OK

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CDM Validation Protocol – Report No. 2008-9108, rev. 05

C. Project emissions not addressed by the methodology	§76			
C.1. Does the methodology describe all project emission source for the project activity that contributes all 1% of the emission reductions? Sources that the methodology considers not to take into account are not relevant (e.g. cement and iron consumption for building hydropower plants).	/1/	DR	Yes.	OK
D. Documentation of baseline emissions	§86			
D.1. Documentation of the baseline determination: <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. All documentation is relevant as well as correctly quoted and interpreted. Assumptions and data can be deemed reasonable Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 	/1/	DR I	i) Yes. The data used by the PP for the baseline emission are listed in the PDD and properly referenced; the related documents have been submitted during the validation process /5/ /24/ /10/ /25/ /39/ 26/ /27/. ii) Yes, all the documents submitted are relevant complete and accurate. iii) Yes. The assumption made can be considered complete and the application of the baseline methodology is transparent and reasonable. iv) Yes. v) The project activity correctly applies the approved methodology ACM0006 version 9 and meets the criteria expected by the same methodology.	OK
E. Documentation of the calculations	§91			
E.1. Algorithms and/or formulae used to determine emission reductions E.2. All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are	/1/	DR	The formula used to determine emission reductions has been correctly applied and the assumptions as well as the data used by the project participant are correctly listed in the PDD. For the emission factor calculation the	OK

* MoV = Means of Verification, DR= Document Review, I= Interview
CDM Validation Protocol – Report No. 2008-9108, rev. 05

properly referenced E.3. All documentation is correctly quoted and interpreted. E.4. All values used can be deemed reasonable in the context of the project activity E.5. The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration.			PP provide the spreadsheet calculation /49/ and the sources from which are taken the data used to determine the Emission Factor /17/ /18/ /45H/. The emission reductions calculation /14/ is complete and transparent and their accuracy has been verified.		
F. Implementation of the monitoring plan	§122c				
F.1. How were the plans for implementation of the monitoring plan, data management, QA/QC procedures assessed? To what extent can the emission reductions achieved by the project be monitored ex-post and verified later by a DOE?	/1/	DR I	The monitoring plan stated in the PDD is in accordance with the monitoring methodology and will give the opportunity for real measurement of achieved emission reductions. Monitoring procedure and monitoring task must be implemented in order to ensure that the real, measurable and long-term GHG emission reductions for the proposed project activity is monitored and reported.		OK
G. CDM consideration prior to starting date					

<p>G.1.The prior consideration of CDM for the project activity complies with EB41 annex 46</p>	<p>/1/</p>	<p>DR I</p>	<p>It has been demonstrated and was assessed and verified during the validation process that serious CDM consideration and real and continuing action to attain CDM status of the proposed project activity has been applied /38/ /28/ /5/ /29/ /30/ /31/ /32/ /42/ /40/ /41/ /43/ /44/.</p> <p>CDM was therefore seriously considered in the decision with the project activity in compliance with the EB 41 Annex 46.</p>	<p>OK</p>
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Table 3 Resolution of Corrective Action and Clarification Requests

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 1.</p> <p>The letter of approval and the authorization for the Annex I party has not yet been received.</p> <p>A formal letter of confirmation regarding the voluntary participation by the DNA of Spain is not yet available.</p>	<p>A.2.2.</p> <p>A.2.3.</p> <p>A.4.1.</p>	<p>A formal letter of confirmation regarding the voluntary participation by the DNA of Spain will be sent DOE later.</p>	<p>The Spain's Designated National Authority issued the Letter Of Approval on 9 October 2009.</p> <p>CAR 1 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 2. No evidence and details are available about the analysis on the consistency with mandatory applicable laws and regulations for the use of biomass residues.</p>	<p>B.2.2. B.2.3. B.2.4. B.2.5. B.3.1.</p>	<p>This part is completed in the updated PDD. The People's Republic of China Renewable Energy Law, Decree No. 33 was sent to DOE.</p>	<p>The PDD has been updated. In relation to power generation in China coal-fired plants with a capacity of 135MW or less are strictly prohibited in large grids such as provincial grid according to Decree No. 2002-06 issued by the General Office of the State Council /10/. In relation to biomass residues the burning in uncontrolled manner is forbidden by the Ministry of Environment Protection of China /38/. CAR 2 is closed.</p>
<p>CAR 3. To determine as the project activity is economically and financially attractive than the other alternatives, the PP use a benchmark analysis instead of an investment comparison analysis as requested by the combined tool. The PP is requested: :</p> <ul style="list-style-type: none"> ● why the amount of the total investment mentioned in the PDD is different between the amount used in the financial analysis. Need to provide also a break up of the investment cost as there are some common facilities and second hand equipment are used; ● to provide a break-up of the annual O&M costs; ● to clarify how the depreciation period has not been applied in the investment analysis 	<p>B.3.1. B.3.2. B.3.3.</p>	<ol style="list-style-type: none"> 1. The investment used in the IRR calculation table is <i>static total investment</i>, but the investment used in the PDD is <i>total investment</i>, so the amount of the investment is different. Because the <i>static total investment</i> is used in sensitivity analysis of the PDD, the investment of PDD will be revised according to the IRR calculation table. 2. The project owner decided to utilize new equipment including biomass boilers and power generators after a board meeting was held in May 2008. It was considered not to use second hand equipment according to the technology requirements and resources available. This part is completed in the 	<p>The project participant has compared the project financials against the benchmark of 8% and regarded as benchmark for investment in power industry in China according to <i>The Economic Assessment Method and Parameters for Construction Project</i> published on 3 July 2006 /34/. A revised IRR calculation spreadsheet 13/ and PDD updated have been provided by the PP. The calculation were verified and found to be correct by DNV as well as the assumptions used in the calculation were deemed to be correct. As per the purchase agreements it has been demonstrated that the project will use only new equipment /42/ /40/ /41/. A sensitivity analysis has been carried out for critical parameters to demonstrate the robustness of the financial analysis. Reasonable variations of the static</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<ul style="list-style-type: none"> ● why the project lifetime mentioned in the PDD at page 14 is different from the value of page 36. Moreover the investment analysis has been made for 20 years; ● to provide the spreadsheet of the investment analysis presented in a transparent manner and it can reproduce the analysis made; ● why in the sensitivity analysis the annual output has not been considered; ● to justify for why 10% variation is chosen as reasonable variation and why it is not likely for each of the parameters to vary; ● the analysis has to be in line with recent guidance on Investment analysis. <p>The PP is requested:</p> <ul style="list-style-type: none"> ● to clarify why the biomass power plant considered in the common practice analysis and for what can be considered similar to the proposed project activity; ● to justify why this region is a appropriate region to do this analysis; ● to provide documented evidence about the barriers faced by the similar project; 		<p>updated PDD. The board of meeting was sent to DOE.</p> <ol style="list-style-type: none"> 3. This part is also completed in the revised PDD and spreadsheet of IRR. 4. Revised in PDD and spreadsheet of IRR. 5. Revised, the annual output has been completed in the updated PDD and spreadsheet of IRR. 6. This part is also completed in the updated PDD. 7. The investment analysis has been revised. 8. The project is the first biomass generation project in Shanxi province. According to the power capacity and technology resources in Shanxi Province, the updated PDD is completed with similar project to the proposed project activity. 9. The chosen projects in Shanxi Province to analyse the common practice of PDD, have similar conditions of climate, biomass resources and economic and social conditions. 10. The evidence has been provided to DOE. 	<p>total investment, annual O&M cost (including the biomass price), electricity tariff and annual electricity output were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen.</p> <p>In Shanxi Province there are two biomass power generation projects approved by the local government until the end of 2008, Shanxi Yangqu 2x12MW biomass power plant project /45/ and Shanxi Fuhua 2x12MW Biomass Power Plant Project /46/. Since the project construction started the on November 2007 /38/, it was not a common practice in China at the project start time to develop biomass power generation projects.</p> <p>CAR 3 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CAR 4. Since the start date of the project activity is prior to the start of validation as required by the Annex 46 EB41, the PP is requested to demonstrate how the revenues from CDM were decisive factor in the decision to implement the project activity and how the continuous effort has been to secure the CDM status and to provide documented evidence.</p>	<p>B.3.4. C.1.1.</p>	<p>How CDM was seriously considered prior to the starting date is described in section B.5 in the updated PDD. All documents as followed are scanned and sent to the DOE. 1) Shanxi Development and Reform Committee replied the biomass power generation investment application of Shanxi Jianghe Chemical Silicon Co. Ltd (9 March 2009) 2) Shanxi Jianghe Chemical Silicon Co. Ltd held a board meeting to discuss the CDM project (18 April 2007) 3) The Shanxi Power Co., Ltd. approved the project connecting to the local power grid (25 April 2007) 4) The development contract with the CDM advisor was signed (11 May 02007) 5) The term sheet was signed with FC2E (6 November 2007) 6) Purchase contract agreement (8 August 2008). 7) Construction report(15 November 2007) The date of 17 November 2007 was chosen as the starting date of the project since it was the date of construct start date, which is an earlier date than the date signing the key equipment purchase contract (8 August,2008).</p>	<p>DNV has assessed and verified the evidence related to timeline for serious CDM consideration and to the real and continuing action to attain CDM status of the project activity in line with Annex 61 of EB48. DNV has checked the documented evidences provided by the PP /38/ /28/ /5/ /29/ /30/ /31/ /32/ /33/ /42/ /40/ /41/ /43/ /44/. CDM was therefore seriously considered in the decision to proceed with the project activity in compliance with EB48 Annex 61. DNV consider satisfactory actions were undertaken to secure CDM status in parallel with the physical implementation of the project activity. CAR 4 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CAR 5 The PP is requested to update the PDD to valid version of methodology ACM0006		The PDD has been updated to version 8 of ACM0006.	The PDD version 03 of 23 December 2009 has been updated to the version 8 of methodology ACM0006. CAR 5 is closed.
CL 1. During the site visit was checked the presence of a waste coal power plant 25MW next to the project activity under construction with the same project developer, moreover the collection station is not included as well as the warehouse of the biomass residual. The clarification is required from PP whether this coal based power plant would also be synchronised with the project activity or it is operated independently. Further clarification and details are requested whether the project is planning to use coal as support fuel.	A1.2. B.1.2.	The waste coal power plant 25 MW next to the project activity was constructed before the project activity in 2002, and was banned because the waste coal power plant 25MW was not in line with the Chinese laws and regulation. According to Chinese laws and regulations, construction of coal-fired power plants of less than 135MW are prohibited in the areas which can be covered by large grids such as provincial grids. Therefore, the waste coal power plant 25 MW can not be operated and can not support fuel to the project. The document that the waste coal power plant 25MW was banned was scanned and sent to DOE.	In 2002 the same owner of the proposed project activity started the construction of a small coal fired power plant having an installed capacity of 25MW at the project site, without consider the CDM benefits; the coal fired power plant construction was stopped in May 2005 when the owner received the request from the Jiang County Government to stop immediately the construction of the 25MW thermal power plant because it was not in line with the Chinese laws and regulation /22/; in fact the Notice issued by the General Office of the State Council /10/ stated that the construction of thermal power plant with the installed unit capacity not more than 135MW in the area covered under the existing large power grid are strictly prohibited. CL. 1 is closed.
CL 2. The PP is requested to include in the PDD a flow diagram to represents the emissions sources and the gases included in the project boundary and the monitoring variables.	A.1.2.	The flow diagram is completed in the revised PDD.	The PDD is updated /1/ with flow diagram of the project boundary. CL. 2 is closed.

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. The PP is requested to provide the documented evidence that there is no diversion of Official development assistance fund from the Annex-I Party i.e. Spain for the proposed project activity.</p>	A.2.4.	The document was sent to DOE.	<p>The Jiang County Government on May 2009 stated that the project is developed without any financial assistance and that the entire required fund by the project are self-financing /21/.</p> <p>CL 3 is closed.</p>
<p>CL 4. The PP is requested:</p> <ul style="list-style-type: none"> ● to include a process flow diagram to represent the proposed project activity; ● to clarify each type and quantity of biomass used; ● to provide details about the second hand equipment (turbine and generator) as where it has been transferred from, the lifetime of this old equipment and the lifetime remaining to utilize in the proposed project activity; ● to clarify the way of biomass collection, storage and transportation, including the relevant equipments information. During the site visit was checked that the PP will use combined harvest machinery and trucks to collect the biomass from farmland directly and this is explained differently in the approved FSR. ● to specify the exact value of the boiler rated evaporating capacity, PDD mentioned different values at page 5 and 6; 	A.3.1. A.3.2. B.1.2.	<ol style="list-style-type: none"> 1. The flow diagram is completed in the updated PDD. 2. The project will consume 141,120 tonnes cereal stalks. 3. See in the second answer of the CAR 3. The project owner decided to utilize new equipment including biomass boilers and power generators after a board meeting was held in May 2008. This part is completed in the updated PDD. The board of meeting was sent to DOE. 4. There are some misunderstandings during the site visit. The way of biomass collection, storage and transportation are completed in the updated PDD. 5. The error has been corrected in the updated PDD. 	<p>The PDD is updated /1/ including the technical flow chart of the proposed project activity. As stated in the approved FSR /5/, the project activity is expected to use for power generation 141,120 tons of cereal stalks with 10.38% water content. As per the purchase agreements it has been demonstrated that the project will use only new equipment /42/ /40/ /41/ and the equipment lifetime is 20 years for steam turbine and generator and 30 years for boilers.</p> <p>CL. 4 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 5.</p> <p>During the site visit was checked that the PP has planned to use combined harvest machinery and trucks to collect the biomass from farmland directly. The PP is requested to clarify and to provide detailed calculation about the consumption of the fuel.</p> <p>The PP is requested to provide documented evidence to ensure the biomass not store more than one year;</p>	B.1.2.	<ol style="list-style-type: none"> 1. See the fourth answer of CL4. 2. As per the stock rotation regulation of the warehouse at the project plant, the biomass fuels collected will be consumed on a first-come-first-used basis. And a regular clearance of the warehouse will be made every three months. Thus, the biomass residues used in the project activity will not be stored for more than one year. The internal procedure about the biomass storatation was sent to DOE. 	<p>The PDD /1/ is updated. Given the stock rotation regulation for the warehouse to ensure first-in-first come, the storage time of the biomass will not exceed more than one year; moreover as stated in approved FSR /5/ the quantity stored by the biomass warehouse at the project site just can satisfy the demand of five days production</p> <p>CL. 5 is closed.</p>
<p>CL 6.</p> <p>The PP is requested to provide further details in order to justify the financial unattractiveness as the installation of lower efficient boilers might attract lower investment.</p> <p>During the site visit was checked the presence of a waste coal power plant 25MW next to the project activity under construction with the same project developer. Further clarification and details are requested to justify the exclusion of this alternative.</p> <p>The PP is requested to provide further details and documented evidence about:</p>	B.2.2. B.2.3. B.2.4. B.2.6. B.2.7.	<ol style="list-style-type: none"> 1. Biomass residue fired grid-connected technology is under initial development and application stage², therefore, it is not common practice in China. Hence, the alternative P5 isn't the credible and realistic baseline scenario. The document was sent to DOE. 2. See CL1.The coal power plant 25MW has been banned, therefore, the alternative is exculed. 3. There is no existing biomass power 	<p>In 2002 the same owner of the proposed project activity started the construction of a small coal fired power plant having an installed capacity of 25MW at the project site, without consider the CDM benefits; the coal fired power plant construction was stopped in May 2005 when the owner received the request from the Jiang County Government to stop immediately the construction of the 25MW thermal power plant because it was not in line with the Chinese laws and regulation /22/; in fact the Notice issued by the General Office of the</p>

² <http://www.chinapower.com.cn/article/1123/art1123981.asp>

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 no existing of other biomass and captive power generation plant; ● the using of biomass residues for other energy and non-energy purposes; ● the alternative B1 to support the assumption made as this is not a common practice; ● the assumption made excluded the alternative B2. 		<p>generation plant and captive power generation plant, and biomass residues are not used for other energy and non-energy purposes because the project is the first biomass power generation plant.</p> <p>4. According to the survey of Shandong Engineering Consulting Institute, a certain amount of the surplus biomass residues would be dumped or left to decay under mainly aerobic conditions in the absence of the proposed project. Therefore, alternative B1 is a realistic baseline alternative for unused biomass. In the updated PDD, it is confirmed that the alternative B1 is a realistic baseline alternative for unused biomass. Therefore, B2 is not the realistic baseline alternative.</p>	<p>State Council /10/ stated that the construction of thermal power plant with the installed unit capacity not more than 135MW in the area covered under the existing large power grid are strictly prohibited. The PDD is update /1/ and documented evidences to support the assumption made for the selection of the baseline scenario has been provided by the PP /24/ /5/ /10/ /25/ /24/ /39/. DNV was able to verify all the documented evidences listed above during the validation process and can confirm that the data and consideration are complete and accurate. Moreover DNV considers the list of realistic and credible alternatives to be complete and the application of the baseline methodology is transparent and reasonable.</p> <p>CL. 6 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 7.</p> <p>The PP is requested to provide further details and documented evidence on the assumption made for the barrier analysis (i.e. high investment, new technology). Otherwise is requested to provide evidence on loan rejection; according to the on site visit interviews, loan to the renewable energy project is encouraged and there is no evidence of rejection.</p> <p>About the technological barriers is requested :</p> <ul style="list-style-type: none"> - to demonstrate the claim that treatment of the ash during the biomass combustion is technological barrier when the proposed project activity utilize a fluidized bed technology boiler; - to clarify if the technology used in the project activity is not available in the relevant geographical area; - to clarify how the CDM could alleviated the barrier if the biomass power generation in China is not commercialized. <p>It is not clear if the proposed project activity is the first of its kind.</p> <p>It is requested to provide further details and documented evidence on the fluctuation of the straw price as claimed in PDD.</p>	<p>B.3.1. B.3.2. B.3.3.</p>	<ol style="list-style-type: none"> 1. Although the renewable energy project is encouraged, it is not financially attractive and would pose a higher investment risk to the project developer. In comparison with developing a coal fired power plant in China, which has lower investment coast, more operational experience and a more stable supply of fuel, the development of a biomass plant is not financially attractive. Therefore, the project can not loan from banks easily. 2. About technological barriers <ul style="list-style-type: none"> ● The evidence is added in the updated PDD. ● Because the project is the first of its kind in the relevant geographical area, the technology used in the project activity is not commercialized. ● The project can overcome the investment barriers, technology barriers and straw prices fluxion with CDM revenue and can normally operate. 3. The proposed project activity is the first of its kind. It is confirmed in the updated PDD. 4. The evidence is added in the updated PDD. 	<p>The PDD is updated /1/ and the PP identified barriers for the proposed project activity. Please refer to section 3.3. Baseline determination of this report for further details.</p> <p>CL. 7 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 8.</p> <p>It needs to be evidenced the number of truck trips during the year, the types of biomass residues used in the project activity and the data used to calculate the average distance from storage site to power plant.</p> <p>It needs to be evidenced the data used to estimate the annual fuel consumption and provide documented evidence of the source used for the NCV of the fuel. During the site visit was checked that the PP will use combined harvest machinery for which has not been calculated the annual fuel consumption. The PP is requested to justify the application of Option B instead of the Option A.</p> <p>The PP is requested to provide further details for what is used the electricity in the proposed project activity and which are the data used to estimate the consumption to calculate the net quantity of electricity generation in the project plant.</p> <p>The PP is requested to justify the NCV of the biomass residues used in the calculation related to the different biomass combusted. During the site visit was checked that the calculation based on corn but the PP used different biomass.</p> <p>Please provide the emission reduction calculation spreadsheet presented in a transparent manner and it can reproduce the calculation made.</p>	<p>B.4.1. B.4.2. B.4.3. B.5.1. B.5.2. B.5.3.</p>	<ol style="list-style-type: none"> 1. The double average distance from storage site to power plant is 100 km to be conservative. The project will utilize cereal stalks collected from local area within 50km average distance. 2. The analysis report tested by China National Centre for Quality Supervision and Test of Coal, which show the NCV value of the cereal stalk, was sent to DOE. As for the data source used in the PDD, some minors was revised. Dissel emission factor for calculation is from the Table A 11 in the annex 3. Please see B.6.1 in the updated PDD. 3. For combined harvest machinery, see the fourth answer of CL4. 4. As for the justification the application of Option A, see page 24. 5. How to calculate the net electricity generation is completed in the updated PDD. 6. There are at least 533,090 tonnes cereal stalks available to the project within 50km local areas, which is more than 141,120 tons biomass consumption; therefore, cereal stalks can satisfy the demand of the project. Additionally, the cost of cereal stalks is cheaper than 	<p>The monitoring plan in the PDD is updated /1/ and monitoring parameters have been addressed as per the approved methodology ACM0006 and related methodological tools. Please for further details refer to section 3.6 Estimate of GHG Emissions of this report.</p> <p>CL. 8 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		<p>other biomass, such as wheat straws and cotton stalks, so the project owner just choose cereal stalks to the fuel of the project.</p> <p>7. The emission reduction calculation spreadsheet has been provided to the DOE.</p>	

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
<p>CL 9.</p> <p>The emission factor calculation spreadsheet need to be presented in a manner that it can reproduce the calculation of the operating margin and build, margin grid emission factor. It also needs to be in accordance with the tool to calculate the emission factor for an electricity system.</p>	<p>B.5.1. B.5.2. B.5.3.</p>	<p>The emission factor calculation spreadsheet has sent to DOE. Because the calculation of build margin grid emission factor in the PDD(version 1) is not the same as the <i>Notification on Determining Baseline Emission Factor of China's Grid</i>(published on 9 Aug.,2007), the updated PDD revised the value of build margin grid emission factor from 0.9361 to 0.9397.</p>	<p>The revised Emission Factor calculation spreadsheet /49/ and updated PDD have been provided by the PDD. The Operating Margin Emission Factor (EF_{OM}) is determined to be 1.1207 tCO₂/MWh; the calculated build margin emission factor (EF_{BM}) is 0.9397 tCO₂/MWh, thus the combined grid emission factor of NCPG taking into account is equal to 1.0302 tCO₂/MWh.</p> <p>CL. 9 is closed.</p>
<p>CL 10.</p> <p>The PP is requested to clearly define the geographical boundary of the region and to provide documented evidence to support the surplus of the biomass residues in the region of the project which is not utilized.</p> <p>Please provide the emission reduction calculation spreadsheet presented in a transparent manner and it can reproduce the calculation made;</p>	<p>B.6.1. B.6.2. B.6.3.</p>	<p>The total amount of the straws within 50km of the project is 1.90 million tonnes, which are burned or dumped without utilized according to the survey report of the project.</p>	<p>The probable source identified for leakage is that the project diverts biomass from other users and thus increases fossil fuel use. Leakage will be accounted of the biomass supply is not abundant around the power plant. To account for this option L₂ of the approved methodology ACM0006 is selected where if the quantity of available biomass in the Region is at least 25% larger than the biomass utilized, no leakage needs to be considered. According to the <i>Straw resources survey and evaluation report in Jiang County and its surrounding areas</i> /24/ of February 2007 the biomass resources in Jiang County and nearby counties shows that, within a 50 km radius of the project plant, there is a total biomass residue available of 571,430 tons per year. The quantity of available biomass in region</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
			<p>is around 75% larger than the biomass utilized, thus no leakage needs to be considered.</p> <p>CL. 10 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
CL 11. Not for all monitored data required for verification and issuance of CERs is mentioned in the PDD the period that need to be kept.	B.8.2.	All data collected should be kept at least 2 years after the end of the last crediting period is added in the updated PDD.	The PDD is update /1/. CL. 11 is closed.
CL 12. The monitoring plan is not completely in compliance with the approved monitoring methodology: <ul style="list-style-type: none"> ● the quantity of the biomass residue type that has been transported to the project site during the year; ● the monitoring should be for all type of biomass; in the PDD section B.7.1. is mentioned only the straw but in the PDD other type of biomass are considered. It has not been established monitoring frequency for the energy balance and the quantity cross-checked with the quantity of the electricity generated; ● the monitoring frequency for the average round trip distance is not established; ● the monitoring of the number of trucks trips or the average truck load used for transportation of biomass is not included; ● it has not been established the cross-checked of the quantity of fuel used setups of the project with the annual energy balance; ● the monitoring of the NCV is not in 	B.9.1. B.9.2. B.10.1.	This part was completed in the revised PDD. <ol style="list-style-type: none"> 1. The quantity of the cereal stalks is added in the monitoring plan. 2. Cereal stalks is the only type of biomass utilized by the project. The quantity of biomass consumption will be cross-checked by the electricity generated by the project every month. 3. The average round trip distance will be monitored every month. 4. The average truck load used for transportation of biomass is corrected. 5. The cross-checked of the quantity of fuel used setups of the project with the annual energy balance is completed in the updated PDD. 6. The NCV of biomass utilized by the project is completed in the updated PDD. 7. The procedure and frequency for the CH₄ emission factor for uncontrolled burning of the biomass residue type is completed. 8. If the project can not operate, such as the maintenance period, the project has to import electricity from the 	The monitoring plan in the PDD is updated /1/ and monitoring parameters have been addressed as per the approved methodology ACM0006 and related methodological tools. Please for further details refer to section 3.6 Estimate of GHG Emissions of this report. CL. 12 is closed.

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>compliance with the approved methodology ACM0006;</p> <ul style="list-style-type: none"> ● the monitoring procedure and frequency for the CH₄ emission factor for uncontrolled burning of the biomass residue type is not in compliance with the approved methodology AMC0006; ● the monitoring plan include the monitoring of the electricity imported from the grid but in the PDD it is stated that the on-site electricity consumption is provided by the proposed project activity itself. 		power grid. The conflicting content is changed.	

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 13. The measurement accuracy and procedure how to deal with erroneous measurement are not established. The measurement interval is not identified. Procedure for maintenance of monitoring equipment and installation are not identified.	B.9.5. B.9.6. B.9.8.	The part was completed in the updated PDD.	The PDD has been updated. The accuracy of the electricity meters shall not exceed $\pm 0.5\%$ and they will be calibrated once per year as well as the automatic weighting. Procedure for maintenance of monitoring equipment has been identified. CL. 13 is closed.
CL 14. The monitoring plan is not completely in compliance with the approved monitoring methodology: <ul style="list-style-type: none"> the net quantity of electricity generated in the project plant during the year is not included; in the monitoring of the electricity supplied to the grid is not established the monitoring frequency; 	B.10.1. B.10.2. B.10.4. B.10.5. B.10.6. B.10.7.	The quantity of electricity supplied to the power grid will be monitored every month.	The monitoring plan in the PDD is updated /1/ and monitoring parameters have been addressed as per the approved methodology ACM0006 and related methodological tools. CL. 14 is closed.
CL 15. The monitoring plan not includes the monitoring frequency of the quantity of biomass residues that are utilized in the defined geographical region and of the quantity of available biomass residue in the region.	B.11.1.	The quantity of biomass residues that are utilized in the defined geographical region and of the quantity of available biomass residue in the region will be monitored once per year.	The monitoring plan in the PDD is updated /1/ and monitoring parameters have been addressed as per the approved methodology ACM0006 and related methodological tools. Please for further details refer to section 3.6 Estimate of GHG Emissions of this report. CL. 15 is closed.
CL 16. Procedure for emergency preparedness for cases that can cause intended emissions need to be identified.	B.13.3. B.13.4. B.13.5.	1. As for the <i>procedure for emergency preparedness for cases that can cause intended emissions</i> , there are some mistakes in the PDD(version 1).	The PDD is updated /1/. CL. 16 is closed.

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>Procedures for review of reported results and data need to be identified.</p> <p>Procedure corrective actions need to be identified.</p>		<p>Actually, the project will not use other fossil fuels according to the FSR and the monitoring plan of the project owner. Therefore, in compliance with the real condition, the updated PDD deleted this content.</p> <p>2. All the monitoring data will be review and cross-checked and kept at least two years after the crediting period. The monitoring report will be checked by the general manager.</p> <p>3. The corrective action was identified.</p>	
<p>CL 17.</p> <p>The PP is requested to justify why the stakeholder questionnaires was sent before the approval of the project (28 September 2007 approval of FSR).</p>	E.1.1.	<p>Shanxi Development and Reform Committee approved the biomass power generation investment application of Shanxi Jianghe Chemical Silicon Co. Ltd. in 9 March, 2007. Furthermore, the Shanxi Power Co., Ltd. approved the project connecting to the local power grid in April 25th, 2007. After the development contract with CDM Center of Excellence Ltd., Representative Office Beijing was signed in May. 11th, 2007, the comments of Stakeholders for the project were got by the way of Stakeholders' Questionnaire in 9 June, 2007.</p>	<p>DNV was able to check the documented evidences.</p> <p>CL. 17 is closed.</p>

Draft report clarifications and corrective action requests by validation team	Ref. to checklist question in table 2	Summary of project owner response	Validation team conclusion
		The document of Shanxi Development and Reform Committee (9 March, 2007) and Shanxi Power Co., Ltd.(25 April 2007) were sent to DOE.	

APPENDIX B

CERTIFICATES OF COMPETENCE



CERTIFICATE OF COMPETENCE

Rita Valoroso

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

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

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Kang Guo

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

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

Høvik, 9 January 2009

Michael Lehmann

Michael Lehmann

Technical Director, Climate Change Services



CERTIFICATE OF COMPETENCE

Hendrik Brinks

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

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

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CERTIFICATE OF COMPETENCE

Vidyacharan Astakala

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

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

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Michael Lehmann

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CERTIFICATE OF COMPETENCE

David Costa

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

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

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CERTIFICATE OF COMPETENCE

Francisco Zamarron

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

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

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CERTIFICATE OF COMPETENCE

Kumaraswamy Chandrashekara

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

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

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CERTIFICATE OF COMPETENCE

Raman Venkata Kakaraparthi

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

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

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