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# VALIDATION REPORT

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## WANZAI KAIDI BIOMASS POWER PROJECT IN P.R.CHINA

REPORT No. 01 997 9105051735

REVISION No. 03

# VALIDATION REPORT

Date of first issue: 2009-06-25	Project No.: 153114687	<i>TÜV Rheinland Japan Ltd.</i>
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Client: Camco International Limited	Client ref.: Ms. Madeleine Rawlins	

**Project Name:** Wanzai Kaidi Biomass Power Project

**Country:** P.R.China

**Methodology:** ACM0006

**Version:** 09

**GHG reducing Measure/Technology:** Renewable energy / Biomass Residue

**ER estimate:** 115,760 tCO<sub>2e</sub> /year

**Size**

☒ Large Scale

☐ Small Scale

**Validation Phases:**

☐ Desk Review

☐ Follow up interviews

☒ Resolution of outstanding issues

**Validation Status**

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is the validation team's opinion that Wanzai Kaidi Biomass Power Project in P.R.China, as described in the PDD of version 04, 31 Mar. 2010 meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria applies the baseline and monitoring methodology ACM0006 (version 09). TÜV Rheinland thus requests the registration of the Project as a CDM project activity with the UNFCCC.

Report No.: 01 997 9105051735	Date of this revision: 2010-10-25	Rev. No. 03
Report title: Wanzai Kaidi Biomass Power Project		
Work carried out by: - Sequoia A, Team Leader - ZHU Jiang, Trainee		
Work verified by: Dr. Manfred Brinkmann		

Key words:

Climate Change

Kyoto Protocol

Validation

Clean Development Mechanism

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## Abbreviations

BM	Build Margin
CAR	Corrective Action Request
CCPG	Central China Power Grid
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DNA	Designated National Authority
EF	Emission Factor
EIA	Environmental Impact Assessment
EPB	Environmental Protection Bureau
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
LoA	Letter of Approval
MP	Monitoring Plan
NCV	Net Calorific Value
NDRC	National Development and Reform Commission
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
SERC	State Electricity Regulatory Commission
UNFCCC	United Nations Framework Convention on Climate Change

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## 1 EXECUTIVE SUMMARY – VALIDATION OPINION

The validation team assigned by the DOE (TÜV Rheinland Japan Ltd.) has performed a validation of the ‘Wanzai Kaidi Biomass Power Project’ in P.R.China on the basis of UNFCCC criteria for Clean Development Mechanism (CDM) projects according to Article 12 of the Kyoto Protocol and subsequent decisions of the CDM Executive Board with regard to CDM modalities and procedures and the application of approved methodologies. The validation report and the validation protocol summarize the findings of the validation.

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

The Validation was executed in the following steps so far:

- Project desk review (PDD version 01, 5<sup>th</sup> Jan. 2009)
- Public stakeholder comment process(23<sup>rd</sup> Jan 2009 to 21<sup>st</sup> Feb 2009)
- On-site visit with stakeholder interviews(27<sup>th</sup> Feb.. 2009)
- Issue of checklist with corrective action requests (CARs) and clarification requests (CLs) and the draft validation report & protocol(Version 00, 25<sup>th</sup> Jun. 2009)
- Desk review of revised PDD (version 04, 31 Mar. 2010)
- Review of proposed correction and clarifications
- Issue of the final validation report & protocol

The host country of the proposed project is P.R.China. The Letter of Approval (LoA) of voluntary participation, including confirmation by China’s DNA National Development & Reform Commission (NDRC) that the project assists them in achieving sustainable development has been received.

According to the revised PDD, the project activity is bilateral CDM-project, with United Kingdom of Great Britain and Northern Ireland identified as the Annex I party, the LoAs from which have also been provided.

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

The project applies approved consolidated baseline and monitoring methodology ACM0006 “*Consolidated methodology electricity generation from biomass residues*” .

And also the project applies the tools as follows:

- “*Combined tool to identify the baseline scenario and demonstrate additionality*”. (Version 02.2)
- “*Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion*” (Version 02)

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- *“Tool to calculate baseline, project and/or leakage emissions from electricity consumption”* (Version 01)

The total emission reductions from the project are estimated to be on the average 115,760 tCO<sub>2</sub>e /year over the first crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

Adequate monitoring procedures have been implemented according to the monitoring methodology ACM0006. Project operational staff's training records is available to the Audit Team.

The project proponent has resolved all Corrective Action Requests and Clarification Requests as stated in the Validation Report and the Validation Protocol, which has resulted in a revision of the PDD. In summary, it is the validation team's opinion that the Wanzai Kaidi Biomass Power Project in P.R.China as described in the PDD of version 04, 31 Mar. 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria and applies the baseline and monitoring methodology ACM0006. TÜV Rheinland thus requests the registration of the Project as a CDM project activity.

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## 2 INTRODUCTION

Camco International Limited has commissioned TÜV Rheinland to perform a validation of the project Wanzai Kaidi Biomass Power Project in P.R.China (hereafter called “the project”). This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures and the subsequent decisions by the CDM Executive Board.

### 2.1 Objective

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

### 2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology. The validation team has, based on the recommendations in the Validation and Verification Manual, version 01.1, focusing on the identification of significant risks for project implementation and the generation of CERs.

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

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## 3 METHODOLOGY

The validation consists of the following three phases:

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

The following sections outline each step in more detail.

### 3.1 Desk Review of the Project Design Documentation

The following table outlines the documentation reviewed during the validation:

- /1/ Camco International Limited, Project Design Document for the “Wanzai Kaidi Biomass Power Project”, version 04, 31 Mar. 2010
- /2/ Camco International Limited, Project Design Document for the “Wanzai Kaidi Biomass Power Project”, version 01, 5th Jan. 2009
- /3/ The National Development and Reform Commission of the People’s Republic of China, Letter of Approval (Ref No.: 2031), Jun. 2009
- /4/ International Climate Change , Letter of Approval for Camco International Limited, 16<sup>th</sup> Jul. 2009
- /5/ International Climate Change, Letter of Approval for Camco Carbon Limited, 16<sup>th</sup> Jul. 2009
- /6/ CDM Executive Board, ACM0006 “*Consolidated methodology electricity generation from biomass residues*”, Version 09
- /7/ CDM Executive Board, Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2
- /8/ CDM Executive Board, Tool for the demonstration and assessment of additionality, Version 5.2
- /9/ CDM Executive Board, Tool for calculation of emission factor for electricity systems ,Version 02
- /10/ CDM Executive Board, Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion ,Version 02
- /11/ CDM Executive Board, Tool to calculate baseline, project and/or leakage emissions from electricity consumption ,Version 01
- /12/ CDM Executive Board, Clean Development Mechanism Project Design Document Form (CDM-PDD), Version 03



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- /13/ CDM Executive Board, Guidelines For Completing The Project Design Document (CDM-PDD) And the Proposed New Baseline And Monitoring Methodologies (CDM-NM), Version 7, Annex 12 EB41 Report
- /14/ CDM Executive Board, Clean Development Mechanism Validation and Verification Manual, Version 01.1
- /15/ Wuhan Kaidi Electric Power Engineering Co., Ltd., Feasibility Study Report for Wanzai Kaidi Biomass Power Project (2×12MW), Mar. 2008
- /16/ Development and Reform Commission of Jiangxi Province, Approval for Wanzai Kaidi Biomass Power Project (2×12MW) (Ref No.:GanFaGaiNengYuanZi [2008] No.782), 13<sup>th</sup> Jun. 2008.
- /17/ Jiangxi Meteorological Science Institute, Environmental Impact Assessment for Wanzai Kaidi Biomass Power Project (2×12MW), Jun. 2007
- /18/ Environment Protection Bureau of Jiangxi Province, Approval of EIA for Wanzai Kaidi Biomass Power Project (2×12MW), (Ref No.: GanHuanDuZi [2007] No. 216), 17<sup>th</sup> Aug. 2007.
- /19/ Wuhan Kaidi Electric Power Engineering Co., Ltd., Biomass Availability Report, Mar. 2008.
- /20/ State Council Office, Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135MW or Below (Ref No.: GuoBanFaMingDian [2002] No.6), June 2002
- /21/ Camco International Limited, IRR Calculation Sheet.
- /22/ Camco International Limited, Emission Reduction Calculation Sheet.
- /23/ National Development and Reform Commission of P.R.China, Notification on Determining Baseline Emission Factor of China's Grid, 30<sup>th</sup> December 2008
- /24/ China Renewable Energy Law, 1 January 2006
- /25/ Wuhan Kaidi Electric Power Engineering Co., Ltd. & Xiangtan Boiler Co. Ltd. Boiler Component Purchasing Contract, 22<sup>nd</sup> Jan. 2008
- /26/ Wuhan Kaidi Electric Power Engineering Co., Ltd. & Nanjing Steam Turbine Co., Ltd., Steam Turbines Purchasing Contract, 6<sup>th</sup> Nov. 2007
- /27/ Jiangxi Electric Power Co., Announcement on Paralleling Design for Wanzai Kaidi Biomass Power Project (Ref No.: GanDianGui [2008] No. 121), 27<sup>th</sup> May 2008.
- /28/ Wanzai Biomass Power Plant, Technical Training Records.
- /29/ Wuhan Kaidi Investment Holding Ltd., CDM Monitoring & QC Manual, 4 September 2008.

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- /30/ Merchant Office of Wanzai County, Confirmation Letter Regarding No Other Biomass Project Existing in Wanzai County (Ref No.: WanZhaoBanZi [2009] No. 1) 25<sup>th</sup> Jun. 2009.
- /31/ Electricity Dispatching Department of State Power Co., Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects, March 2003
- /32/ Jiangxi Meteorological Science Institute, Stakeholder Interview Records for Wanzai Kaidi Biomass Power Project, May 2007
- /33/ Central Southern China Electric Power Design Institute of China Power Engineering Consulting, Statement on Life Span of Industry Boilers of Wanzai project, 20<sup>th</sup> Jun. 2009.
- /34/ Wuhan Kaidi Electric Power Engineering Co., Ltd., Analysis for ‘Heat Supply by the Wanzai Kaidi Biomass Power Project’ (KaiDiGongChengHan [2009] No.106), 25<sup>th</sup> Jun. 2009.
- /35/ Administrative Commission of the Wanzai Industrial Zone, Introduction of the Boilers in Wanzai Industrial Zone, 29<sup>th</sup> Jun. 2009.
- /36/ Environment Protection Bureau of Wanzai County, Introduction of Local Biomass Uncontrolled Burning (WanHuanHan [2009] No.10), 26<sup>th</sup> Jun 2009.
- /37/ Evidences on operation hour of the project:  
 Wuhan Kaidi Electric Power Engineering Co., Ltd., Introduction Letter Regarding the Operation Hour Defined in the ‘FSR for Wanzai Kaidi Biomass Power Project’ (KaiDiGongChengHan [2009] No. 104), 25<sup>th</sup> Jun. 2009.  
 Suqian Power Supply Co., Zhongjieneng Suqian Biomass Project Production List, 4<sup>th</sup> Jan 2009.  
 Ministry of Hydro Power and Water Resources of P.R.China, Regulations on Power Plant Overhaul, SD 230-87.
- /38/ Wuhan Kaidi Electric Power Engineering Co., Ltd., Introduction Letter Regarding the Electricity Tariff Defined in the ‘FSR for Wanzai Kaidi Biomass Power Project’ (KaiDiGongChengHan [2009] No. 103), 25<sup>th</sup> Jun. 2009.
- /39/ Jiangxi Chengda Engineering Consulting Co. Ltd., Construction Approval Form, 12<sup>th</sup> Nov. 2008
- /40/ Calculation Regarding Auxiliary Consumption rate of the project plant.
- /41/ Electricity connecting system line diagram of the Wanzai Kaidi Biomass Power Project.
- /42/ State Key Laboratory of Coal Combustion in Huazhong University of Science and Technology, Laboratory Testing of NCV of Rice Husk, 30<sup>th</sup> Aug. 2007.
- /43/ State Key Laboratory of Coal Combustion in Huazhong University of Science and Technology, Laboratory Testing of NCV of Straws, 8<sup>th</sup> Jul. 2007.

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- /44/ Wuhan Kaidi Investment Holding Ltd., Board Resolution Regarding Applying CDM Activity for Biomass Projects (KongGu DongZii [2007] No. 12), 21<sup>st</sup> Sep. 2007
- /45/ Wuhan Kaidi Electric Power Engineering Co., Ltd. & Jiangxi Power Construction Co., Construction Contract of Main Buildings & Project Installation, Mar. 2008.
- /46/ Wanzai Kaidi Green Energy Development Co., Ltd & Camco International Limited., CDM Consultation Agreement, 1<sup>st</sup> Nov. 2007.
- /47/ National Development and Reform Commission, Renewable Energy Electricity Tariff and Cost Management Trial Regulations (*FaGaiJiaGe* [2006] 7), 4<sup>th</sup> Jan. 2006.
- /48/ Enterprise Incoming Tax Law of People's Republic of China
- /49/ Ministry of Finance P.R.China & State Administration of Taxation, Notice on Value Added Tax Policy Regarding Resource Multi-utilization and Other Products, 1<sup>st</sup> Dec. 2001.
- /50/ NDRC & SERC, Subsidies for Renewable Project between January and September 2007
- /51/ NDRC & SERC, Subsidies for Renewable Project between October 2007 and June 2008
- /52/ Administrative Commission of the Wanzai Industrial Zone, Supplementary explanation on the heat supply in the Wanzai Industrial Zone (Ref No.: Wan Yuan Zi [2010] No. 08), 25 Feb. 2010.
- /53/ China Statistic Year Book, 2004 to 2008
- /54/ Related Questions Research on Biomass Generation Using Agriculture and Forest Residue in China, HUANG Jintao, Journal of Shenyang Institute of Engineering (Natural Science), Vol14 No11, Jan. 2008
- /55/ Records and logbook of biomass residue purchased by the Project in Dec. 2009 and Jan. 2010.
- /56/ Administrative Commission of the Wanzai Industrial Zone, Letter of confirmation that Wanzai Kaidi Biomass Power Project as heat supply source for Wanzai Industrial Zone (Ref No.: Wan Gong Qu Han [2010] No. 10), 25 Feb. 2010.
- /57/ Calculation Regarding Auxiliary Consumption rate of the project plant.
- /58/ List of CDM projects registered in China based on ACM0006 by Nov. 2009.
- /59/ Spreadsheet of levelized cost calculation.
- /60/ FANLing, CAO Qin, GUTao, YUQian, Comparison of Environmental Impact and Operation Cost of Mini Type Gas-fired Boiler( Oil-fired Boiler) with Coal-fired boilers,[J] Arid Environmental Monitoring, 2004(03)
- /61/ Wuhan Kaidi Electric Power CO., LTD. Annual Reports for year 2004, 2005 and 2006.

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- /62/ Wuhan Kaidi Electric Power Engineering Co., Ltd., Introduction Letter Regarding the Biomass Cost Defined in the 'FSR for Wanzai Biomass Project' (*kaidigongchenghan* [2009]105), 25 Jun. 2009.
- /63/ ZHANG Yan-li, WANG Fei, ZHAO Li-xin, SUN Li-ying, the operating model, existing problems and development strategies for China's straw storage and transportation system, *Renewable Energy Resources*, Vol.27 No.1, Feb. 2009
- /64/ Development and Reform Commission of Jiangxi Province, Tariff Approval of Wanzai Kaidi Biomass Power Project (Ref No.: Gan Fa Gai Shang Jia Zi [2010] No. 160, 1 Feb. 2010.
- /65/ China Electric Power Yearbook 2003 to 2007.
- /66/ China Energy Statistical Yearbook 2005 to 2007.
- /67/ Wuhan Kaidi Electric Power Engineering Co., Ltd., Introduction Letter Regarding the Salary and Welfare Defined in the 'FSR for Wanzai Kaidi Biomass Power Project' (Ref No.: Kaikigongchenghan [2010] No. 23), 26 Mar. 2010.
- /68/ Medium and Small Scale Cogeneration Construction Design Handbook, China Electric Power Press, Apr. 2006.
- /69/ Fossil Fuel Power Plant Cost Indicator Guidance (priced at level of 2007), General Institute of Electric Power Design, Mar. 2008.
- /70/ Hubei Yinhe Accounting Inc., the Accounting Report for the Construction of Wanzai Kaidi Biomass Power Project (Ref No.: EYinHeShenZi [2010] No. 093), 25 Oct. 2010.

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

- Changes related to the CAR and CL identified in the TÜV Rheinland's draft validation report to the Project;
- Methodology applied to the project activity is updated from version 6.2 to version 09.
- Changes related to the questions from incomplete submission for registration through completeness check.
- Changes of the baseline emissions determination due to no claim of heat displacement.

### 3.2 Follow-up Interviews with Project Stakeholders

	Date	Name	Organization	Topic
//	2009-02-27	<ul style="list-style-type: none"> <li>- CHEN Ben</li> <li>- YANG Peng</li> <li>- XIN Gesheng</li> <li>- YE Xumei</li> <li>- OUYANG</li> </ul>	Government of Wanzai County	<ul style="list-style-type: none"> <li>- Local energy supply condition</li> <li>- Positive or negative impact brought by the Project</li> <li>- Environmental impacts</li> </ul>

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		<ul style="list-style-type: none"> <li>- Peng CHEN Meirong</li> <li>- XIAO Gannan</li> <li>- ZHANG Xiaoling</li> </ul>		<ul style="list-style-type: none"> <li>- during project construction and protection measures applied</li> <li>- Biomass availability</li> </ul>
/II/	2009-02-27	<ul style="list-style-type: none"> <li>- SONG Pinggen</li> <li>- WANG Xilin</li> </ul>	Wanzai Kaidi Green Energy Development Co., Ltd	<ul style="list-style-type: none"> <li>- Project technology discussion</li> <li>- Project implementation</li> </ul>
/III/	2009-02-27	<ul style="list-style-type: none"> <li>- ZHANG Zhengquan</li> <li>- HUANG Qionghua</li> </ul>	Carbon Asset Management Centre, Wuhan Kaidi Electric Power Co., Ltd.	<ul style="list-style-type: none"> <li>- Project Management</li> <li>- Technical issues</li> <li>- Approval status by the host country</li> <li>- Sustainable development issues</li> <li>- Investment risks and barriers</li> <li>- Additionality</li> <li>- Monitoring plan</li> <li>- Training plan</li> <li>- Environmental impacts</li> <li>- Stakeholder process</li> <li>- Financial source</li> <li>- CDM incentive consideration</li> </ul>
/IV/	2009-02-27	<ul style="list-style-type: none"> <li>- GONG Jing</li> </ul>	Camco International Limited	<ul style="list-style-type: none"> <li>- PDD discussion</li> <li>- Baseline discussion</li> <li>- Emission reduction discussion</li> <li>- Monitoring discussion</li> </ul>

### 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 TÜV Rheinland's positive conclusion on the project design. In order to ensure transparency a validation protocol is customised for the project. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;

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- 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 Wanzai Kaidi Biomass Power Project is enclosed in Appendix A to this report.

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

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

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

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

  

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

  

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

**Figure 1 Validation protocol tables**

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### 3.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project 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 TÜV Rheinland's qualification scheme for CDM validation and verification.

### 3.5 Validation Team

Role/Qualification	Last Name	First Name	Affiliation of Team Members
Team Leader	A	Sequoia (Qingxing)	TÜV Rheinland (Shanghai) Co., Ltd.
Trainee/ MEng	ZHU	Jiang	TÜV Rheinland (China) Ltd.
Technical Reviewer PhD	Brinkmann	Manfred	TÜV Rheinland Japan Ltd.



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### 4 VALIDATION FINDINGS

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

The final validation findings relate to the project design shall be documented and described in the revised and resubmitted project design documentation.

#### 4.1 Approval and Participation

The below table summarizes the project participants and parties involved. The authenticity of the letter of approval from host country has been validated by checking on Chinese DNA's website. The authenticity of the letter of approval from Annex I country United Kingdom of Great Britain and Northern Ireland has been checked by making a comparison to the LoA issued by International Climate Change, to the latest registered CDM project. These LoA(s) are regarded as valid and meeting the requirements.

<b>Project participants</b>	<i>1 Wanzai Kaidi Green Energy Development Co., Ltd</i>	<i>2. Camco International Limited</i>	<i>3. Camco Carbon Limited</i>
<b>Parties involved</b>	<i>P.R.China (host)</i>	<i>United Kingdom of Great Britain and Northern Ireland</i>	<i>United Kingdom of Great Britain and Northern Ireland</i>
<b>Ratification status of the parties</b>	China ratified the Kyoto Protocol on 30 August 2002.	United Kingdom of Great Britain and Northern Ireland, the Annex I party, ratified the Kyoto Protocol on 31 May 2002	
<b>APPROVAL</b>			
LoA received	Yes	Yes	Yes
Date of LoA	<i>Jun. 2009</i>	<i>16 Jul. 2009</i>	<i>16 Jul. 2009</i>
Reference to document	<i>Ref./3/</i>	<i>Ref./4/</i>	<i>Ref./5/</i>
LoA received from	<i>The project participants</i>	<i>The project participants</i>	<i>The project participants</i>
Validation of authenticity	<i>All approved CDM projects by DNA of China NDRC will be published on: 'http://cdm.ccchina.gov.cn/'.</i>	<i>The Audit Team made a comparison between the LoA of the Project with that of the latest registered CDM project as UK as</i>	<i>The Audit Team made a comparison between the LoA of the Project with that of the latest registered CDM project as UK as the</i>

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	<i>The Project is indicated as approved by China DNA, source: <a href="http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3632">http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3632</a></i>	<i>the Annex I party and no doubts were found.</i>	<i>Annex I party and no doubts were found.</i>
Validity of LoA	<i>Valid</i>	<i>Valid</i>	<i>Valid</i>
<b>PARTICIPATION</b>			
Party is party to Kyoto Protocol	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Voluntary participation	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
Diversion of official development aid towards host country	<i>No</i>		
Project contribution to SD	<i>Yes</i>	<i>N/A</i>	<i>N/A</i>

### 4.2 Project Design Document

The Project Design Document is based on the currently valid PDD template/12/and is completed in accordance with the applicable guidance document /13/.

### 4.3 Project Description

Based on the project Feasibility Study Report/15/ (FSR), the proposed project, located at Industrial Area, Wanzai County is to utilize the biomass material (mainly consists of rice husk) as the fuel for four sets of 65t/h Circulating Fluidized Bed (CFB) boiler and four units of 12 MW steam turbine and 15 MW generator. There are three operational conditions for the steam turbine generator unit as the following. 1) Rated operation condition, 12MW power generation and 15t/h heat supply. 2) Maximum condensing condition, 15MW power generation and 0t/h heat supply. 3) Maximum extraction condition, 6.59MW power generation and 45t/h heat supply. The install configuration is confirmed by the Audit Team by reviewing the project approval/16/ and the CFB and steam turbine generator's purchasing contract /25//26/. By the time of on site assessment, the CFB and the workshop was under construction.

To be in line with relevant requirements in Page 6 and 7 of the applied methodology, the situation of the project activity and baseline scenario has been documented in the PDD, and validated as follows:

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- *For each power plant that was operating at the project site during the most recent three years prior to the start of the project activity: the type and capacity of the power plant, types and quantities of fuels have been used in the power plant during the most recent three years prior to the start of the project activity and whether the plant continues operation after the start of the project activity;*
- Not applicable. It was confirmed by the Audit Team during the site visit that the project activity is a Greenfield project and there is no power plant that was operating at the project site.
- *For each boiler or other heat generation equipment that was operating at the project site during the most recent three years prior to the start of the project activity: the type and capacity of the boiler, types and quantities of fuels have been used in the boiler during the most recent three years prior to the start of the project activity and whether the boiler continues operation after the start of the project activity;*
- Not applicable. It was confirmed by the Audit Team during the site visit that the project activity is a Greenfield project and there is no boiler or heat generation that was operating at the project site.
- *For each boiler or power plant installed under the project activity: the type and capacity of boilers and/or power plants and which types and quantities of fuels are planned to be used;*
- Specification of the boilers and power plant of the project activity, including steam turbines and generators, have been documented in the PDD version 04, 31 Mar. 2010, which are all from Equipment Purchasing Contracts/25//26/. Fuels that might be used in the project activity include the start-up diesel and the diesel consumption for forklifts at collections sites and project site. Quantities of the fuels have been documented in PDD version 04, 31 Mar. 2010 and used for calculation of project emissions due to on-site consumption of fossil fuels.
- *For each new boiler or power plant that would be installed in the absence of the project activity: the type and capacity of the new boilers and/or power plants and which types and quantities of fuels would be used.*
- No off-site new boiler was scheduled to be installed to be displaced by the project activity /35//52/.
- For off-site boilers that were operating at the Wanzai Industrial Zone, the type, capacity and location of the boiler, type and quantities of fuels have been used in the boiler during the most recent three years prior to the start of the project activity, were evidenced by Administrative Commission of the Wanzai Industrial Zone /35//52/, and the authenticity of the information were confirmed by the Audit Team. Relevant information has been provided in the PDD version 04, 31 Mar. 2010.

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The biomass residues utilized in this proposed project will be mainly rice husk, rice straw and oil seed rape straw, which is from the FSR/15/. The rice husk will be packed and stored temporarily at the rice mills. Some collection sites will be set up near to the resources for the straws to be processed and stored, then transported to the plant according to the dispatch schedule. Part of straws will be transported to the project plant directly as well.

Starting date of project activity	Expected project operational lifetime	Crediting period
6 <sup>th</sup> Nov. 2007	20 Years as applied in the financial analysis	7 years

The project annual net generated electricity amount is expected to be 126,720MWh. The project will connect with Central China Power Grid (CCPG) at the 220kv Wanzai Substation through 110kv transmission line /27/. According to the interview with local government officer /I/ and the heat supply conditions of the Wanzai Industrial Zone, the enterprises located at Wanzai Industrial Zone depend on installation the fossil fired boilers of their own to meet their heat demand. The Project is expected to deliver 541,602 GJ annually of heat to those off-site heat consumers located in the Wanzai Industrial Zone.

All the training records /28/ have been provided by the project proponent and verified by the Audit Team. It shows that the project operational staffs have received theory, practice and management training.

In Audit Team's opinion, the project description is accurate and complete.

### 4.4 Baseline and Monitoring Methodology

#### 4.4.1 Applicability of the selected methodology to the project activity

The Project activity applies the ACM0006, Version 09, "*Consolidated methodology electricity generation from biomass residues*". The compliance of the Project is presented as follows:

1. The main fuel consumed by the project is biomass residues, which can be evidenced by the project FSR. According to the FSR/15/, except some small part of diesel will be used for project start up, no other fossil fuel is expected to be consumed by the project.
2. Only biomass from local agricultural residues will be used by the project, not from production process.
3. All biomass residues won't be stored more than one year. The rice husks are directly bought from the rice mills and transported to the plant and the straws are directly bought from the farmers at the temporary storage stations.
4. According to the FSR/15/ and on site assessment, it can be confirmed except for transportation of biomass and mechanical pre-treatment biomass, no-significant energy quantities will be used.

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Moreover, for the indicative applicability of different scenarios, the proposed project activity meets the requirement of Scenario 2 because of the following,

1. The proposed project activity is a Greenfield project.
2. The proposed project activity is a cogeneration project.
3. The baseline scenario of Power generation is identified as P4.
4. The baseline scenario of Biomass usage is identified as B1 and B3.
5. The baseline scenario of Heat supply is identified as H6.

The following tools are employed for the proposed project activity, “Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2”, “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, Version 02”, “Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01” and “Tool to calculate the emission factor for an electricity system, Version 02”. The Audit Team has verified and can confirm the project activity meets each of the applicability conditions of these tools.

### 4.4.2 Project Boundary

During on site assessment, the Audit Team could confirm the project location. The physical project boundary also includes the means of biomass residues transportation, the power system of the project, the sites where the biomass residues would have been left decay or dumped and the biomass collection sites where the straws will be pre-treated. The biomass residues transportation means is the trucks. The grid system boundary includes all the power plants connecting to the CCPG, which geographical range includes the Henan Grid, Hubei Grid, Hunan Grid, Jiangxi Grid, Sichuan Grid and Chongqing Grid. The project has included the CH<sub>4</sub> both in baseline emissions and in project emissions as required by the methodology. The Audit Team can confirm that the identified boundary and the selected sources and gases are justified for the project activity.

The heat users are not included in the spatial extent of the project boundary. Emissions from fossil fuel heat boilers, which are supposed to be baseline emissions, are not included in the baseline emissions of the proposed project as well. The Audit Team can confirm this is consistent with applied methodology.

The emissions sources included in the project boundary are identified as the following table.

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	<b>GHGs involved</b>	<b>Description</b>
<b>Baseline emissions</b>	<i>CO<sub>2</sub>, CH<sub>4</sub></i>	<i>CO<sub>2</sub> is the main emission source from fossil fired power plants in CCPG. CH<sub>4</sub> is the main emission source from uncontrolled burning or decay of biomass</i>
<b>Project emissions</b>	<i>CO<sub>2</sub>, CH<sub>4</sub></i>	<i>CO<sub>2</sub> is the main emission source from on site biomass treatment or boiler start up or biomass transportation. CH<sub>4</sub> is the main emission source from biomass combustion for electricity or heat generation.</i>
<b>Leakage</b>	<i>Not involved</i>	<i>Leakage is excluded in the PDD by demonstration that there is an abundant surplus of the biomass residue in the region of the project activity which is not utilized. See discussion in section 4.4.4 of this report.</i>

### 4.4.3 Baseline Identification

The baseline of the Project is identified by applying the approved consolidated monitoring methodology ACM0006, version 09-“*Consolidated methodology electricity generation from biomass residues*”. The baseline scenario of the project is in compliance with scenario 2 as indicated in Table 2 of ACM0006, version 09. A detailed account of the how scenario 2 is selected has been given in the PDD. The Audit Team has examined it by on site assessment, interviewing the local stakeholders and documents review.

<i>The approved baseline methodology applicable to the project</i> - explicit criteria - implicit criteria (e.g. available scenarios, applicability of formulas for BE/PE/LE calculations)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>As discussed in Section 4.4.1, the compliance of the methodology has been justified in the PDD and verified by the Audit Team.</i>
<i>PDD includes all assumptions and data used by project participants</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>All assumptions regarding the power generation, heat supplying and biomass disposal are included in the PDD.</i>
<i>All the references and documents used are relevant for establishing the</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

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<i>baseline scenario</i>		
<i>All the references and documents used are correctly quoted and conservatively interpreted in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<i>All relevant policies / regulations considered are listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>Regulation like 'Notice on Strictly Prohibiting the Illegal Installation of coal-fired Generators with the Capacity of 135MW or below issued by the General Office of the State Council'/20/ is clearly listed in the PDD.</i>
<i>Identified potential baseline scenarios reasonably represent what would/could occur in the absence of the proposed project activity</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<p>Yes.</p> <ul style="list-style-type: none"> <li>- For power generation, it is confirmed by the Audit Team during on site assessment and interview with the local government officer/I/that the project is a greenfield one installed at where no power generation occurs before. Without the project, power would be purchased from CCPG.</li> <li>- For heat supplying. By interviewing the local government officer/I/at the Wanzai Industrial Zone, the, and by heat supplying condition introduction letter issued by Wuhan Kaidi Electric Power Engineering Co., Ltd./34/ and the Introduction of the Boilers in Wanzai Industrial Zone/35/. Audit Team can confirm that there is no district heat supplying network. Heat supplying has always been installing fossil fired boilers.</li> <li>- For biomass disposal, it is evidenced the introduction of local biomass uncontrolled burning in Wanzai County /36/that dumping or uncontrolled burning has always been a common</li> </ul>



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		<i>phenomena. It is also evidenced by the local Merchant Bureau /30/ that except the project, there is no other biomass processing plants.</i>
<i>The baseline scenario selection is appropriate and determined according to the methodology</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>'Combined tool to identify the baseline scenario and demonstrate additionality, Version 02.2' is applied to determine the baseline scenario.</i>
<i>The approved methodology used is applicable to the identified baseline scenario</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

To the Audit Team's opinion, the baseline scenario is determined according to the methodology and is reasonable.

### 4.4.4 GHG Emission Reductions

The GHG emission reductions calculation is based on the methodology ACM0006, version 09- "Consolidated methodology electricity generation from biomass residues". The emission reduction  $ER_y$  by the project during a given year  $y$  is the difference between the emission reductions through substitution of electricity generation with fossil fuels ( $ER_{electricity,y}$ ), the emission reductions through substitution of heat generation with fossil fuels ( $ER_{heat,y}$ ), baseline emissions due to the natural decay or burning of anthropogenic sources of biomass residues ( $BE_{biomass,y}$ ), project emissions ( $PE_y$ ), emissions due to leakage ( $L_y$ ).  $CH_4$  emission has been concluded both in project boundary and project baseline.

The Audit Team has verified the emission reductions calculation by document review of the ER spreadsheet/22/, and the "Notification on Determining Baseline Emission Factor of China's Grid"/23/, released at '<http://cdm.ccchina.gov.cn/>' on 30 December 2008..

<i>All assumptions made for estimating GHG are listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<i>All data used by project participants are listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<i>Their references and sources are also listed in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<i>Formulas, parameters, values are complete, accurate, transparent and conservative</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1. For $ER_{heat,y}$ - Emission reductions due to heat displacement is not claimed by the proposed project, which is



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		<p><i>confirmed by the Audit Team conservative.</i></p> <p>2. For <math>ER_{\text{electricity},y}</math></p> <ul style="list-style-type: none"> <li>- <i>The grid emission factor OM and BM was calculated according to the Version 02 of the "Tool to calculate the emission factor for an electricity system", and data used in the calculation are from relevant yearbooks/65//66/, which is confirmed by the Audit Team consistent with the requirements of the tool and emission factor published by Chinese DNA/23/.</i></li> </ul> <p>3. For <math>BE_{\text{biomass},y}</math></p> <ul style="list-style-type: none"> <li>- <i>The project proponent applies the max moisture content for rice husk and straw/22/ to approach the dry biomass residue amount to calculate the smallest emission reduction, which is conservative.</i></li> <li>- <i>The project proponent applies the emission factor value accordingly with the methodology ACM0006, version 09</i></li> </ul> <p>4. For <math>PE_y</math></p> <ul style="list-style-type: none"> <li>- <i>Carbon dioxide emissions from combustion of fossil fuels for transportation of biomass residues to the project plant (<math>PE_{T,y}</math>); the project proponent applies the IPCC default value for emission factor of the vehicles in the PDD, the audit team was able to confirm that the calculation is correct and conservative.</i></li> <li>- <i>Carbon dioxide emissions from on-site consumption of fossil fuels (<math>PE_{FF,y}</math>): Two combustion processes are considered in the calculation, one is from the start-up</i></li> </ul>
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		<p><i>diesel consumption and the other is from the diesel consumption for using forklifts, the emission factor is referred from IPCC default value and is conservative.</i></p> <ul style="list-style-type: none"> <li>- <i>CO2 emissions from electricity consumption (<math>PE_{EC,y}</math>): the project proponent calculated this value exactly following "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"(Version 02) . According to the ACM0006 Version 09, page 29, The on-site electricity consumption attributable to the project activity (<math>EC_{PJ,y}</math>) should include all electricity consumption that is consumed by the project activity (e.g. for mechanical treatment of the biomass), except for auxiliary electricity consumption by the project plant (e.g. for pumps, vans, etc)." This means that auxiliary consumption (12%) required to maintain operation of the power plant is dealt with in the net quantity of electricity generation, whereas the electricity consumption from biomass preparation (1,857MWh) is dealt with in the calculation of project emissions.</i></li> <li>- <i>Methane emission from Biomass residues combustion (<math>PE_{biomass,CH4,y}</math>): the project proponent applies the CH4 emission factor referred to IPCC default value described in the methodology and is conservative.</i></li> </ul> <p>5. For <math>L_y</math></p> <ul style="list-style-type: none"> <li>- <i>The project proponent applies option L2 of the methodology ACM0006, version 09 and the leakage is expected to be zero. The biomass availability amount can be evidenced by the Biomass</i></li> </ul>
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		<i>Availability Report /19/.</i>
<i>All the references and documents used are correctly quoted and conservatively interpreted in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<i>Methodology has been applied correctly to calculate project emissions, baseline emissions, leakage emissions and emission reductions</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>All formulas are applied accordingly with the methodology.</i>
<i>All the emissions of baseline emissions can be replicated using information provided in the PDD</i>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<i>All the applied data is listed out in section B.6 and Annex 3 of the PDD. The baseline emissions can be replicated.</i>

The emission reduction calculation sheet/22/ has been assessed by the Audit Team. The project is expected to achieve emission reduction amount of 115,760 tCO<sub>2</sub>e /year during the first crediting period. As discussed above, the heat supplying network has not been finalized by the time of on site assessment and emission reductions due to heat supply will not be claimed by the Project Participants, which is confirmed by the Audit Team conservative.

### 4.5 Additionality

The additionality of the project is demonstrated by applying ‘*Combined tool to identify the baseline scenario and demonstrate additionality, version 02.2*’.

#### 4.5.1 CDM Consideration

Regarding the project starting date, the Audit Team determine that by desk review and on site assessment. The project got approval on 13<sup>th</sup> Jun. 2008/16/. On 6<sup>th</sup> Nov. 2007, the steam turbines purchasing contract was signed/26/. On 22<sup>nd</sup> Jan. 2008, Boiler Component Purchasing Contract was signed/25/. In March 2008, the Construction Contract was signed/45/. On 12<sup>th</sup> Nov. 2008, the construction of the project got permits/39/. Among the above activities, date 6th Nov. 2007 is considered to be the earliest date of project real action since the cost of key equipments constitute significantly of the project investment.

The proposed project is one of a batch of projects of Wuhan Kaidi Investment Holding Ltd. (the parent company of the project owner). The Wuhan Kaidi Investment Holding Ltd. planned to develop and invest 12 biomass to power generation projects<sup>1</sup> using the same equipments and technology. The proposed project was included in the 12 biomass projects. Within these 12 biomass projects, FSRs for first three pilot projects Jianli Kaidi Biomass, Yueyang Kaidi Biomass and Yiyang Kaidi biomass to power generation projects, UNFCCC Numbers of which are 3044, 3065 and 3072, were finalized respectively in September 2007,

<sup>1</sup> Which are all being submitted for registration to UNFCCC EB by Jan. 2010.

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June 2007 and August 2007. Key technical and financial parameters of these three projects have been documented in the table B-5 of the PDD version 04, 31 Mar. 2010. As these three projects are also validated by the same DOE as the proposed project, the audit team can access the FSRs of these three projects. The audit team can confirm the parameters in FSRs of these three projects have been accurately documented in table B-5 of the PDD version 04, 31 Mar. 2010. Based on the input values from FSRs, The financial analysis of these 3 pilot projects shows without CER revenue, IRR of Jianli Kaidi Biomass, Yueyang Kaidi Biomass and Yiyang Kaidi biomass to power generation projects are respectively 3.03%, 4.83% and 5.28%. The authenticity of the parameters and correctness of IRR calculation have been confirmed by the audit team, which are documented in the Validation Reports of these three projects.

Based on the financial analysis of 3 pilot projects (Jianli Kaidi Biomass, Yueyang Kaidi Biomass and Yiyang Kaidi biomass to power generation projects, UNFCCC Numbers of which are 3044, 3065 and 3072), whose FSRs had been completed before 21 Sep. 2007 (FSRs were completed respectively in September 2007, June 2007 and August 2007), the Board of the project investor Wuhan Kaidi Investment Holding Ltd. issued a resolution/44/ on 21<sup>st</sup> Sep. 2007 to indicate that CDM activities would be applied for all invested biomass projects. It is clearly indicated in the Board Resolution that IRRs of the three pilot projects were all far below the sectoral benchmark without carbon revenue, and CER revenue makes these three projects financially attractive. Considering utilization of same technology and equipments, the Board deemed other nice projects would, in common sense, face the same financial barriers as prior three pilot projects already faced, and decided to develop other nine biomass projects as CDM project to make them financially attractive. The Board Resolution was checked by the Audit Team and considered authentic and reasonable.

Real actions were taken by purchasing the equipments for the 12 projects in Nov. 2007/26/, which is confirmed as the starting date of the proposed project.

To determined project specific profiles, the FSR of the Project was finalized in March 2008/15/, which reconfirms that CDM incentive is necessary for developing the proposed project. The Project is considered financial unattractive in the financial analysis of the FSR/15/ and is suggested to apply CDM activity to conquer the financial difficulty. In section 4.8 of the financial analysis of the FSR it is stipulated that to apply CDM activity for the project would be the key factor for the project's implementation.

The audit team checked the FSRs and equipment purchasing contracts of the three pilot projects and the proposed projects. Key technical profiles of the four projects are listed in the table below:

<b>Parameters</b>	<b>Jianli Kaidi Biomass Power Project</b>	<b>Hunan Yueyang Kaidi Biomass Power Project</b>	<b>Hunan Yiyang Kaidi Biomass Power Project</b>	<b>The proposed project</b>
UNFCCC No.	3044	3065	3072	
Installed capacity	24MW	48MW	48MW	24MW

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Capacity per unit	12MW	12MW	12MW	12MW
Power generation technology	Biomass residue combustion for power co-generation (electricity and heat) by circulating fluid bed (CFB) boilers with medium temperature and sub-high pressure.			
Model of Boilers	KG65-450/5.29-FSWZ- I			
Manufacture of Boilers	Jiangxi Jianglian Energy and Environmental Protection Co., Ltd			
Model of Steam Turbines	C12-4.90/0.981-12/435			
Manufacture of Steam Turbines	NanJing Steam Turbine(Group) Co., Ltd			
Model of Generator	QFJ-15-2			
Manufacture of Generators	NanJing Steam Turbine(Group) Co.			
Fuel type	Biomass (rice husks and straws)			

As shown in the table, key technical indicators of the four biomass for power generation projects, including project scale and unit scale, fuel type, fuel combustion technology (CFB) and power generation equipments are comparable and almost the same.

As shown in the table B-5 of the PDD version 04, 31 Mar. 2010, IRR (3.21%) of the proposed project reflects the same financial unattractive as the three pilot projects, which was estimated at the time of investment decision in the Board Resolution. Thus the audit team considers it is plausible that the board of the project investor made the decision to develop the proposed project as a CDM project, by extrapolating conclusion from the FSRs of the three pilot projects to the proposed project and other subsequent projects.

On 1<sup>st</sup> Nov. 2007, the project owner signed CDM Consultation Agreement/46/ with Camco International Limited. The PDD was made publicly available in Jan. 2009. Therefore it is confirmed by the Audit Team that CDM was seriously considered in the decision to implement the project and the continuing and real actions were taken to secure CDM status for the project by the project participants.

<b>Starting date of project</b>	<b>Justification of and evidences (references) on the starting date of project</b>	<b>Date of CDM consideration</b>
<i>6th Nov. 2007</i>	<i>/25//26//39//45/</i>	<i>September 2007/44/, Board Resolution of CDM project development.</i>

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### 4.5.2 Alternatives

The project proponent applies ‘*Consolidated methodology electricity generation from biomass residues*’, Version 09’ to define all plausible baseline alternatives.

For Power generation, eleven alternatives are identified and the Audit Team have verified the elimination process as the following table.

Alternatives	Selection in the PDD	DOE’s opinion
<b>P1</b> The project not undertaken as a CDM project activity.	<b>Yes.</b> Despite the fact that this alternative is economically unattractive, as analysed in step3, this alternative is a plausible scenario for further analysis.	The alternative is realistic and credible.
<b>P2</b> The continuation of power generation in an existing biomass residue fired power plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as (co-)fired in the Project.	<b>No.</b> Since the proposed project is a greenfield project and there is no existing biomass residues fired power plant at the project site, therefore this alternative is excluded.	During the site visit, the Audit Team can confirm that there is no existing biomass residue fired power plant at the project site, and the proposed project is a Greenfield type. The alternative can be eliminated.
<b>P3</b> The generation of power in an existing captive power plant, using only fossil fuels.	<b>No.</b> Since there is no existing captive power plant, using fossil fuels near the project site, therefore this alternative is excluded.	During the site visit, the Audit Team can confirm that there is no existing captive fossil fuel fired power plant at the project site, and the proposed project is a Greenfield type. The alternative can be eliminated.
<b>P4</b> The generation of power in the grid	<b>Yes.</b> This alternative is a plausible scenario for further analysis.	The alternative is realistic and credible.
<b>P5</b> The installation of a new biomass residue fired power plant, fired with the same type and with the same annual amount of biomass residues as the Project, but with a lower efficiency of	<b>No.</b> Since biomass power plants including the lower efficiency ones are not common practice in the local area. There is no on-grid installed capacity from	Based on the results of the common practice analysis, the biomass residue fired power plant is not common in local industrial sector. The alternative can be eliminated.

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electricity generation (e.g. an efficiency that is common practice in the relevant Industrial sector) than the Project plant and therefore with a lower power output than in the Project case.	Biomass Power plant before 2007 in Jiangxi Province. Therefore, this alternative is excluded.	
<b>P6</b> The installation of a new biomass residue fired power plant that is fired with the same type but with a higher annual amount of biomass residues as the Project and that has a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant Industrial sector) than the Project. Therefore, the power output is the same as in the Project	<b>No.</b> Since biomass power plants are not common practice in the local area. There is no on-grid installed capacity from Biomass Power plant before 2007 in Jiangxi Province. Therefore, this alternative is excluded.	Based on the results of the common practice analysis, the biomass residue fired power plant is not common in local industrial sector. The alternative can be eliminated.
<b>P7</b> The retrofitting of an existing biomass residue fired power, fired with the same type and with the same annual amount of biomass residues as the Project, but with a lower efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant Industrial sector) than the Project plant and therefore with a lower power output than in the Project case.	<b>No.</b> Since the proposed project is a greenfield project and there is no existing biomass residues fired power plant at the project site, therefore this alternative is excluded.	During the site visit, the Audit Team can confirm that there is no existing biomass residue fired power plant at the project site, and the proposed project is a Greenfield type. The alternative can be eliminated.
<b>P8</b> The retrofitting of an existing biomass residue fired power that is fired with the same type but with a higher annual amount of biomass residues as the Project and that has a lower	<b>No.</b> Since the proposed project is a greenfield project and there is no existing biomass residues fired power plant at the project site, therefore this alternative is excluded.	During the site visit, the Audit Team can confirm that there is no existing biomass residue fired power plant at the project site, and the proposed project is a Greenfield type. The



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efficiency of electricity generation (e.g. an efficiency that is common practice in the relevant Industrial sector) than the Project.		alternative can be eliminated.
<b>P9</b> The installation of a new fossil fuel fired captive power plant at the project site	<b>Yes.</b> This alternative is a plausible scenario for further analysis.	The alternative is realistic and credible.
<b>P10</b> The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power plant, but that is fired with a different type and/or quantity of fuels (biomass residues and/or fossil fuels). The annual amount of biomass residue used in the baseline scenario is lower than that used in the project activity.	<p><b>No.</b> Firstly, since biomass cogeneration plants (including single-or co-fired cogeneration plants) are not common practice in the local area. There is no on-grid installed capacity from Biomass Cogeneration plant before 2007 in Jiangxi Province.</p> <p>Secondly, there are no other biomass resources identified in the biomass availability report and as such no other viable biomass fuel options available. It is financially unattractive to use some biomass types that are not identified in the biomass availability report.</p> <p>Thirdly, the <i>Renewable Energy Electricity Tariff and Cost Management Trial Regulations (fagaijiage [2006] 7)</i> issued by NDRC of China in 2006 stipulates that “ if the energy consumption from the fossil fuel of a co-fired( using a mix of biomass residues and fossil fuels) power plant exceeds 20% of the total energy consumption, the</p>	<p>Based on the results of the common practice analysis, the biomass cogeneration plant is not common in local industrial sector. The Validation Team can confirm the biomass availability report and the referred national regulation are authentic. Potential use of other types of biomass and or displacement of part of the biomass by co-firing fossil fuels are therefore deemed unlikely.</p> <p>The alternative can be thus eliminated.</p>



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	<p>project should be taken as a ordinary fossil fuel fired project”, which means the tariff of the project within the first 15 years since commissioning will be only the bus-bar tariff for Jiangxi Province (0.385RMB/KWh including VAT) without 0.25RMB/KWh as the subsidy. Thus, it is not financially feasible to build new co-fired biomass power project in the region at present.</p> <p>Therefore this alternative is excluded.</p>	
<p><b>P11</b> The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site.</p>	<p><b>No.</b> Since there is no existing fossil fuel fired cogeneration plant co-fired with biomass residues near the project site, therefore this alternative is excluded.</p>	<p>During the site visit, the Audit Team could confirm that there is no existing fossil fuel fired cogeneration plant co-fired with biomass residues at the project site, and the proposed project is a Greenfield type. The alternative can be eliminated.</p>

According to the reasonable analysis, only P1, P4 and P9 are remained. However, P9 cannot meet the requirement of the regulation *Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135MW or below /20/*. Finally, the realistic and credible alternatives of Power generation are P1 and P4. In Audit Team's opinion, the list of alternatives for power generation is complete.

For Heat generation, ten alternatives are identified and the Audit Team have verified the elimination process as the following table.

Alternatives	Selection in the PDD	DOE's opinion
<p><b>H1</b> The Project not undertaken as a CDM project activity.</p>	<p><b>Yes.</b> Despite the fact that this alternative is economically unattractive, as analyzed in Step3, this alternative is a plausible scenario for further analysis.</p>	<p>The alternative is realistic and credible.</p>
<p><b>H2</b> The proposed project</p>	<p><b>No.</b></p>	<p>Based on the results of the</p>

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activity(installation of a cogeneration power plant), fired with the same type of biomass residues but with a different efficiency of heat generation ( e.g. an efficiency that is common practice in the relevant industrial sector)	Since at present the technology of biomass cogeneration in China is just started and there is no on-grid installed capacity from Biomass Cogeneration power plant before 2007 in Jiangxi Province, thus it is not common practice in the local area no matter lower efficiency or higher efficiency, therefore this alternative is excluded.	common practice analysis, the biomass residue fired power plant is not common in local industrial sector. The alternative can be eliminated.
<b>H3</b> The generation of heat in an existing captive cogeneration plant, using only fossil fuels.	<b>No.</b> Since there is no fossil fuel fired cogeneration plant or any other cogeneration plant at or around the project site.	During the site visit, the Audit Team can confirm that there is no existing captive fossil fuel fired cogeneration plant at the project site, and the proposed project is a Greenfield type. The alternative can be eliminated.
<b>H4</b> The generation of heat in boilers using the same type of biomass residues.	<b>No.</b> Since there is no heat boiler using biomass residues in the local area, while using small coal-fired boiler is common practice to meet the process heat demand for the plants in the industry park, besides, it is not feasible for the individual enterprise to be equipped with expertise on the biomass collection or biomass-boiler operation.	It is common that coal-fired boilers are always preferable option in order to supply heat for industrial process in China. Furthermore, collection of biomass residues and operation of biomass residues fired boilers is too difficult for individual enterprise. The alternative can be eliminated.
<b>H5</b> The continuation of heat generation in an existing biomass residue fired cogeneration plant at the project site, in the same configuration, without retrofitting and fired with the same type of biomass residues as in the Project.	<b>No.</b> Since there is no biomass residue fired cogeneration plant at or around the project site. Therefore, therefore this alternative is excluded.	During the site visit, the Audit Team can confirm that there is no existing biomass residue fired cogeneration plant at the project site, and the proposed project is a Greenfield type. The alternative can be eliminated.

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<b>H6</b> The generation of heat in boilers using fossil fuels.	<b>Yes.</b> As discussed in section A4.3, existing heat demand is met by small fossil-fuel fired boilers <sup>2</sup> .  In the absence of the proposed project, the industrial process heat will continue to be met the individual small fossil fuel fired boilers.  Therefore, this alternative is a plausible scenario for further analysis.	Generation of heat in boilers using fossil fuel is widely used in China, which is confirmed by the Audit Team.  Therefore this alternative is realistic and credible.
<b>H7</b> The use of heat from external sources, such as district heat.	<b>No.</b> Since there is no district heat supply in the local area, heat sources from external sources such as district heating do not exist. Besides, there is no plan to build district heat system in Wanzai County	During the site visit, the Audit Team can confirm that there is no district heat supply in the local area. The alternative can be eliminated.
<b>H8</b> Other heat generation technologies (e.g. heat pumps or solar energy).	<b>No.</b> Since the heat consumers for the project are those enterprises located in the industrial park. They require a huge amount of qualified steam, therefore neither solar energy nor heat pumps are feasible heat supply alternatives that could meet the quality nor the quantity of the process heat needed in the industrial park.	It is common that coal-fired boilers are always preferable option in order to supply heat for industrial process in China. The heat pumps and solar energy can not provide similar services, high temperature steam and the relevant pressure. The alternative can be eliminated.
<b>H9</b> The installation of a new single- (using only biomass residues) or co-fired (using a mix of biomass residues and fossil fuels) cogeneration plant with the same rated power capacity as the project activity power	<b>No.</b> Firstly, since biomass cogeneration plants (including single-or co-fired cogeneration plants) are not common practice in the local area. There is no on-grid installed capacity from Biomass Cogeneration plant before	Based on the results of the common practice analysis, the biomass cogeneration plant is not common in local industrial sector. The Validation Team can confirm the biomass availability report and the referred national regulation

<sup>2</sup> “Introduction on the boilers in Wanzai Industrial Park”, official letter of Administration Bureau of Wanzai Industrial Park

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<p>plant, but that is fired with a different type and/or quantity of fuels (biomass residues and/or fossil fuels). The annual amount of biomass residue used in the baseline scenario is lower than that used in the project activity.</p>	<p>2007 in Jiangxi Province.</p> <p>Secondly, there are no other biomass resources identified in the biomass availability report and as such no other viable biomass fuel options available. It is financially unattractive to use some biomass types that are not identified in the biomass availability report.</p> <p>Thirdly, the <i>Renewable Energy Electricity Tariff and Cost Management Trial Regulations (fagaijiage [2006] 7)</i> issued by NDRC of China in 2006 stipulates that “ if the energy consumption from the fossil fuel of a co-fired( using a mix of biomass residues and fossil fuels) power plant exceeds 20% of the total energy consumption, the project should be taken as a ordinary fossil fuel fired project”, which means the tariff of the project within the first 15 years since commissioning will be only the bus-bar tariff for Jiangxi Province(0.385RMB/KWh including VAT)without 0.25RMB/KWh as the subsidy. Thus, it is not financially feasible to build new co-fired biomass power project in the region at present.</p> <p>Therefore this alternative is excluded.</p>	<p>are authentic. Potential use of other types of biomass and or displacement of part of the biomass by co-firing fossil fuels are therefore deemed unlikely. The alternative can be thus eliminated.</p>
<p><b>H10</b> The generation of power in an existing fossil fuel fired cogeneration plant co-fired with biomass residues, at the project site.</p>	<p><b>No.</b></p> <p>Since there is no existing fossil fuel fired cogeneration plant co-fired with biomass residues near the project site, therefore this alternative is excluded.</p>	<p>During the site visit, the Audit Team could confirm that there is no existing fossil fuel fired cogeneration plant co-fired with biomass residues at the project site, and the</p>

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		proposed project is a Greenfield type. The alternative can be eliminated.
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According to the reasonable analysis, the realistic and credible alternatives of Heat generation are H1 and H6. In Audit Team's opinion, the list of alternatives for heat generation is complete.

For the use of Biomass residues, eight alternatives are identified for rice husk and straws respectively and the Audit Team have verified the elimination process as the following table.

Alternatives	Selection for Rice husk	Selection for Straws ( <i>Including Rice straw, Oil seed rape straw</i> )	DOE's opinion
<b>B1</b> The biomass residues are dumped or left to decay under mainly aerobic conditions. This applies, for example, to dumping and decay of biomass residues on fields.	<b>Yes.</b> The availability of the rice husk which has been investigated by the FSR institute with support from the local authorities shows that 36,300 tons of the rice husk are used for other purposes which only takes up 20% of the total available rice husk generated in the region (181,400 tons), with the rest (80%) left to decay under mainly aerobic conditions or burnt in an uncontrolled manner without utilizing it.	<b>Yes.</b> The availability of the straws which has been investigated by the FSR institute with support from the local authorities shows that 16,000 tons of the straws were used for other purposes which only takes up 5.5% of the total available straws generated in the region (290,800 tons), with the rest (94.5%) left to decay under mainly aerobic conditions or burnt in an uncontrolled manner without utilizing it.  The local farmers have to get rid of a huge amount of	The Audit Team has checked the scenario by references to official documents of local agriculture bureau on biomass residues' supplying capacity attached in the biomass residue availability report/19/ and Introduction of Local Biomass Uncontrolled Burning/36/ by the Environmental Protection Bureau of Wanzai County, and by site visit inspection and interview with both local government and farmers. It can be confirmed that the biomass residues are dumped or left to decay under mainly aerobic conditions, or burnt in an uncontrolled manner without utilizing it for energy purposes.  Therefore this alternative

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	<p>The rice mills have limited room for the rice husk and they have to burn it or dump it to leave room for the rice.</p> <p>Therefore, this alternative is a plausible scenario for further analysis.</p>	<p>straws in order to keep the land free for the next season's planting, so they burn the straw in the field.</p> <p>Therefore, this alternative is a plausible scenario for further analysis.</p>	<p>is realistic and credible.</p>
<p><b>B2</b> The biomass residues are dumped or left to decay under clearly anaerobic conditions. This applies, for example, to deep landfills with more than 5 meters. This does not apply to biomass residues that are stock-piled or left to decay on fields.</p>	<p><b>No.</b> It is common that the biomass residues are dumped or left to decay under mainly aerobic conditions and burned in an uncontrolled way outside in the fields. In China, landfill plant only collects and processes the residential waste which does not cover the waste from agricultural and industrial sector, like the rice husk.</p>	<p><b>No.</b> It is common that the biomass residues are dumped or left to decay under mainly aerobic conditions and burned in an uncontrolled way outside in the fields. In China, landfill plant only collects and processes the residential waste which does not cover the waste from agricultural and industrial sector, like the straws.</p>	<p>The Biomass residues are produced in the rural area where there are no landfill services. The alternative can be eliminated.</p>
<p><b>B3</b> The biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes.</p>	<p><b>Yes.</b> As for Alternative B1. This alternative is a plausible scenario for further analysis.</p>	<p><b>Yes.</b> As for Alternative B1. This alternative is a plausible scenario for further analysis.</p>	<p>Please refer to the opinions for alternative B1.</p> <p>The alternative is realistic and credible.</p>
<p><b>B4</b> The biomass residues are used for</p>	<p><b>Yes.</b></p>	<p><b>Yes.</b></p>	<p>The alternative is that of the proposed project,</p>

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heat and/or electricity generation at the Project site	This alternative is a plausible scenario for further analysis.	This alternative is a plausible scenario for further analysis.	which is realistic and credible.
<b>B5</b> The biomass residues are used for power generation, including cogeneration, in other existing or new grid-connected power plants	<b>No.</b> Using biomass to generate electricity or heat is not common practice in this region: near the project site, there are no existing power plants (including) cogeneration projects or boilers which are using rice husks to generate energy. Besides, confirmed by Wanzai County Investment Promotion Bureau, there will be no other biomass power plant except the proposed project and there will be no other biomass energy projects in Wanzai County.	<b>No.</b> Using biomass to generate electricity or heat is not common practice in this region: near the project site, there are no existing power plants (including) cogeneration projects or boilers which are using straws to generate energy. Besides, confirmed by Wanzai County Investment Promotion Bureau, there will be no other biomass power plant except the proposed project and there will be no other biomass energy projects in Wanzai County.	During the site visit, the Audit Team can confirm that there is no existing biomass residue fired power plants or cogeneration plants at the project site. Furthermore, the Audit Team have verified the Confirmation Letter Regarding No Other Biomass Project Existing in Wanzai County /30/, issued by Merchants Bureau of Wanzai County on 25 <sup>th</sup> Jun. 2009, and can confirm there are no plans about new biomass residues fired power plant other than the proposed project activity in Wanzai County.  The alternative can be eliminated.
<b>B6</b> The biomass residues are used for heat generation in other existing or new boilers at other sites.	<b>No.</b> As for Alternative B5.	<b>No.</b> As for Alternative B5.	During the site visit, the Audit Team can confirm that there is no existing biomass residue fired boilers for heat generation at the project site. Furthermore, the Audit Team have verified the Confirmation Letter Regarding No Other Biomass Project Existing in Wanzai County /30/,



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			<p>issued by Merchant Bureau of Wanzai County on 25<sup>th</sup> Jun. 2009, and can confirm there are no plans about new biomass residues fired heat generation plant other than the proposed project in Wanzai County.</p> <p>The alternative can be eliminated.</p>
<p><b>B7</b> The biomass residues are used for other energy purposes, such as the generation of biofuels</p>	<p><b>No.</b> There are no projects using biomass residues like rice husk for other energy purposes at the project site now or in Wanzai County's development plan. Besides, due to the high cost in the biofuels projects, the biofuel industry in China just started development and the biomass used for the biofuels are crops or non-crops plants mainly including the broomcorn, cassavas, sweet potato, Coptis chinensis, hairy chestnut, tung tree, palm oil or waste cooking oil and/or waste fat from biogenic origin. The biomass residues used in the</p>	<p><b>No.</b> There are no projects using biomass residues like straws for other energy purposes at the project site now or in Wanzai County's development plan. Besides, due to the high cost in the biofuels projects, the biofuel industry in China just started development and the biomass used for the biofuels are crops or non-crops plants mainly including the broomcorn, cassavas, sweet potato, Coptis chinensis, hairy chestnut, tung tree, palm oil or waste cooking oil and/or waste fat from biogenic origin. The biomass residues used in the proposed project are not common raw material to produce</p>	<p>The official letter from the Merchant Bureau of Wanzai County/30/ was provided by the project proponent and assessed by the Audit Team. It is confirmed by the local government that except the Project, there is no other projects are planned to apply the local biomass resource.</p> <p>The alternative can be eliminated.</p>



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	proposed project are not common raw material to produce biofuel.	biofuel.	
<b>B8</b> The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper Industrial)	<b>No.</b> Around 36,300 tons of rice husk within the collection radius are used as feedstuff, which only accounts for 20% of the total rice husk availability and according to the leakage analysis in Section B.6.1, the rice husk is quite abundant surplus, the project will not change the use of rice husk as feedstuff.	<b>No.</b> Around 16,000 tons of the straws within the collection radius are used as household fuel, feedstuff and fertilizer which only accounts for 6% of the total straws availability and according to the leakage analysis in Section B.6.1, the straws are quite abundant surplus, the project will not change the use of straws as their non-energy uses as household fuel, feedstuff and fertilizer.	The relevant data are sourced from Biomass Availability Letter /19/, which has been verified by the Audit Team. The alternative can be eliminated.

According to the reasonable analysis, only B1, B3 and B4 are remained not only for rice husk but also for straws. In Audit Team's opinion, the list of alternatives for the use of biomass residues is complete.

The result is identified as the two combined scenarios. One is the project not undertaken as a CDM project activity, i.e. combination of P1 and H1 and B4.

The other is the combination of P4, H6 and B1/B3, i.e. the Scenario 2, exporting electricity from the grid; generating heat from fossil fuel fired boilers; and dumping biomass residues to naturally decay or burnt in an uncontrolled manner without utilizing it for energy purposes.

### 4.5.3 Investment analysis

Investment analysis is applied in the PDD to demonstrate that the Project is not the most economically or financially attractive or economically feasible one. And the project will benefit from selling electricity to the grid and heat to its neighbor so a benchmark analysis is applied in the PDD.

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For the Project, a Project IRR of 8% has been selected as the benchmark rate according to the ‘*Interim Rules on Economic Assessment of Electric Engineering Retrofit Projects*’ /31/, which has been verified by the Audit Team. The Audit Team confirmed in Section 2, Appendix B of this Rule that a Project IRR of 8% (after tax) is applied by power industry or power transmission & dispatching industry, and the Audit Team also confirmed in Page 13 of this Rule that the Rule is applied by cogeneration projects as well. In the financial analysis of the FSR/15/, Project IRR of 8% is also applied as the benchmark. By cross-checking the biomass to power projects registered in UNFCCC up to date of Nov. 2009, 8% benchmark were widely used and applicable to investment analysis for all fifteen China projects, as well as four cogeneration projects (No. 0778, 0811, 0825 and 1293). Therefore the Audit Team can confirm the benchmark is selected suitable for the financial analysis.

According to the financial analysis, the IRR (after tax) of total investment of the Project is only 3.21% without the CERs revenues, which shows the Project can not be considered financially attractive. However, if the Project could be registered as a CDM project, the IRR may reach 11.38%.

Moreover, a sensitivity analysis, covering a fluctuation range of 10%, is discussed with regards to Static total investment, Equivalent operation hour at full load, Electricity Tariff, Heat Price, Biomass Cost and Total O&M Cost. The sensitivity analysis shows that without the income from CERs sales the IRR of the Project is still lower than the benchmark.

As per the discussion in Section 4.5.1 of this report, the investment decision of the proposed project was made in Sep. 2007, based on the financial analysis of three pilot projects. The FSR of the proposed project was finalized in Mar. 2008. Values from the FSR of the proposed project were selected as input to the investment analysis in the PDD. To the audit team’s opinion, whereas the three pilot projects are highly comparable to the proposed project in technology, equipments and financial indicators, the input values in FSRs of the proposed project reflect more accurately the Project’s characteristics and actual situation. Thus the audit team considered that use of the input values from the FSRs of the proposed project in investment analysis is reasonable.

The Audit Team has assessed the IRR calculation sheet/21/. The Audit Team compared the input value in the IRR calculation sheet and confirmed that all values are quoted from the FSR/15/. The FSR was developed by Wuhan Kaidi Electric Power Engineering Co., Ltd., which is certified to compile design reports for power projects with the highest grade A issued by Ministry of Construction P.R.China. The FSR was approved/16/ by local authority on 13<sup>th</sup> Jun. 2008. The main input data in the IRR are cross checked and validated by the Audit Team as below.

### **Interest taken into account in the calculation of income tax**

In the original version of the IRR calculation that was submitted for registration, the interest was not taken into account as cost in the calculation of income tax. This is in accordance with the FSR and the FSR follows the guidance in Methods and Parameters Guidance for

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construction projects<sup>3</sup>. However the latest version of “*Guidelines on the Assessment of Investment Analysis*”, which was released in EB51 in December 2009, and was not available at the time of submission of this project activity, indicates that the income tax after interest should be used for project IRR calculation.

A CAR (CAR12, please refer to Appendix A, Table 3) was raised that the PP is requested to re-calculated the IRR to comply with this new guidance. The PP has updated the IRR calculation spreadsheet, which is in accordance with the requirement of this guidance. Thus the CAR was closed, and income tax is now calculated after interest payments in accordance with the actual project situation.

The updated project IRR is 3.21%, which is still below the benchmark and continues to be below the benchmark when a sensitivity analysis is undertaken at +/- 10% for the Static total investment, Equivalent Operational Hour at full load, Tariff, Heat Price, Biomass Cost and Total O&M Cost.

The audit team has checked the updated IRR spreadsheet and can confirm that actual interest payable has been taken into account in the calculation of income tax and the investment analysis. Therefore the revised IRR calculation fully complies with EB51 Annex 58 – Guidance on the assessment of investment analysis (Version 03) and the calculations are confirmed to be correct.

Furthermore, to be in accordance with paragraph 11 of the “Guidance on the assessment of investment analysis” (Version 03) and EB requirements, the Audit Team cross-checked the debt-equity ratio and the interest rate with public sources and Annual Reports of 2006, 2005, 2004 for Wuhan Kaidi Electric Power Co., Ltd/61/. Authenticity of these reports were confirmed by the Audit Team.

From the reports, following data from years 2004 to 2006 were observed:

1. The interest rates on long term loans were between 5.76% and 6.30%;
2. The debt-equity ratio is between 34% and 42%;

Interest rates used in the investment analysis are 8.06% for long term loans and 7.47% for working capitals, which are both from and consistent with approved FSR. These loan interest rates are crossed-checked against rates published by the People’s Bank of China<sup>4</sup> by the Audit Team. The Audit Team can confirm that actual interest rates in years 2004 to 2006 and the rates estimated in FSR in Mar. 2008 (which is close to the date of investment decision) are corresponding to synchronized interest rates published (for year 2007, i.e., nominal interest rate from 7.11% to 7.83%). Thus the interest rate used in the investment analysis can be confirmed reasonable.

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<sup>3</sup> Methods and Parameters for the Economic Appraisal of Construction Projects Version 3, National Development and Reform, Commission, published by China Planning Publisher, 2006

<sup>4</sup> <http://www.pbc.gov.cn/detail.asp?col=460&ID=2483>.

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In IRR calculation process, considering fixed equity-debt rate and payback period, a lower interest rate results in a higher profits and consequently higher income taxes. Given that the income taxes but not interest payments are considered as cost in the calculation of the project IRR, higher income taxes result in lower project IRR. As a conclusion, a lower interest rate results in a lower project IRR. That means the project IRR calculated with the higher interest rate of 8.06% is higher than that calculated with long-term interest rates (>5 years) available in the 3 years prior (2004-2006). Therefore, a higher interest rate used in the investment analysis can be confirmed by the Audit Team reasonable and conservative.

79% of total investment comes from debt estimated in FSR, which is higher than actual loan rate of 34% - 42% from 2004 to 2006. Based on fixed interest rate and pay-back period, a deduction of project IRR was made that a lower proportion of debt will result in less interest payments, which consequently result in more profit and more tax payments. This again would lead to a lower project IRR. A higher debt ratio of 79% is therefore conservative. Therefore, a higher loan rate used in the investment analysis can be confirmed by the Audit Team more conservative.

In conclusion the actual interest payable has now been taken into account in the calculation of income tax in the IRR calculation and the interest rate and the debt ratio in the IRR calculation which are from FSR are considered conservative.

Due to reasons mentioned above, the IRR of the project is corrected as 3.21%, which can be confirmed by the Audit Team credible.

### **Project Output**

The project installation is 24 MW. The Audit Team can confirm that by reviewing the project's FSR and the approval/16/.

#### **i) Auxiliary Consumption Rate**

The Net Power Generation Output is 126,720 MWh, excluding 12% of auxiliary consumption, and this is expected based on the 6,000 operation hour of the Project/40/. By comparing the auxiliary consumption of 15 already registered biomass projects by Nov. 2009 from '<http://UNFCCC.int/58/>', the Audit Team found out the auxiliary consumption is between 8% to 21%, with an average of 12.9%. The proposed project's auxiliary consumption rate is 12%, sourced from the approved Feasibility Study Report.

The audit team confirms that Circulating Fluidised Bed boilers, due to the operation of the blowers, generally have a higher self-consumption rate than, for example, grate fired boilers. Additionally, according to an investigation report from Kushan Municipal Development and

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Reform Commission<sup>5</sup>, the auxiliary consumption rate of the operational biomass power generation projects in China is 12%. The report states that, for biomass power plants “the auxiliary consumption rate is 12%, much higher than the self consumption rate of the fossil fuel power units, which is at a level of 6%”.

Based on the above, the Audit Team was able to confirm, by cross check with registered CDM projects and by the public reference from independent party reference, that a 12% auxiliary consumption rate is appropriate for the project activity.

### ii) Operation Hours

The operation hour is based on the *Introduction Letter Regarding the Operation Hour*, issued by Wuhan Kaidi Electric Power Engineering Co., Ltd./37/, and the *equipment availability rate*, *generation load rate* and *Backup ration for load or accident*. The scheduled equipment maintenance days are 54 days and a corresponding *equipment availability rate* is 0.852. The average load factor is 0.9 depending on the type of biomass and the *Backup ration for load or accident* is expected to be 0.1. The result of the annual operation hours is 6045 hours. Thus the project annual operation hour is expected to be 6000. To the Audit Team’s opinion, this value is approached in a scientific way.

There are 15 biomass power plants by Nov. 2009, which were registered as CDM projects and applying the methodology ACM0006 in China, for which the operational hours range within 5500hrs and 6,500hrs per year (i.e., five projects with 5500hrs, four projects with 6000hrs and three with 6,500hrs). The project under validation ranges well within this field and is not unusual as compared to the other projects. For details, please see the reference /58/.

Only the project #2230 assumes a significantly higher amount of operating hours. Whereas the reason for this exceptionally high availability is not traceable without detail knowledge of that project, it should be noted that both projects cannot be directly compared due to the different technology (fluidized bed vs. grate) applied and fuels used (rice husk in the project activity).

The audit team was able to verify that the operational hour was unlikely to increase by 21 % ( 7,285 hours) to reach the benchmark. Since the proposed project has not completely operational yet and there are no similar projects operational within the investor’s companies when the project was designed, the audit team has checked the operating hours of the biomass project against the actual operation status in China. It was confirmed by the audit team through 13 monitoring reports of the registered CDM projects (CDM project reference no.0778, 0811, 0819, 0825, 1032, 1263, 1293, 1375 and 1546) that the average annual operating hour (auxiliary consumption deducted) was 3,863 hours, which is much lower than that (5280 hours deducting the auxiliary consumption) of the project activity. Considering the PP may have less operational experience and face technical problems at starting period of the

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<sup>5</sup> Energetically facilitate the development of biomass power generation industry to actively explore new ways of ecological civilization-building, Kushan Municipal Development and Reform Commission.  
<http://www.dpc.ks.gov.cn/xxnr.jsp?ID=884>

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project, which is considered a common sense, the audit team checked four periodic monitoring report of three projects (CDM project reference No. 0778, 0811 and 0819) the average annual operation hour is 4,266 hours, which are still much lower than that (5280hours with auxiliary consumption deducted) of the project activity.

As a result, the operation hour of the project activity was confirmed by the Audit Team conservative and not been underestimated. Therefore the suitability of this parameter was confirmed by the Audit Team.

The audit team can also confirm that the emission reduction from electricity is calculated correctly according to the methodology as follows:

$$ER_{electricity,y} = EG_y \cdot EF_{electricity,y}$$

Where,  $EG_y$  is Net quantity of increased electricity generation as a result of the Project.

$EG_y$  = Net Power Generation

= Installed Capacity x Equivalent Operational Hours at full load x (1-auxiliary consumption rate)

= 24MW x 6000h x (1-12%)

= 126,720MWh

### Output in different operational conditions

Given that different operational condition may lead to a difference in power output and heat output, it is compared in PDD that project IRR under these two different operation conditions.

a) Maximum condensing condition; and

b) Maximum extraction condition based on the technical specification of the steam turbines

The result of this comparison is shown in the table below, calculation of which was verified by the Audit Team.

Operational Conditions	Power Capacity (MW)	Steam Extracted (t/h)	IRR (%)
Rated	2 x 12	2 x 15	3.21
Maximum Condensing	2 x 15	0	1.98
Maximum Extraction	2 x 6.59	2 x 45	6.51

It can be confirmed that even in extreme conditions the project IRRs will remain below the benchmark (8%) and thus the project is considered still not financially attractive.

### Project Investment



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The project static total investment is 226,410,000 RMB. The value is consistent with that of the FSR. The Audit Team referred to the project's approval/16/, on which the project total investment is 233,130,000 RMB, which incorporates the static total investment of 226,410,000 RMB and the interest of raised from the construction period based on the financial analysis of the FSR. Financial analysis in the FSR was evaluated by sector experts designed by the local government before the project got approval.

The Audit Team cross-checked 15 relevant biomass for power generation projects registered on the UNFCCC web site before November 2009/58/. The result shows an average ratio of total investment/annual power supply of the 15 registered projects shows an average of 1.95RMB/kWh, and that the range the factor was between 1.50 RMB/kWh and 2.31RMB/kWh. The ratio total investment/annual power supply of the project is 1.84RMB/kWh, which is below the average level. To the Audit Team's opinion; the project total investment is considered reasonable.

The Audit Team checked the accounting report for the construction of the proposed project activity. This report was issued by a third-party accounting firm/70/ and released by two Certified Public Accountants. The authenticity of the report can be confirmed by the audit team. In the report, it is clearly audited that the actual static investment for the proposed project has been 229,410,000RMB till Sep. 2010, which is larger than that estimated in the FSR (226,410,000 RMB).

The audit team was also able to verify that the static total investment is unlikely to drop by 28% to reach the benchmark.

The audit team can also verify that the capital cost for the heat pipeline and distribution network to the consumers has not been included in the capital cost for this project. This has been checked by the audit team in the detailed breakdown of investment cost in the Feasibility Study Report and associated spreadsheets<sup>6</sup>. From this breakdown it can be concluded that the heat pipeline capital cost was not considered in the investment decision.

### Electricity Tariff

The tariff rate of 0.635 RMB/kWh (including VAT) in the investment analysis is from the approved FSR, which is equivalent to 0.542 RMB/kWh excluding VAT. The tariff of 0.635 RMB/kWh (including VAT) is derived from the tariff from fossil fuel plants in 2006 plus the biomass subsidy of 0.250 RMB/kWh. As no other regulations were observed by the audit team for the tariff determination, this tariff was still valid at the time of decision making (Nov. 2007). The investment decision was made on the basis of the tariff rate in the FSR hence it is appropriate to apply this tariff rate in the investment analysis.

Additionally, the audit team has further performed validation on the suitability of the tariff rate as below:

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<sup>6</sup> Pages 11 – 25, Feasibility Study Report for Wanzai Kaidi Biomass Power Project, Volume 3, Mar. 2008

## VALIDATION REPORT

### (i) Cross-check the tariff rate against the government regulation regarding tariff rate for biomass power plants

The tariff for biomass power plants in China are set according to the *Renewable Energy Electricity Tariff and Cost Management Trial Regulations (fagaijiage [2006] 7) /47/* issued by the National Development and Reform Commission of China in 2006. This document states that the tariff within the first 15 years since commissioning is calculated by 0.25RMB/KWh plus the on-grid tariff for coal-fired power plants with de-sulphurisation units installed in year 2005. Furthermore, this document also states that the actual tariff of the biomass project should be priced and approved by the provincial government in accordance with the national regulation. After 15 years' operation, this tariff subsidy is cancelled.

In 2005, the tariff rate for fossil fuel fired power plants in Jiangxi Province was 0.372<sup>7</sup> RMB/kWh. According to the *Renewable Energy Electricity Tariff and Cost Management Trial Regulations*, the tariff for biomass should be 0.622 RMB/kWh including VAT (0.372 RMB/kWh +0.25 RMB/kWh). This tariff rate is applicable for every year of the first 15 years. After this, the subsidy is cancelled and the project will revert to a standard tariff for fossil fuel power plants..

In 2006, the tariff rate for fossil fuel fired power plants in Jiangxi Province was 0.385 RMB/kWh. The FSR applied the tariff rate for fossil fuel plants in 2006 plus the subsidy of 0.25 RMB/kWh. This is equal to 0.635 RMB/KWh. This reflects the trend of tariff rate at the decision making time. In the audit team's opinion, applying the higher tariff rate of 2006 in the investment analysis is conservative and hence it is appropriate.

### (ii) Cross check with approved tariff rate of the project activity

As mentioned in the regulation on tariff rate for biomass power plants, the tariff rate was approved by the Development and Reform Commission of Jiangxi province. The audit team confirms that the tariff approved by the Development and Reform Commission of Jiangxi Province for the project is 0.622 RMB/KWh (0.372 RMB/KWh +0.250 RMB/KWh)/64/. This is the actual tariff obtained by the project and is consistent with the regulation. As the tariff for the project has been approved, it is unlikely of tariff to increase 17% to reach the benchmark.

Thus the Audit Team can confirm the tariff used in the proposed project is reasonable and conservative.

### Heat generation

The audit team checked the heat generation designed in the FSR. The designed working temperature and pressure of the steam are separately 0.981MPa and 280.5°C. The audit team checked relevant workbooks and can confirm the designed enthalpy for the steam, 3008.9kJ/kg, is reasonable. For the proposed project in rated condition, that the heat extraction is 15t/h for each unit, the annual heat generation by the project was calculated as:  $3008.9\text{kJ/kg} * 15\text{t}/(\text{h} * \text{unit}) * 2 \text{ units} * 6000\text{h} = 541,602 \text{ GJ}$

<sup>7</sup> <http://cdb.secr.gov.cn/UploadImages/20081142072290.doc>



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The operation hour for the project has been justified as above. Thus the audit team can confirm the heat generation for the project was calculated in a scientific way, and is deemed appropriate.

### **Heat Price**

The heat price is 29.85 RMB/GJ (excluding VAT), sourced from the approved Feasibility Study Report.

As mentioned above, the power plant is still not fully commissioned. It would therefore be inappropriate to start to deliver heat until the power generation is stable. Furthermore, the heat pipeline has not yet been built and this is confirmed by interview with the project owner in March 2010 by the audit team. Thus there are no actual invoices for the audit team to cross check the heat price. However, the audit team has validated the heat price by cross-checking with similar projects and official documents.

#### **i) Cross Check with Similar Projects**

The audit team has cross checked the heat price applied in the investment analysis with the heat price applied in similar projects. There were three registered biomass cogeneration CDM projects in China that apply investment analysis at the time of submission of the final validation report and PDD to request registration. These projects (#811, # 825 and #1293) assume heat prices excluding VAT of 30 RMB/GJ, 17 RMB/GJ and 25 RMB/GJ. These are comparable to the heat price applied in this project activity and indeed the project activity can be compared to the highest tariff applied in any registered project activity.

#### **ii) Cross Check with Official Document from the Administrative Commission of the Wanzai Industrial Zone:**

The audit team assessed the heat price by cross-checking the heat price with a official document which was submitted by the PP in the end of February 2010, issued by the Administrative Commission of the Wanzai Industrial Zone /56/. The document clearly states that the heat selling price for the Wanzai Kaidi Biomass Power Project should not be higher than 30RMB/GJ (excluding VAT) in consideration of the consumer's procurement cost of heat.

This price is the price at the generation site and does not include the pipeline cost and the transmission losses. The heat pipeline capital cost is born by the local government.

Therefore the audit team can confirm that the heat price 29.85 RMB/GJ (excluding VAT) is appropriate and following a crosscheck with other registered projects and government document, it is also deemed to be conservative.

#### **iii) Cross checked with levelised cost analysis**

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A levelised cost analysis of heat supply from small coal-fired boiler was performed by the project participant/59/. The purpose of the levelised cost analysis undertaken by the PP was to provide additional substantiation as to the heat price applied in the investment analysis.

The levelised cost analysis for the independent small coal fired boiler heat generation illustrates whether or not it is feasible to purchase heat from the proposed project from the heat users' point of view. If the purchase price of heat is higher than the levelised cost of generation heat, the existing heat users will continue to run their own small coal-fired boilers to meet their heat demand. At the same time, it also reflects whether or not the project owner will be able to sell the heat at that price.

The spreadsheet for the levelised cost calculation was provided. The levelised cost was calculated based on 6 t/h coal-fired boilers as these are common practice boilers for heat generation in China/60/. The audit team has conducted an assessment of the data sources of the input values. In the audit team's opinion, the data source of input parameters is from independent parties hence is reliable and credible.

The audit team has rechecked all calculated assumptions and has found one error in the calculation spreadsheet. Thus A CAR (CAR13, please refer to Appendix A, Table 3) was raised. This error relates to the total O&M cost, which in the PDD omitted the Ash and sediments treatment fees. The O&M cost in the PDD was 350,625 RMB and this has been corrected to 422,625 RMB. The error has now been corrected in the spreadsheet and the CAR is therefore closed. This has minimal impact on the levelised cost, but for clarity the cost rises from 31 RMB / GJ to 31.5 RMB/GJ.

The audit team also recalculated the levelised cost by using the provided input data, and came to the same outcome. Therefore, the audit team can conclude that the calculation of levelised cost is correct.

What is more, the IRR would only pass the benchmark when the heat tariff increases by more than 44% to 43RMB/GJ, which shows that heat price is not a sensitive indicator.

### **iv) Heat pipeline investment**

The official documents issued by the Administrative Commission of the Wanzai Industrial Zone in Feb 2010/52//56/ point out that in order to build a green, environmental friendly, attractive industrial park, the Administrative Commission of the Wanzai Industrial Zone is willing to build a district heating system through the proposed project to meet the heat demand of consumers in the Wanzai Industrial Zone. The official papers also state that to provide better infrastructure for the development area, the local government will bear the capital cost on the heat pipeline for transporting steam to the independent heat users within the development area.

### **Biomass consumption**

The biomass consumption used by the proposed project is assumed to be 97,800t straws and 87,900t rice husks annually. The value is consistent with that of FSR. The audit team checked

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the approval of the project/16/, and can confirm the biomass consumption in the FSR is consistent with the approval. Generally, project design in the FSR was evaluated by sector experts designed by the local government before the project got approval. Thus, to the Audit Team's opinion; the project biomass consumption is reasonable.

### Biomass Cost

The biomass cost is assumed to be 260 RMB/t in FSR, and based on the clarification /62/ by Wuhan Kaidi Electric Power Engineering Co., Ltd This value is a reflection of the fact that in order to get the biomass from the fields to the power plant including collection cost, agent cost for collection, transportation, handling and storage.

#### i) Confirmation of the biomass procurement model

Project business model for biomass procurement is clearly indicated in the PDD, which is sourced from approved FSR/15/ and Biomass Availability Report/19/. The Audit Team has checked the biomass residue collection part of these two reports, and can confirm the business model is consistent with that described in the FSR and Biomass Availability Report. The Audit Team also checked the document "*The operating model, existing problems and development strategies for China's straw storage and transportation system, Renewable Energy Resources, Vol.27 No.1, Feb. 2009*" /63/, and can confirm the business model for biomass procurement used in the design of the project activity is a common practice in China. Cost due to collection cost from farmers, transportation & storage, labor, overhead, margin for the agent and rough process, which is derived from the biomass procurement model, is considered by the Audit Team reasonable.

The Audit Team can also confirm that only once biomass residues are used as a fuel, market will be created for the waste residues and opportunity for agent. In case of baseline scenario, biomass residues remain wasted in the absence of the project activity, since no market will be established if biomass residues has no other purpose of use (which has been demonstrated in PDD and confirmed by the Audit Team in 4.5.2 of this report). The biomass purchase cost results from the project activity and reflects the cost to the project activity to purchased biomass for the power plant. Hence, the Audit Team can confirm it is reasonable to include a purchase price for the biomass residues in the financial analysis but the price is not applicable to the baseline scenario due to the large amount of surplus biomass residues will remain left to decay in the baseline scenario.

#### ii) Check of the biomass cost

Biomass cost was determined based on the project business model, and the breakdown of biomass cost for the project is clearly described in the document "Introduction Letter Regarding the Biomass Cost Defined in the 'FSR for Wanzai Biomass Project'" issued by the FSR design institute/62/, which is shown below:

- i. **Cost from farmers/field to the collection site: 115RMB/ton**, including the collection cost at the field (labor cost) and transportation cost from field to the collection sites and storage.

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- ii. *Cost incurred at the collection site: 70RMB/ton*, including the land utilization cost, pre treatment cost, labor cost, biomass residues loss, agent margin/agent cost.
- iii. *Cost from the collection site to the power plant for power generation: 75RMB/ton*, including the transportation cost, the labor cost (loading and unloading), and the biomass loss.

The total biomass cost is 260 RMB/tonne, which is consistent with that estimated in approved FSR.

The Audit Team validated the document, and confirm the authenticity of the document. The breakdown of the biomass cost is logically consistent with the business model described above.

The Audit Team also cross-checked the biomass cost breakdown by above mentioned published research report /63/, which shows a typical biomass cost under this biomass procurement model:

- i. *Cost from the farmer to the collection site: 150RMB/ton*
- ii. *Cost incurred at the collection site: 105RMB/ton*
- iii. *Cost from the collection site to the power generation: 35RMB/ton*

The total costs from this third party report are 290 RMB/tonne compared to 260 RMB/tonne used in the investment analysis for the project activity. Therefore, the Audit team considers the biomass cost applied in the investment analysis of the project is plausible and conservative.

### iv) Cross Check of Biomass Costs with Invoices for the Project

The audit team has also cross-checked the total biomass cost using purchase records as well as the settlement log book. The audit team can thus confirm that the cost of rice husks and straws were from 270RMB/t to 300RMB/t (delivered price to plant) in December 2009 and January 2010/55/. Thus, the Audit Team considers the biomass cost assumed in the IRR calculation and PDD is consistent with actual purchasing costs. Based on the above discussion, the biomass cost is unlikely to decrease 16% to reach the benchmark

### O&M Cost

The annual O&M cost is sourced from and consistent with the FSR/15/ of the proposed project, which is confirmed by the Audit Team.

The audit team has cross-checked breakdown of key components of the annual O&M cost as the table below:

Components	Percentage of the O&M cost	Opinions of the audit team
Fuel Expenditure (Biomass cost)	77.4%	Please see above the descriptions on the biomass cost.
Employee expenditure	8.9%	The Introduction Letter Regarding the Salary and Welfare Defined in the 'FSR for Wanzai Kaidi Biomass Power Project' has been

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		cross-checked by the audit team/67/. It is clearly indicated in the letter that the actual employee expenditure in 2009 has exceeded that estimated in the FSR.
Repairs and maintenance	9.3%	The audit team cross-checked the 'Medium and Small Scale Cogeneration Construction Design Handbook'/68/. The handbook is applicable to the cogeneration projects with a installed capacity below 50MW of a single unit. It is clearly indicated on page 1241 of the handbook that repairs and maintenance cost for the cogeneration projects installed with domestic equipments are 2.5% of the Fixed Assets Investment, which is as same as that used in the investment analysis of the Project.
Other O&M expenditure	2.9%	The audit team cross-checked the 'Fossil Fuel Power Plant Cost Indicator Guidance' (priced at 2007 level)/69/. It is clearly indicated on page 127 of the guidance that other O&M expenditures for fossil fuel power plant with capacity of 300MW is 12RMB/kwh. Considering the proposed project is only 24MW biomass power plant, the smaller installed scale makes the cost higher than the larger scale, therefore, the Other O&M expenditures of 12.5RMB/kWh used in the investment analysis of the Project is reasonable.
Total	98.6%	

Totally 98.6% of the O&M cost has been cross-checked by the audit team, and the audit team considers the O&M cost applied in the investment analysis is appropriate and reasonable. Based on the above discussion, the O&M cost is unlikely to decrease 11% to reach the benchmark.

### Tax Rate

The enterprise tax rate is 25%, the VAT for electricity tariff is 17% and 13% for heat price. The Audit Team confirms that they are consistent with relevant host country's regulations/48//49/.

### Ash revenue

The value of ash generated by the project is not considered in the financial analysis of the FSR. The audit team can confirm no deal would happen between the plant and the entity collecting the ash during site visit, as effective component in the ash would be low and unsteady, and the economic value of the ash is too low to make it possible to sell the ash as a product at a profitable price. The audit team also checked the IRR calculation sheet, and can

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confirm if the venue of ash is considered in the financial analysis, only the price of ash reaches 372RMB/t can make the IRR of the project reach the benchmark, which is considered by the audit team greatly unlikely. Thus the audit team can confirm the ash revenue not considered in the financial analysis is reasonable and appropriate.

### 4.5.4 Barrier analysis

No barrier except the financial difficulty is expected by the project proponent in the PDD.

### 4.5.5 Common practice analysis

A common practice analysis is made in the PDD. The relevant geographical boundary is defined as the CCPG, where the electricity of the Project is delivered to. According to the ‘*Combined tool to identify the baseline scenario and demonstrate additionality, version 02.2*’, the relevant geographical area should include preferably ten facilities that provide outputs or services with comparable quality, properties and application areas as the proposed CDM project activity. In China, different provinces have different available resources and different electricity tariffs. CCPG is composed of several provinces and the region selection is appropriate.

In this area, five projects in operation and thirteen projects under construction are identified within the 15MW to 100MW. All identified projects are either registered as CDM activities or applying CDM activity. The data source is from NDRC and verified by Audit Team. Therefore, the proposed project activity is not common.

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

## 4.6 Monitoring

The project applies approved monitoring methodology ACM0006, version 09-“*Consolidated methodology electricity generation from biomass residues*”. The data monitored and the monitoring interval and frequency is in compliance with the methodology. The monitoring method has been clearly described in section B.7.1 of the PDD and examined by the Audit Team to be appropriate. The project investor has issued the CDM Monitoring & QC Manual/29/ for training the monitoring staff. In Audit Team’s opinion, the project owner is capable of implementing the project monitoring job.

### 4.6.1 Parameters determined ex-ante

The Audit Team has examined the following parameters that determined ex-ante by document review:

- The baseline grid emission factor is determined ex-ante, based on the most recent information available as published by Chinese DNA/23/, and is calculated as a combined



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margin, consisting of the weighted average of the OM and BM emission coefficients; The data source are listed clearly in Annex 3 of the PDD;

- $TDL_{j,y}$ , the average technical transmission and distribution losses for providing electricity to source  $j$  in year  $y$ , is determined ex-ante as 20%. The electricity consumed due to the project activity is transmitted from the CCPG and is compliant with scenario A of 'Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 01'. The value applied is the default value as indicated in the tool and is appropriate.

### 4.6.2 Parameters monitored ex-post

The Audit Team has examined the following parameters that determined ex-post by document review and on site assessment:

- The biomass residues dry amount transported to the site and the biomass residues dry amount disposed by the project will be monitored by the weight meters installed on site and corrected by the moisture content measured;
- The net calorific value of biomass residue. The monitoring methods and frequency is in line with the methodology;
- The moisture value of biomass residue. The monitoring methods and frequency is in line with the methodology;
- The average round trip distance from the biomass residue site and the project site. During on site assessment, the Audit Team understood that the biomass residues will be transported from several sites, i.e., the rice factories or the collection site set up by the project owner. Since the collection sites planning are not determined by the time of on site assessment, it is described in the PDD clearly that the longest distance would be applied by the project proponent;
- The number of truck trips for the transportation of biomass. Every truck trips will be counted and recorded in the log books according to the interview with project owner/II/
- Average CO<sub>2</sub> Emission Factor for transportation of biomass with trucks during year  $y$ . The appropriateness of the data will be reviewed annually.
- The fossil fuel combusted in the plant or combusted on site due to the project activity. According to the FSR, fossil fuel is needed to start the boiler. During on site assessment, the Audit Team was explained that the forklift machine at collections sites and project site use fossil fuel also. Their consuming amount shall be recorded.
- The net calorific value of the fossil fuel combusted in the plant or on site due to the project activity. The monitoring methods and frequency is in line with the methodology;
- CO<sub>2</sub> emission factor for fossil fuel combusted in the plant or on site due to the project activity. The appropriateness of the data will be reviewed annually.
- Net generated electricity by the project and the on site electricity consumed attributable to the project activity during year  $y$ .
- Quantity of available biomass residues of type  $k$  in the region and quantity of biomass residue type  $k$  that are utilized in the defined geographical region will be monitored annually by Surveys or statistics from local agricultural bureau or other official public resource.

The accuracy and calibration frequency for all monitoring meters has been correctly quoted in the PDD.

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### 4.6.3 Management system and quality assurance

A CDM team will be set up by the project owner to carry out the monitoring implementation. As discussed above, all the monitoring staff will be trained against with the CDM Monitoring & QC Manual/29/. The monitoring responsibilities lie on the CDM project director and CDM project manager. The data collection follow has been clearly described in the PDD. The monitoring position and parameters are also inserted in the PDD. The meters accuracy level, monitoring frequency and monitoring erroneous handling procedures are discussed in the PDD. All important indicators for controlling and reporting of project performance are incorporated in the monitoring plan.

### 4.7 Sustainable Development

During on site interview with local officers /I/ introduced to the Audit Team that the Project will bring positive effects to the local community. First of all, the Project can help to dispose the abundant biomass residues and the project will contribute to alleviate the environment pollution caused by uncontrolled burning of biomass residues. Secondly, the project is located in an industrial zone, where there is no central heat distribution/34/. Heat consumers there have to install the fossil fired boilers of their own. The implementation of the project will displace these boilers and to meet the heat demand in the community. In this way, the project will contribute to form a better business environment there by providing clean heat source to meet the enterprises demand. Thirdly, the project will meet the energy demand and provide clean and renewable energy to the grid. Finally, implementation of the project can bring more job opportunities for the local people to increase their incoming.

### 4.8 Environmental Impacts

An EIA/17/ has been finalized in Jun. 2007 and got approval/18/ by Environmental Protection Bureau of Jiangxi Province on 17<sup>th</sup> Aug. 2007. The environment impacts have been described in Section D.1 of the PDD. According to the EIA, no significant environmental impacts are expected. During on site interview with officer /I/ from local Environment Protection Bureau, that no complaints are received for the construction of the Project. The EIA has been performed in accordance with all relevant local regulations.

### 4.9 Local Stakeholder Consulation

In the EIA/17/ the affected area of the Project is described to be Wanzai County, including the industrial zone. This is also confirmed by interviewing officer /I/ from local Environment Protection Bureau. The stakeholder survey is incorporated in the EIA.

The local stakeholder survey was carried out in May 2007/32/. Officer /I/ from local Environment Protection Bureau introduced to the Audit Team that before the stakeholder interview started, the local stakeholders were informed by means of published posters and launched news on the government's website. These means are described clearly in section 12.1 of the EIA.



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Totally 50 questionnaires were distributed and 98% collected. The survey results and statistics analysis are presented in section E.2 of the PDD. The survey demonstrates that the local community are supportive to the project. The implementation of the project could benefit the local in aspects of environment protection and better business environment for the local industry area zone. The local stakeholder consultation process of the project is adequate.

### **4.10 Comments by Parties, Stakeholders and NGOs**

The PDD of version 01, 5th Jan. 2009 was made publicly available on UNFCCC website (<http://cdm.unfccc.int/Projects/Validation/DB/43J0S4G5VJPY8T6UZZDGMBHSSAWWK2/view.html>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 23rd Jan 2009 to 21st Feb 2009.

No comments were received.

## **Appendix A**

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### **CDM VALIDATION PROTOCOL**

#### **Wanzai Kaidi Biomass Power Project in**

**Industrial Area, Wanzai County, Jiangxi Province.**

**REPORT No. 01 997 9105051735**

**Table 1: Validation requirements**

(based on § 37 of the CDM Modalities and Procedures and on CDM Validation and Verification Manual, Annex 3 of EB44)

Checklist question	Ref.	MoV <sup>8</sup>	Findings, comments, references, data sources	Draft conclusion	Final conclusion
<b>1. Approval</b>					
1.1 Have Letters of Approval have been provided from all involved Parties?	/3/ /4/ /5/	DR	The letters of approval from the DNAs of China and United Kingdom of England and Northern Ireland have not been provided.	<del>CAR1</del>	OK
1.2 Are all Parties, who issued the LoA, Parties to the Kyoto Protocol <u>and</u> is this stated in the LoA?	/3/ /4/ /5/	DR	China ratified the Kyoto Protocol on 30 August 2002.  United Kingdom of Great Britain and Northern Ireland ,the Annex I party, ratified the Kyoto Protocol on 31 May 2002  LoA from both parties have not been received.	<del>CAR1</del>	OK
1.3 Is every LoA from the Parties involved issued by an organisation listed as Designated National Authority (DNA) on the UNFCCC web site?	/3/ /4/ /5/	DR	Ditto	<del>CAR1</del>	OK
1.4 Is the participation in the CDM project activity voluntary <u>and</u> is this stated in all LoAs?	/3/ /4/ /5/	DR	Ditto	<del>CAR1</del>	OK
1.5 Is the LoA unconditional with respect to 1.2 to 1.4?	/3/ /4/	DR	Ditto	<del>CAR1</del>	OK

<sup>8</sup> MoV = Means of Verification, DR = Document Review, I = Interview, www = internet search.

	/5/				
1.6 Is the title of the CDM project activity as given in the PDD identical with the title given in all LoAs and Modalities of Communication?	/3/ /4/ /5/	DR	Ditto	<del>CAR1</del>	OK
1.7 If any of provided LoAs contains additional specification of the CDM project activity (PDD version number, validation report version number, amount of ER, etc.) are those specifications valid and consistent with other documents?	/3/ /4/ /5/	DR	Ditto	<del>CAR1</del>	OK
1.8 Does the project activity involve any public funding from Annex I Parties? <u>If yes</u> , has Annex I Party provided a written confirmation that the use of such funding does not lead to the diversion of the official development assistance.	/3/ /4/ /5/	DR	The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards China.		OK
<b>2. Participation (VVM E.2)</b>					
2.1 Are the Parties and project participants (PP) listed in the section A.3 of the PDD correctly <u>and</u> is this information consistent with the contact details provided in Annex 1 of the PDD?	/2/	DR,I	Yes. The parties and project participants are listed in section A.3 of the PDD correctly and this information is consistent with the contact details provided in Annex 1 of the PDD.		OK
2.2 Has every Party involved approved the participation of each corresponding PP, either by means of a LoA or by a separate written document?	/2/	DR,I	No.	<del>CAR1</del>	OK
<b>3. Project Design Document (VVM E.3)</b>					
- Is the PDD presented for validation based on the latest template available at the UNFCCC website?	/2/ /13/	DR	Yes. It is confirmed that the PDD presented for validation is based on the latest template available at the UFCCC website.		OK

3.2	Has the PDD been established in accordance with the CDM requirements for completing PDDs issued by the CDM EB?	/2/ /13/	DR	As per the PDD guideline, please represent in the diagram, inserted in section B.3 of the PDD, the emission sources and gases included in the project boundary.	<del>CAR2</del>	OK
<b>4. Project Description (VVM E.4)</b>						
4.1	Does the PDD contain a description, which provides the reader with a clear understanding of the precise nature of the project activity and the technical aspects of its implementation?	/2/ /15/	DR,I	Please further clarify the project paralleling scheme to the Validation Team and providing relevant necessary documents.	<del>CL1</del>	OK
4.2	In the case of green-field project activity, is the project design described sufficiently by means of specifications, drawings and manuals?	/2/ /15/	DR,I	Yes.		OK
4.3	Does the project activity reflects current good practices, uses state of the art technology or would the technology result in a significantly better performance, than any commonly used technologies in the host country?	/2/ /15/	DR,I	Yes. The project activity reflects current good practices. The FSR was made by Wuhan Kaidi Electric Power Engineering Co., Ltd., which is CLASS A engineering company awarded by construction department of P.R.China. The original version of FSR is to be provided. The steam turbine generator units are purchased from Nanjing Steam Turbine Co., Ltd. The boiler components are purchased from Jiangxi Jianglian Energy and Environment Inc. Both of the equipment providers are famous in Chinese market.	<del>CL2</del>	OK
4.4	In cases where the project activity involves the alteration of an existing installation or process, does the PDD provide a clear description of the differences between the project and the pre-project scenario?	/2/ /15/	DR,I	Not applicable. The project activity is a green-field type.		OK

<b>5. Baseline and Monitoring methodology</b>					
<b>5.1 General requirements</b>					
5.1.1 Is the methodology used in the project activity approved by the CDM EB <u>and</u> is the selected version still valid?	/6/	DR	Yes. The methodology used in the project activity is approved by the CDM EB and is valid at the time the PDD submitted for validation.		OK
<b>5.2 Applicability of the selected methodology</b>					
5.2.1 Does the project activity qualify under the criteria for small-scale CDM project activities set out in § 6 (c) of decision 17/CP.7 and Annex II of the Modalities and Procedures for the CDM?	/2/	DR	Not applicable for this large scale project.		OK
5.2.1.1 If yes, does the PDD extensively demonstrates and confirms that the small-scale project activity is not a debundled component of a larger project?	/2/	DR	Not applicable for this large scale project.		OK
5.2.2 Are all applicability conditions of the selected baseline and monitoring methodology and all tools involved satisfied by the project activity?	/2/ /6/	DR,I	<p>Yes. All applicability conditions of the selected baseline and monitoring methodology are satisfied by the project activity.</p> <ol style="list-style-type: none"> <li>1. The main fuel consumed by the project is biomass residues. According to the FSR, except some small part of diesel will be used for project start up.</li> <li>2. Only biomass from local agricultural residues will be used by the project, not from production process.</li> <li>3. All biomass residues won't be stored more than one year. The rice husks</li> </ol>		OK

			<p>are directly bought from the rice mills and transported to the plant and the straws are directly bought from the farmers at the temporary storage stations.</p> <p>4. According to the FSR and on site assessment, it can be confirmed except for transportation of biomass and mechanical pre-treatment biomass, no-significant energy quantities will be used.</p>		
5.2.3 Is the selection of the applied baseline and monitoring methodology justified?	/2/ /6/	DR	Yes. The selection of the applied baseline and monitoring methodology is justified.		OK
5.2.4 Is the selected methodology correctly quoted in all related documents?	/2/ /6/	DR	Yes. The selected methodology is correctly quoted in all related documents.		OK
5.2.5 Does the PDD sufficiently describe other GHG emission sources or sinks occurring as a result of project activity, which have not been accounted for under the selected methodology and are expected to contribute more than 1% of the overall expected average annual emission reductions?	/2/ /6/	DR	No other GHG emission sources or sinks expect those selected in the baseline methodology are identified in the project activity.		OK
<b>5.3 Project boundary</b>					
5.3.1 Does the PDD correctly describe the project boundary?	/2/ /6/	DR	Yes. The project boundary description is in compliance with the methodology, which includes the power plant, the grid system, the heat consumers, the biomass transportation means and the places where the biomass left decay or burnt uncontrolled.		OK
5.3.2 Does the PDD correctly indicate and describe the	/2/	DR,I	No. Refer to 3.2	<del>CAR2</del>	OK

emission sources and sinks of GHG gases that are included in the project boundary?	/6/				
5.3.3 In cases where the methodology allows project participants to choose whether a source or gas is to be included in the project boundary, is the choice explained and justified by PPs?	/2/ /6/	DR	Yes. CH <sub>4</sub> emission both from baseline (uncontrolled burning or decay of surplus biomass residues) and combustion of biomass residues for electricity and/or heat generation are included in the project boundary. The choice is in compliance with the requirement of baseline methodology.		OK
<b>5.4 Baseline identification</b>					
5.4.1 Has the procedure contained in the selected methodology to identify the most reasonable baseline scenario been applied correctly and documented in the PDD?	/2/ /15/	DR,I	Yes. Procedure contained in the baseline methodology to identify the most reasonable baseline scenario has been applied correctly and documented in the PDD		OK
5.4.1.1 Is the identified baseline scenario plausible?	/2/ /15/	DR,I	Yes. The identified baseline scenario is plausible.		OK
5.4.1.2 Are all assumptions stated in a transparent and conservative manner?	/2/ /15/	DR,I	Refer to 5.4.3.1	CL3	OK
5.4.2 Does the selected methodology require the use of tools <u>and</u> does PDD reflects that correctly?	/2/ /15/	DR,I	Yes. Combined tool to identify the baseline scenario and demonstrate additionality has been applied correctly and documented in the PDD.		OK
5.4.2.1 Were all the tools applied correctly?	/2/ /15/	DR,I	By defining the use of biomass residues, where the project activity uses different types of biomass residues, the baseline scenario should be identified for each type of biomass residue separately.	<del>CAR3</del>	OK
5.4.3 In case the methodology requires several alternative scenarios to be considered in the identification of the most reasonable baseline scenario, have all scenarios been considered <u>and</u>	/2/ /15/	DR,I	No. Refer to 5.4.3.1	CL3	OK



have no reasonable alternative scenario been excluded?					
5.4.3.1 Has the choice of the baseline scenario been done using conservative assumptions?	/2/ /15/	DR,I	Please further substantiate in the PDD why to rule B7 and B8 out of consideration as possible baseline scenario for handling biomass residues.	<del>CL3</del>	OK
5.4.4 Is the identified baseline scenario reasonable according to the assumptions, calculations and rationales used in the PDD and other reference sources?	/2/ /15/	DR,I	Yes. The identified baseline scenario is reasonable.		OK
5.4.5 Does the PDD describe how the national and sectoral policies relevant to the baseline scenario have been identified and considered in the PDD?	/2/ /15/	DR,I	Yes. 'Notice on strictly prohibiting the installation of fuel-fired generators with the capacity of 135MW or below' issued by State Council Office is referred.		OK
5.4.6 Does the PDD provide a verifiable description of the identified baseline scenario, including a description of the technology that would be employed and/or the activities that would take place in the absence of the project activity?	/2/ /15/	DR,I	Please further substantiate how the life span for existing coal-fired boilers is concluded.	<del>CL4</del>	OK
<b>5.5 Algorithm and/or formulae used to determine emission reductions</b>					
5.5.1 Are all calculations applied and documented according to the selected methodology and in a complete and transparent manner?	/2/ /6/ /15/	DR,I	The emission factor refers to Chinese NDRC's publication. Please apply the latest one available when the PDD is submitted for validation, when is Jan. 2009.	<del>CAR4</del>	OK
5.5.2 In case the methodology allows a selection between different options for equations or parameters, has adequate justification been given and have the correct equations and parameters been used, in accordance with the methodology selected?	/2/ /6/ /15/	DR,I	"Option C" is chosen as the approach to calculate the OM value when applying "Simple OM" method but is not justified in the PDD i.e. ruling out Option A and Option C can not result in choosing Option C, which applicable requirements are clearly set in the Tool and shall be followed.	<del>CAR5</del>	OK

<p>5.5.3 In case some data and parameters will not be monitored throughout the crediting period, but have already been determined and fixed, are all data sources, assumptions and calculations correct, applicable to the proposed CDM project activity and conservative?</p>	<p>/2/ /6/ /15/</p>	<p>DR,I</p>	<p>For BM determination, the PDD refers to the publication of Chinese NDRC. However, the definition of “CAPTotal” in section B.6.1 of the PDD is inconsistent with that indicated in the publication of Chinese NDRC. Please make a correction for a clear understanding. Also, please list out “CAPTotal” and “CAPThermal” in section B.6.2 of the PDD.</p> <p>For calculation of CO2 emission from electricity assumption in Section B 6.3 of the PDD, the combined margin of emission factor applied is inconsistent with that in Annex 3 of the PDD. Please make a correction.</p> <p>Please further clarify the EFkm, CO2, Average CO2 Emission Factor for transportation of biomass with trucks. For those not monitored data as listed out in section B.6.2 of the PDD, please address its data source in a complete transparent manner i.e. the page, section, volume is clearly traceable.</p> <p>Please further clarify whether Fi,y in section B.6.2 of the PDD shall be FCi,y.</p>	<p><del>CAR6</del></p> <p><del>CAR7</del></p> <p><del>CL5</del></p> <p><del>CL6</del></p>	<p>OK</p> <p>OK</p> <p>OK</p> <p>OK</p>
<p>5.5.4 In case data and parameters will be monitored on implementation and hence become available only after validation of the project activity, are the estimates provided in the PDD for these data and parameters reasonable?</p>	<p>/2/ /6/ /15/</p>	<p>DR,I</p>	<p>The applied moisture content for biomass is not consistent with FSR. Please make corrections.</p> <p>The biomass collection radius value applied in the PDD is inconsistent with that verified</p>	<p><del>CAR8</del></p> <p><del>CL7</del></p>	<p>OK</p> <p>OK</p>

			from the FSR. Please further clarify this value.		
			Please further clarify the practical amount of biomass and substantiate how economic amount of biomass that could supply is reached.	CL8	OK
5.5.5 Have the major risks and uncertainties, which can influence the emission reduction estimates, been identified and addressed in the PDD?	/2/ /6/ /15/	DR,I	No major risks are to be identified.		OK
<b>5.6 Leakage</b>					
5.6.1 Has the leakage been identified and calculated according to the approved methodology?	/2/ /6/ /15/	DR,I	Yes. The PDD applies Option L2 of the baseline methodology to identify the project leakage.		OK
5.6.2 Have the leakage been addressed in complete, conservative and substantiated manner?	/2/ /6/ /15/	DR,I	Refer to 5.5.4	CL8	OK
5.6.3 Are uncertainties in the leakage emission estimates properly addressed?	/2/ /6/ /15/	DR,I	Ditto	CL8	OK
<b>6. Methodology-related issues for afforestation or reforestation CDM project activities</b>					
Add specific A/R requirements – if applicable!			Not applicable for this CDM project activity		OK
<b>7. Additionality</b>					
<b>7.1 Prior consideration of the CDM (VVM E.6.III.a)</b>					
7.1.1 Is there documented evidence provided by the project participants on how and when the decision to proceed with the project activity was taken?	/2/ /15/	DR,I	The starting date of the Project is before the validation. As per the PDD guideline, in such cases project proponents shall provide an implementation timeline of the proposed CDM project activity. In addition to this	CAR9	OK

			implementation timeline project participants shall provide a timeline of events and actions which have been taken to achieve CDM registration to allow the DOE to assess the serious consideration of the CDM in the project decision making process and project implementation.		
7.1.2 Is the starting date of the project activity, reported in the PDD, in accordance with the “Glossary of CDM terms” <u>and</u> CDM VVM (§97)?	/2/ /15/	DR,I	Yes. The starting date is defined the key equipments purchasing date, which constitutes significantly of the project cost.		OK
7.1.3 Is the date stated in the provided evidence consistent with other available evidence (e.g. dates of construction, purchase orders for equipment)?	/2/ /15/	DR,I	Yes.		OK
7.1.4 If the project was not published and the starting date is on or after 2 <sup>nd</sup> August 2008, was it possible to receive from UNFCCC secretariat and/or DNA a written confirmation that PPs previously informed the above entities on commencement of the project activity and of their intention to seek CDM status?	/2/ /15/	DR,I	Not applicable.		OK
7.1.5 For the project activities with a starting date before 2 <sup>nd</sup> August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were previously aware of CDM?	/2/ /15/	DR,I	Yes. The CDM consideration has been discussed in the FSR. Before the project starting date, the board has issued the resolution of applying the project as a CDM activity.		OK
7.1.6 For the project activities with a starting date before 2 <sup>nd</sup> August 2008 and before the actual publication, was there enough evidence presented to prove that CDM benefits have been a decisive factor in the decision to proceed with the project activity?	/2/ /15/	DR,I	Yes. Benefits from CDM have been discussed in the financial analysis of the FSR.		OK

7.1.7 Does the individual or body that took the decision to proceed with the project activity have/had the authority to do so?	/2/ /15/	DR,I	Yes. To apply project as a CDM activity is from a board resolution.		OK
7.1.8 For the project activities with a starting date before 2 <sup>nd</sup> August 2008 and before the actual publication, was there enough evidence presented to prove that PPs were taking continuing and real actions to secure CDM status for the project in parallel with its implementation?	/2/ /15/	DR,I	Yes.		OK
7.1.9 In case there is a significant gap between the start date of the project activity and the commencement of validation, how was it possible for the project participant to commit funds to the project in advance of receiving a positive validation opinion?	/2/ /15/	DR,I	Not applicable.		OK
<b>7.2 Identification of alternatives</b>					
7.2.1 Does the PDD identify and list credible alternatives to the CDM project activity in order to determine the most realistic baseline scenario, unless selected approved methodology prescribes/identifies the baseline scenario and no further analysis is required?	/2/ /15/	DR,I	Yes. The PDD identifies and lists credible alternatives to the CDM project activity.		OK
7.2.2 Does the list of alternatives include as one of the options that the project activity is undertaken without being registered as a CDM project activity?	/2/ /15/	DR,I	Yes. One alternative is the project activity to be undertaken without being registered as a CDM project activity.		OK
7.2.3 Does the list contain all realistic/credible alternatives that the DOE, on the basis of its local and sectoral knowledge, considers to be viable means of supplying the outputs or services that are to be supplied by the project activity?	/2/ /15/	DR,I	Yes		OK

7.2.4 Is the exclusion of the alternatives for legal reasons justified?	/2/ /15/	DR,I	Yes. The exclusion of the alternatives for legal reasons is justified.		OK
<b>7.3 Investment Analysis</b>					
7.3.1 Are all sources of revenues (including savings) have been considered in the PDD and all calculations?	/2/ /15/	DR,I	In section A.4.3 of the PDD it is described that “The ash is expected to be picked up by the local farmers and used as fertilizer”. Please clarify that whether this will result in revenue.	<del>CL9</del>	OK
7.3.2 Is the type of investment analysis selected correctly in the PDD?	/2/ /15/	DR,I	Yes. The benchmark analysis is selected.		OK
7.3.3 Is the selected financial indicator chosen and applied correctly?	/2/ /15/	DR,I	Please clarify the selected benchmark.	<del>CL10</del>	OK
7.3.4 Is the guidance on IRR calculation and assessment correctly applied?	/2/ /15/	DR,I	Yes. Guidance on the Assessment of Investment Analysis is applied, which is made by comparing the IRR calculation sheet with the corresponding financial analysis of the FSR.		OK
7.3.5 In case project participants use values from Feasibility Study Reports (FSR) is it possible to verify that the period between the FSR date and investment decision was reasonably short and FSR values did not change materially?	/2/ /15/	DR,I	Yes.		OK
7.3.6 Are all the values consistent between FSR and PDD <u>and</u> are inconsistencies properly justified?	/2/ /15/	DR,I	Please list out the detailed date source of input value for Project IRR calculation contained in Table B-2 of the PDD.	<del>CAR11</del>	OK
7.3.7 Were all the values from FSR applicable and valid at the time of the investment decision?	/2/ /15/	DR,I	Please further clarify the project electricity tariff. Please further clarify whether the heat price includes VAT or not.	<del>CL11</del>	OK

			Please further clarify the project annual operation hours and the project's power loss i.e. in-house load, transmission loss, etc.	<del>CL12</del>	OK
7.3.8 Is it reasonable to assume that no investment would be made at a rate of return lower than the benchmark by, for example, assessing previous investment decisions by the project participants or some verifiable circumstances that have lead to a change in the benchmark?	/2/ /15/	DR,I	See 7.3.3	<del>CL10</del>	OK
7.3.9 Is the Investment Analysis prepared in compliance with the latest version of the "Guidance on the Assessment of Investment Analysis" as provided by the CDM EB?	/2/ /15/	DR,I	Yes.		OK
<b>7.4 Barrier analysis</b>					
7.4.1 Are there any issues addressed in the barrier analysis that have a clear impact on the financial viability of the project activity and that shall be assessed by an investment analysis?	/2/ /15/	DR,I	Except financial barriers, no other barriers are identified by project proponents.		OK
7.4.2 Do the listed barriers exist <u>and</u> is their existence substantiated? Note: (a) by independent sources of data such as relevant national legislation, surveys of local conditions and national or international statistics and/or (b) by interviews with relevant individuals: including members of industry associations, government officials or local experts if necessary?	/2/ /15/	DR,I	Not applicable.		OK
7.4.3 Would any of the identified barriers prevent the implementation of the project activity but not equally prevent the implementation of the	/2/ /15/	DR,I	Not applicable.		OK

possible alternatives, in particular the implementation of the identified baseline scenario?					
<b>7.5 Common practice analysis</b>					
7.5.1 If the PPs claim in the PDD that CDM project activity is the “first of its kind”, is it justified?	/2/ /15/	DR,I	Not applicable.		OK
7.5.2 Are the geographical boundaries of the project activity identified correctly?	/2/ /15/	DR,I	The common practice region is identified to be Central China Power Grid.		OK
7.5.3 Does the PDD provide an explanation why this region was selected and deemed more appropriate <u>and</u> is this explanation traceable and reliable?	/2/ /15/	DR,I	Yes. The common practice is justified in CCPG, to which the project exported its electricity.		OK
7.5.4 Are there similar operational project activities, other than CDM activities, “widely observed and commonly carried out” in the defined region?	/2/ /15/	DR,I	Please further clarify how similar projects are sourced out. The Validation Team took notice that the data source for the similar projects is unfccc.int or CDM China website, which is not comprehensive and persuading.	CL13	OK
7.5.5 In case there are similar commercially operated project activities, other than CDM activities, already “widely observed and commonly carried out” in the defined region, are there essential distinctions between the CDM project activity and the other similar activities?	/2/ /15/	DR,I	Ditto	CL13	OK
<b>8. Monitoring plan</b>					
8.1 Are all parameters required by the selected approved methodology or tool identified <u>and</u> listed in the PDD?	/2/ /6/	DR,I	Regarding fossil fuel consumed on site, it is described that fossil fuels are only used for boiler start up on site. However, from other similar projects implemented by the same project owner and observed by the Validation Team, there are equipments i.e. fork lift also consumes fossil fuel. Please	CL14	OK



			<p>clarify that whether there will be such part of fossil fuel. Also, for this biomass energy project, please clarify if there is a diesel generator used as back up power.</p> <p>Please further clarify the gateway meter's installation position. Also please further to substantiate the installation of "meters monitoring the gross electricity generated by the generators" as described in section B.7.2 of the PDD.</p>	CL15	OK
8.2	Is the measurement method clearly stated for each value to be monitored and deemed appropriate?	/2/ /6/	DR,I	CL16	OK
8.3	Are values of the ex-ante parameters / monitoring parameters selected correctly and conservative in accordance to methodology or tools?	/2/ /6/	DR,I		OK
8.4	Is the measurement equipment for each parameter described and deemed appropriate?	/2/ /6/	DR,I		OK
8.5	Is the measurement accuracy addressed and deemed appropriate?	/2/ /6/	DR,I		OK

8.6	Are procedures in place on how to deal with erroneous measurements <u>and</u> are the corrective actions identified?	/2/ /6/	DR,I	Yes		OK
8.7	Is the frequency of measurement identified and deemed appropriate?	/2/ /6/	DR,I	Yes. The monitoring frequency is identified and is in compliance with the monitoring methodology.		OK
8.8	Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?	/2/ /6/	DR,I	Yes. The monitoring plan is documented according to ACM0006.		OK
8.9	Are the sampling, measurement methods and procedures defined?	/2/ /6/	DR,I	Yes. The net calorific value of the biomass residue of type k utilized in the project will be measured by taking at least three samples (dry matter) for each measurement at a frequency of at least 6 months a time. This is in compliance with the monitoring methodology		OK
8.10	Are procedures identified for maintenance of monitoring equipment and installations?	/2/ /6/	DR,I	Yes. In section B.7.1 of the PDD the maintenance for measurement equipments are described.		OK
8.11	Are the equipment calibration intervals identified and justified?	/2/ /6/	DR,I	Yes. The equipment calibration intervals are identified and justified in section B.7.2 of the PDD.		OK
8.12	Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)?	/2/ /6/	DR,I	Yes. Procedures have been identified for day-to-day records handling.		OK
8.13	Are the monitoring arrangements described in the monitoring plan feasible within the project design?	/2/ /6/	DR,I	Please clarify the CDM monitoring structure and the indicate person who hold the overall responsibility.	<del>CL17</del>	OK
8.14	Are the means of implementation of the monitoring plan, including the data management and quality assurance and quality control	/2/ /6/	DR,I	Yes.		OK

procedures, sufficient to ensure that the emission reductions achieved by / resulting from the project activity can be reported ex post and verified?					
8.15 Do the PPs make provisions for personnel training needs?	/2/ /6/	DR,I	Yes. It is discussed that the CDM Manual details the training procedures and training plan.		OK
8.16 Is the authority and responsibility of overall project management clearly described?	/2/ /6/	DR,I	Refer to 8.13	<del>CL17</del>	OK
8.17 Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/2/ /6/	DR,I	No such unintended emissions can be addressed.		OK
8.18 Are procedures identified for review of reported results/data?	/2/ /6/	DR,I	Yes. Procedures are identified for review of reported results.		OK
8.19 Is the data archiving period for this project activity stated in the PDD appropriate?	/2/ /6/	DR,I	Yes. It has been identified clearly in the PDD that all archived monitoring data, required for verification should be kept at least 2 years after the end of the crediting period or the last issuance of CERs, whichever occurs later.		OK
<b>8.2 Monitoring of the leakage</b>					
8.2.1 Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/2/ /6/	DR,I	Leakage is assumed zero in the PDD by applying option L2 of the monitoring methodology. Please further clarify the practical amount of biomass and substantiate how economic amount of biomass that could supply is reached.	CL8	OK
8.2.2 Is the choice of project leakage indicators made according to selected methodology in a reasonable and conservative manner?	/2/ /6/	DR,I	Ditto	CL8	OK

8.2.3	Is the measurement method clearly stated and deemed appropriate for each leakage value?	/2/ /6/	DR,I	Ditto	CL8	OK
<b>9. Sustainable development</b>						
9.1	Does the LoA from the Host country DNA contain the confirmation that the proposed CDM project activity contributes to the sustainable development of the host Party?	/2/ /3/	DR,I	Refer to 1.1	CAR1	OK
9.2	If PDD indicates any additional environmental benefits of the project, other than GHG emission reductions, were those benefits properly substantiated?	/2/ /3/	DR,I	Yes. The project will not only provide clean energy, decreasing SO <sub>x</sub> and NO <sub>x</sub> amount by displacing the existing fossil fuel boilers, but also providing job opportunities and stimulate local economy.		OK
<b>10. Stakeholders' consultation and comments</b>						
10.1	Were the stakeholders identified in appropriate and complete manner?	/2/ /17/ /18/	DR,I	Yes. The stakeholders consultation is incorporated in the EIA. The stakeholders are identified local residents covering farmers, workers, officers or teachers.		OK
10.2	Are the identified stakeholders plausible?	/2/ /17/ /18/	DR,I	Yes. The identified stakeholders are plausible.		OK
10.3	Does PDD describe the means being used to invite local stakeholder's comments?	/2/ /17/ /18/	DR,I	Yes.		OK
10.4	Were those means appropriate?	/2/ /17/ /18/	DR,I	Yes.		OK
10.5	Was the project presented to the stakeholders in unbiased manner?	/2/ /17/ /18/	DR,I	Yes. Stakeholders with different gender, different age and different designation are invited in an unbiased manner.		OK

10.6	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?	/2/ /17/ /18/	DR,I	Yes. The stakeholder consultation is in accordance with local regulations.		OK
10.7	Is a summary of the stakeholder comments provided in the PDD?	/2/ /17/ /18/	DR,I	Yes. The summary of the stakeholder comments are provided in the PDD.		OK
10.8	Has due account of any stakeholder comments been taken by PPs and reflected in the PDD?	/2/ /17/ /18/	DR,I	Yes. Due account of stakeholder comments has been taken and reflected in the PDD.		OK
<b>11. Environmental impacts</b>						
11.1	Is the documentation supplied by the PPs regarding environmental impacts relevant and accurately reflected in the PDD?	/2/ /17/ /18/	DR,I	Yes. The environment impacts are reflected in the PDD.		OK
11.2	Is an environmental impact assessment (EIA) required for the CDM project activity?	/2/ /17/ /18/	DR,I	The EIA is required before the project can be implemented.		OK
11.3	In case an EIA is required, has the EIA has been approved by local authorities and is the outcome accurately reflected in the PDD?	/2/ /17/ /18/	DR,I	Yes. The EIA has been approved by local Environment Protection Bureau.		OK
11.4	Does the PDD include a brief description of the environmental effects of the project, including transboundary?	/2/ /17/ /18/	DR,I	Yes. A brief description of the environmental effects has been described in section D.1 of the PDD.		OK
11.5	Are those effects properly addressed in the design of the project activity?	/2/ /17/ /18/	DR,I	Yes. Those effects are properly addressed in the design of the project activity.		OK
11.6	Does the project comply with environmental legislation in the host country?	/2/ /17/	DR,I	Yes. The project EIA got approval from local authority.		OK

	/18/				
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**Table 2: List of Requests for Corrective Action (CAR) and Clarification (CL)**

Draft report clarifications and corrective action requests by validation team	Reference	Summary of project owner response	Validation team conclusion
<b>CAR1</b> The letters of approval from the DNAs of China and United Kingdom of England and Northern Ireland have not been provided.	1.1 1.2 2.2	The letters of approval from DNAs of China and UK have been provided to the auditor.	All the relevant LoA have been received and verified by the Audit Team. The LoA (s) received are authentic.  The CAR is therefore resolved and closed.
<b>CAR2</b> As per the PDD guideline, please represent in the diagram, inserted in section B.3 of the PDD, the emission sources and gases included in the project boundary.	3.2 5.3.2	Revised accordingly, please refer to figure B-1 of the PDD.	The diagram of project boundary with emission sources and gases has been included in the revised PDD  The CAR is therefore resolved and closed.
<b>CAR3</b> By defining the use of biomass residues, where the project activity uses different types of biomass residues, the baseline scenario should be identified for each type of biomass residue separately.	5.4.2.1	Each type of the biomass is discussed in the baseline scenario determination, please refer to PDD Section B.4	The correction is to the Audit Team's satisfaction.  The CAR is therefore resolved and closed.

<b>CAR4</b> The emission factor refers to Chinese NDRC's publication. Please apply the latest one available when the PDD is submitted for validation, when is Jan. 2009.	5.5.1	Revised accordingly, the EF updated and issued by NDRC of China on 30 <sup>th</sup> Dec. 2008 is adopted.	The correction is to the Audit Team's satisfaction.  The CAR is therefore resolved and closed.
<b>CAR5</b> "Option C" is chosen as the approach to calculate the OM value when applying "Simple OM" method but is not justified in the PDD i.e. ruling out Option A and Option C can not result in choosing Option C, which applicable requirements are clearly set in the Tool and shall be followed.	5.5.2	For the proposed project, the data on fuel consumption, net electricity generation and the average efficiency of each power unit are unavailable, thus option A and option B cannot be used.  Nevertheless, the data on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system are available, and, nuclear and renewable power generation are considered as low-cost / must-run power sources and the quantity of electricity supplied to the grid by these sources is known, therefore, Option C can be used.  Please refer to section B.6.1 in PDD.	The description of choosing Option C has been appropriately indicated in the revised PDD.  The CAR is therefore resolved and closed.
<b>CAR6</b> For BM determination, the PDD refers to the publication of Chinese NDRC. However, the definition of "CAP <sub>Total</sub> " in section B.6.1 of the PDD is inconsistent with that indicated in the publication of Chinese NDRC. Please make a correction for a clear understanding. Also, please list out "CAP <sub>Total</sub> " and "CAP <sub>Thermal</sub> " in section B.6.2 of the PDD.	5.5.3	The definition of "CAP <sub>Total</sub> " in section B.6.1 1 of the PDD has been revised and consistent with the publication of Chinese NDRC.  "CAP <sub>Total</sub> " and "CAP <sub>Thermal</sub> " have been listed out in section B.6.2 of the PDD. Please refer to the PDD.	The correction is to the Audit Team's satisfaction.  The CAR is therefore resolved and closed.
<b>CAR7</b> For calculation of CO <sub>2</sub> emission from electricity assumption in Section B 6.3 of the PDD, the combined margin of emission factor	5.5.3	Corrected accordingly.	The correction is to the Audit Team's satisfaction.  The CAR is therefore resolved and closed.



applied is inconsistent with that in Annex 3 of the PDD. Please make a correction.									
<b>CAR8</b> The applied moisture content for biomass is not consistent with FSR. Please make corrections.	5.5.4	<p>The moisture value of each biomass residue type in the FSR is from the laboratory test outcome. The applied moisture of rice husk is 6% which is the same with FSR.</p> <p>The maximum moisture value of the straws (25.4%) is used for biomass decay or uncontrolled burning emission (BFpj,k,y) calculations , which is conservative. The smallest moisture value of the straws (18.4%) is used for PE biomass CH4,y calculation , which is conservative.</p>	<p>The moisture values used in the revised PDD were checked from FSR, which was composed by the qualified entity /15/, and the Testing results /42//43/, which were conducted by State Key Laboratory, and can be confirmed valid. Conservative values were used in the ER calculation, and is confirmed appropriate to the project.</p> <p>The CAR is therefore resolved and closed.</p>						
<b>CAR9</b> The starting date of the Project is before the validation. As per the PDD guideline, in such cases project proponents shall provide an implementation timeline of the proposed CDM project activity. In addition to this implementation timeline project participants shall provide a timeline of events and actions which have been taken to achieve CDM registration to allow the DOE to assess the serious consideration of the CDM in the project decision making process and project implementation.	7.1.1	<p>Wuhan Kaidi Investment Holding Ltd. is the parent company of the project owner who wanted to invest and develop grid-connected biomass combustion projects for a long time but due to the high cost, low profit of biomass power plants in China, Wuhan Kaidi Investment Holding Ltd found it is not feasible to invest in biomass project at that time. Then they learned that some biomass projects were applying for CDM and began to learn about CDM and consider seeking help from CDM financing. The financial result in the FSR shows that with CER revenue, the IRR of the project is above benchmark, while the IRR is below benchmark without CER revenue. Therefore, Wuhan Kaidi Investment Holding Ltd determined to develop the biomass project as CDM project.</p> <p><b>Timelines in Project Implementation and CDM application activities:</b></p> <table><tr><th>Time</th><th>Project Implementation Activities</th><th>CDM Application Activities</th></tr><tr><td>June</td><td>EIA was finished</td><td></td></tr></table>	Time	Project Implementation Activities	CDM Application Activities	June	EIA was finished		<p>The implementation timeline of the proposed project and the timeline of events and actions which have been taken to achieve CDM registration have been included in the revised PDD, and relevant documents provided to DOE have been checked and confirmed valid and authentic.</p> <p>By comparing the key project implementation documents/15//25//26//39//45/, it can be concluded that the date of purchasing key equipment, 6th Nov. 2007, is confirmed as the staring date of the project</p>
Time	Project Implementation Activities	CDM Application Activities							
June	EIA was finished								

		2007			and closed.
		August 2007	EIA was approved by Environment Protection Bureau of Jiangxi Province		
		September 2007		The management board's decision was made and issued to undertake the proposed project as CDM project.	
		November 2007		Carbon Assets Development Agreement was signed with Camco	
		November 2007	Key Equipment Purchase agreement signed	Project Starting Date in the PDD	
		March 2008	FSR was finished, which showed that without CER revenue, the project is not feasible and pointed out clearly to implement the project as CDM project can make the project financially attractive.		
		June 2008	Project was approved by DRC of Jiangxi Province		
		December 2007-July 2008		PDD writing, Emission Reduction Purchase Agreement negotiating and DOE selecting	
		August 2008		Validation Contract was signed with DOE	
		September 2008		Application documents were submitted to NDRC	

		<table><tr><td>February 2009</td><td></td><td>PDD was published on UNFCCC website for Global stakeholder consultation</td></tr><tr><td>February 2009</td><td></td><td>Global stakeholder consultation finished, no comments were received</td></tr><tr><td>March 2009</td><td></td><td>Validation Site Visit</td></tr><tr><td>March 2009</td><td>Construction started</td><td></td></tr><tr><td>June 2009</td><td></td><td>CDM application is approved by NDRC of China</td></tr></table> <p>Please refer to section B.5 in the PDD.</p>	February 2009		PDD was published on UNFCCC website for Global stakeholder consultation	February 2009		Global stakeholder consultation finished, no comments were received	March 2009		Validation Site Visit	March 2009	Construction started		June 2009		CDM application is approved by NDRC of China	
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March 2009		Validation Site Visit																
March 2009	Construction started																	
June 2009		CDM application is approved by NDRC of China																
<b>CAR10</b> The construction permission letter is to be provided.	7.1.3	It has been provided.	<p>The construction permission /39/ was provided to the Validation Team and been verified valid and authentic.</p> <p>The CAR is therefore resolved and closed.</p>															
<b>CAR11</b> Please list out the detailed date source of input value for Project IRR calculation contained in Table B-2 of the PDD.	7.3.6	Revised accordingly.	<p>The correction is to the Auditor's Team's satisfaction.</p> <p>The CAR is therefore resolved and closed.</p>															
<b>CAR12</b> The interest payable is to be considered as cost in the calculation of income tax, to be in accordance with EB51/Annex 58/paragraph 11.		The IRR calculation sheet and relevant part in investment analysis in PDD has been revised and updated.	The CAR is therefore resolved and closed.															

<p><b>CAR13</b></p> <p>Error in the calculation of levelized cost of 6t/h coal fired boiler for heat supply in spreadsheet is to be corrected.</p>		<p>The error of calculation of levelized cost of 6t/h coal fired boiler for heat supply has been corrected in the spreadsheet. The error relates to the total O&amp;M cost, which in the PDD omitted the Ash and sediments treatment fees. The O&amp;M cost in the PDD was 350,625 RMB and this has no been corrected to 422,625 RMB. Therefore the levelized cost was changed from 31 RMB / GJ to 31.5 RMB/GJ.</p>	<p>The data source of the levelized cost has not been changed and deems reliable and credible. The calculation error has been rectified in the calculation spreadsheet, and considered by the Audit Team correct.</p> <p>The CAR is therefore resolved and closed.</p>
<p><b>CL1</b></p> <p>Please further clarify the project paralleling scheme to the Validation Team and providing relevant necessary documents.</p>	4.1	<p>According to the “The announcement by Jiangxi Power Company on the review comments of the paralleling scheme of Wanzai Biomass Power Plant Project”, the electricity generated might be transmitted through an 110kV cable to Wanzai 220kV substation and then supplied to CCPG indirectly.</p> <p>Please refer to the document for details.</p>	<p>The paralleling scheme announcement of the project /27/ has been provided and checked valid. The project paralleling scheme is verified clear and authentic.</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL2</b></p> <p>The original version of FSR is to be provided.</p>	4.3	It has been provided.	<p>The original version of FSR has been provided to Validation Team, and been verified authentic and valid.</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL3</b></p> <p>Please further substantiate in the PDD why to rule B7 and B8 out of consideration as possible baseline scenario for handling biomass residues.</p>	5.4.3 5.4.3.1	<p>For alternative B7: According to the official letter by the office of Wanzai Investment Promotion Committee, there are and will be no biomass power plant except the proposed project or biomass energy project in Wanzai County. Besides, due to the high cost in the biofuels projects, the biofuel industry in China just started development and the biomass used for the biofuels are crops or non-crops plants mainly including the broomcorn, cassavas, sweet potato, Coptis chinensis, hairy chestnut, tung tree, palm oil or waste cooking oil and/or waste fat from biogenic origin, not including the biomass</p>	<p>The Biomass Availability Report /19/ and the Confirmation Letter of No Other Biomass Project Existing in Wanzai County issued by Merchant Bureau of Wanzai County/30/, was provided by the project proponent and assessed by the Audit Team.</p>

		<p>types what will be used in the project.</p> <p>For alternative B8:</p> <p>According to the Biomass Availability Report, only 20% and 6% of available amount of rice husk and straws are used for non-energy purpose. The project will not change the use of rice husk and straws as their non-energy uses.</p> <p>Therefore, both B7 and B8 are ruled out. Please refer to Table B-4 of the PDD for more details.</p>	<p>It is confirmed by the local government that except the Project, no other Biomass power plant is and will be implemented in Wanzai County, and biomass residue in Wanzai City is confirmed enough for the project.</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL4</b></p> <p>Please further substantiate how the life span for existing coal-fired boilers is concluded.</p>	5.4.6	<p>Firstly, the starting year of the existing boilers have been demonstrated clearly in the paper from the Administration Committee of Wanzai Economic Development Area about &lt;Introduction on the boilers in Wanzai Economic Development Area&gt;.</p> <p>Secondly, according to the “Introduction on the lifetime of the boilers” by the Senior Engineer Zhu yuqing from Central Southern China Electric Power Design Institute of China Power Engineering Consulting Group: the design lifetime for those kinds of boilers is 30 years. The average commercial lifetime is above 25 years, therefore 25 year lifetime is used to calculate the predicted year of replacement to be conservative.</p> <p>Therefore, we can estimate the retiring year for the boilers.</p>	<p>The project proponent refers the statement/33/ of Mrs.ZHU Yuqin, the senior engineer from Central Southern China Electric Power Design Institute of China Power Engineering Consulting, that for industry boilers applied the designed life span is 30 years. And if the quality of the boiler passes the local Quality Management Bureau’s yearly quality checking, those industry boilers could be used more than 30 years.</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL5</b></p> <p>Please further clarify the EF<sub>km</sub>, CO<sub>2</sub>, Average CO<sub>2</sub> Emission Factor for transportation of biomass with trucks. For those not monitored data as listed out in section B.6.2 of the PDD, please address its data source in a complete transparent manner i.e. the</p>	5.5.3	<p>0.001097 tCO<sub>2</sub>e/km is used as the value, and the data source is Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (Table 1-32 on Page 1.75) of the Reference Manual (Estimated Emission Factors for US Heavy Duty Diesel Vehicles ).</p> <p>Besides, the parameters including EF<sub>km,CO<sub>2</sub></sub> have been moved to section B.7.1 of the PDD.</p>	<p>The clarification is to the Audit Team’s satisfaction.</p> <p>The CL is therefore resolved and closed.</p>

page, section, volume is clearly traceable.			
<b>CL6</b> Please further clarify whether $F_{i,y}$ in section B.6.2 of the PDD shall be $FC_{i,y}$ .	5.5.3	The latter one is correct, and the PDD has been revised.	The clarification is to the Audit Team's satisfaction.  The CL is therefore resolved and closed.
<b>CL7</b> The biomass collection radius value applied in the PDD is inconsistent with that verified from the FSR. Please further clarify this value.	5.5.4	According to the FSR, the farthest collection distance of rice husk and straws is 70km. Therefore, 70km is applied as the biomass collection radius and used for emission reduction calculation, which is conservative.	The clarification is to the Audit Team's satisfaction.  The CL is therefore resolved and closed.
<b>CL8</b> Please further clarify the practical amount of biomass and substantiate how economic amount of biomass that could supply is reached.	5.5.4 5.6.2 5.6.3 8.2	The Biomass Residue Availability Report was done by the FSR writing institute with support from the local authorities. The plantation area and crop yield data are provided by local Agriculture Bureau, which has been provided to auditor. The Rice Husk amount is obtained from the local Agriculture bureau. The loss rates for straws and rice husk are experienced data. The consumption amounts for uses other than the project are done by survey on the local farmers and rice mill owners and confirmed by the local authorities.  Please refer to PDD Section B.6.1 and the Emission Reduction calculation spreadsheet.	Besides the biomass availability report/19/, the project proponent provides the biomass amount information by investigation. The practical and economical available biomass residues amount is approached and evidenced from a reliable official source.  The CL is therefore resolved and closed.
<b>CL9</b> In section A.4.3 of the PDD it is described that "The ash is expected to be picked up by the local farmers and used as fertilizer". Please clarify that whether this will result in revenue.	7.3.1	<u>The ash revenue is not considered in the financial analysis in the FSR</u>  According to the FSR, there is expected to be 18.9 thousand ton ash per year generated by the project.  According to the EIA report, the ash is considered as solid residues which will lead to field occupation and pollutions to the soil and air, thus needs to be treated or utilized.  Although the ash is considered as a solid residues generated from the project, it could be utilized as fertilizer for the local farmers to	The clarification is to the Audit Team's satisfaction.  The CL is therefore resolved and closed.

		<p>improve the soil condition because it contains nutrient elements as K and P elements.</p> <p>However, considering that the fuels utilized in the project is a mixed of biomass residues, the effective component in the ash would be low and not homogenous in nature. The ash is also alkali which means it is only good for the acidic soil, thus the local farmers are not interested in purchasing the ash as fertilizer at all.</p> <p>Therefore, the project is designed not to build storeroom (there will be a temporary space) for the ash but to ask some local fertilizer company to transport it outside of the power plant and deal it on it's own expense with no transaction between the two parties. Through this, the field occupied in the project site by the ash is saved and the project owner will realize the utilization of the ash required by the EIA report.</p> <p>Therefore, there is no revenue from ash for the project and there is no ash revenue in the IRR calculation in the FSR.</p> <p><u><i>There is no market for the ash based on experience from other operational biomass power plants</i></u></p> <p>The experience from the already commissioned biomass projects which belong to the project owner's parent company shows that the ash is in fact a "cost" instead of a "revenue". Due to the EIA requirements as mentioned above, those projects have had to pay the local farmers to transport the ash outside of the power plant. The local farmers may bring it to the refuse dump or use it as additive to the construction material. Therefore, it is reasonable to predict that no revenue will be obtained from ash, but rather additional expenditure will be required.</p> <p>However, to be conservative and to demonstrate that the ash revenue (if any) will not influence the additionality of the project, the ash price at which the revenues would bring the IRR over the benchmark has</p>	
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		been calculated. The results show that the ash price should be about 500RMB/ton to increase the IRR to 8%. Given that the market price for cement is only around 300RMB/ton in China, 500RMB for waste ash is not plausible and as such ash revenues cannot impact the additionality of this project.	
<b>CL10</b> Please clarify the selected benchmark.	7.3.3 7.3.8	<p>The project IRR benchmark for this project is 8%. This was set by the Department of Power Generation &amp; Transmission Operations of the former State Power Corporation of China, in the “Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects”. This organization was responsible for carrying out government policies relating to new and retrofit power projects and for issuing rules such as IRR benchmark. Following re-organization, the functions of the State Power Corporation were transferred to the National Development and Reform Committee.</p> <p>The Interim Rules were issued based on “The Methodology and Parameters for Financial Evaluation of Construction projects (Chapter 1 General, Section 1.1)” edited by the National Development and Reform Committee and Construction Ministry. The 8% project IRR benchmark listed in the Interim Rules is still valid and is applicable to new and retrofit power projects including fossil fuel -fired projects, and is accepted as the benchmark of CDM projects in the power sector which has been used widely for the Feasibility Studies Reports of those projects. Hence, the proposed project adopts this benchmark. In addition, the 8% project IRR benchmark used in the PDD is an important index that is adopted in the benchmark investment analysis of Feasibility Study Report (FSR). The project FSR was approved by DRC of Jiangxi Province in June 2008.</p>	<p>The clarification is to the Audit Team’s satisfaction.</p> <p>The CL is therefore resolved and closed.</p>
<b>CL11</b> Please further clarify the project electricity tariff. Please further clarify whether the heat price includes VAT or not.	7.3.7	<p><b>Power tariff</b> –According to (<i>Renewable Energy Electricity Tariff and Cost Management Trial Regulations</i> [<i>fagaijiage</i> [2006] 7) issued by NDRC of China in 2006, for biomass power plant, the tariff within the first 15 years since commissioning is calculated by 0.25RMB/KWh plus the benchmark for the on-grid tariff of coal-fired power plants with de-sulphurisation units installed. After 15 years’</p>	<p>The project electricity tariff used in investment analysis can be confirmed consistent with that in FSR, which was composed by a qualified entity/15/ and approved by local government/16/.</p>



		<p>operation, the tariff would be cancelled. The benchmark on-grid tariff (with de-sulphur subsidy) for Jiangxi Province is 0.385RMB/KWh including VAT, which is used after 15 years' operation. 0.635RMB/KWh( 0.635=0.385+0.250) including VAT is used within the 15 years' operation.</p> <p>This is the tariff used in the investment analysis in the FSR and is therefore accurate. Please refer to "Explanation on the applied electricity tariff in the FSR of Wanzai Kaidi Biomass Power Plant Project" for more details.</p> <p><b>Heat price</b> –The heat price in the FSR is 29.85 RMB/GJ excluding VAT(VAT rate for heat is 13%), which is determined after a investigation of the heat demand, local market price of heat supply during the FSR period and a fully discussion with the Administration Bureau of Industrial Park by the FSR writing Institute and the project owner.</p>	<p>Electricity tariff can be further confirmed by cross-checking with the 'Renewable Energy Electricity Tariff and Cost Management Trial Regulations'/47/</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL12</b> Please further clarify the project annual operation hours and the project's power loss i.e. in-house load, transmission loss, etc.</p>	7.3.7	<p><b>Operational Hour</b></p> <p>The investment analysis assumes 6000 hours as the equivalent operational hours at full load. It does not assume that the plant will only operate for 6000 hours, but rather that the project will not run at full capacity for 100% of the time.</p> <p>The following bullet points provide a technical explanation of the 6000 operational hours:</p> <ul style="list-style-type: none"> <li>• Risk on the Reliability of the CFB boiler The CFB boiler is designed by the project owner and manufactured by domestic manufacturer. All the facilities in fuel feeding system are also domestic equipments. Although Wuhan Kaidi Power Engineer Co. Ltd has done a lot of research on the CFB biomass fired boiler, this new technology still needs to be tested and debugged during a long-term operation, and there's still relatively great potential technology risks, like inadequate</li> </ul>	<p>The Audit Team confirms that the annual operation hours and project's power loss are referred from the FSR, which is the foundation for the project implementation.</p> <p>The coal fired power generation technology is mature in China and the average annual operation hour is round about 7000 to 8000 hrs. Compared with coal fired power generation technology, the biomass energy technology is in an early stage in China and the annual operation hour is expected to be fluctuation around 6000 hrs,</p>

		<p>steam output, dust depositing, unbalanced fluidization, serious corrosion of heating surfaces etc.</p> <ul style="list-style-type: none"> <li> <b>Risk on the fuel quality</b>  The straws contain considerable elements of K, Na, and Cl, resulting in a high risk of dust depositing, blockages and erosion. Moreover, the content of SiO<sub>2</sub> in rice husk ash is higher than 85%, which will cause serious wear and tear of heating surface. Although some mitigation measures are taken, potential risks still exist. Besides, biomass residues are seasonal fuels, not only the amount but also some characteristics (such as water content) always fluctuate seasonally. Additionally, the residues may rot during storage and the calorific value will decrease. Any changes in the quantity and quality of biomass could lower the generator operating hour, or even stop production. </li> <li> <b>Maintenance</b>  The technology is relatively new to the project owner. Having no experience in operation and maintenance and thus no skilled workers will affect the efficiency and smooth operation of the plant. Also, because the feeding system of biomass power plants is much more complicated than that of normal coal-fired power plants, there are a number of resulting technology difficulties. Until now, nearly all relevant equipment in the operating biomass power plants in China are imported. However, all the devices of feeding system employed in this project are domestically manufactured. Considering that there's no mature Industrial and market of supporting devices and service, a higher frequency of incidents that require maintenance as well as longer maintenance periods would be expected. </li> </ul> <p>In addition to the explanations above, the project owner has made a comparison of similar biomass projects in operation. Zhongjieneng Suqian Biomass project is considered as a comparable project since it is a publicly available grid connected biomass residues project using CFB boilers and it is located in the southern area of China. The</p>	<p>which can be evidenced by registered CDM biomass project.</p> <p>The Validation Team confirmed the further description of power loss calculation/40/ is authentic by comparing with registered CDM biomass projects.</p> <p>The CL is therefore resolved and closed.</p>
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<p><b>CL13</b></p> <p>Please further clarify how similar</p>	7.5.4	<p>According to the “Combined tool to identify the baseline scenario and demonstrate additionality”, CCPG is selected as the relevant</p>	<p>‘Subsidies for Renewable Project between January and September</p>

<p>projects are sourced out. The Validation Team took notice that the data source for the similar projects is unfccc.int or CDM China website, which is not comprehensive and persuading.</p>	<p>7.5.5</p>	<p>geographical boundary of the project activity, which covers Henan Province, Hubei Province, Hunan Province, Jianxi Province, Sichuan Province and Chongqing City and includes more than 10 biomass residues power plants that are implemented or underway.</p> <p>In China, the investment environment for each region is different. Specifically in terms of available resources, loan policies, labour costs and electricity tariffs, these can vary significantly in different parts of China, even different province of China. Therefore, it is not appropriate to consider activities in the whole of China and CCPG is selected as the appropriate geographical scope for the common practice analysis.</p> <p>The biomass combustion power generation industry in China is quite new. Until 2006, no grid-connected biomass combustion power generation or cogeneration project with similar installed capacity (15-100MW) as the proposed project has been developed in China and the first similar biomass combustion generation power plant in China is the Shandong Shanxian 1*25MW Biomass Power Plant Project which was registered as CDM projects in year 2007.</p> <p>Based on the papers "Subsidies for Renewable Project commissioned between January and September 2007 issued by NDRC and SERC" and "Subsidies for Renewable Project commissioned between October 2007 and June 2008 issued by NDRC and SERC", the similar and operational projects in the CCPG are obtained.</p> <p>Besides, the similar projects that are currently under construction, but not operational are also searched. These projects have been found through internet searches as well as checking the UNFCCC and China DNA website.</p> <p>Based on the above information, we can see that all operational and underway grid-connected biomass power projects (15-100MW) are applying for CDM in CCPG. Therefore, the proposed project is not</p>	<p>2007' and 'Subsidies for Renewable Project between October 2007 and June 2008' issued by NDRC and SERC is confirmed by Validation Team as a comprehensive and public sources for the common practice</p> <p>For this project totally 18 similar projects are referred, covering the installation range from 15 MW to 100MW, and discussed in the PDD. It is demonstrated that to apply CDM activity is the common practice in CCPG</p> <p>The CL is therefore resolved and closed.</p>
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		common practice and it is additional.  Please refer to Section B.4 for detailed information.	
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<p><b>CL14</b></p> <p>Regarding fossil fuel consumed on site, it is described that fossil fuels are only used for boiler start up on site. However, from other similar projects implemented by the same project owner and observed by the Validation Team, there are equipments i.e. fork lift also consumes fossil fuel. Please clarify that whether there will be such part of fossil fuel. Also, for this biomass energy project, please clarify if there is a diesel generator used as back up power.</p>	8.1	<p>The information is updated.</p> <p>The on-site consumption of fossil fuels is from two sources. The first one is from the start-up diesel whose consumption is estimated as 25t per year. The second source is from the diesel consumption for forklifts at collections sites and project site whose consumption is estimated as 50t per year. The fossil fuel consumption is included in the emission reduction calculation.</p> <p>The consumption of the fossil fuels will be monitored according to the methodology.</p> <p>There is no diesel generator used as back up power.</p>	<p>The clarification is to the Audit Team's satisfaction.</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL15</b></p> <p>Please further clarify the gateway meter's installation position. Also please further to substantiate the installation of "meters monitoring the gross electricity generated by the generators" as described in section B.7.2 of the PDD.</p>	8.1	<p>The gate way meter will be installed at the project site monitoring the electricity supplied to the power grid and purchased from the power grid.</p> <p>There are meters installed at the outlet of the generators to monitor the gross electricity generated from the generators.</p>	<p>The clarification is to the Audit Team's satisfaction.</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL16</b></p> <p>In section B.7.2 of the PDD, it is described that there will be a 10kv backup power supply available in the early period of project's operation, please clarify that how imported electricity from this back up line will be monitored and make sure to incorporate this part of emission into consideration.</p>	8.2	<p>A 10KV backup power supply will be available in site in the early time of the proposed project and the amount of electricity imported through this line will be monitored and checked by the invoice if available.</p> <p>The net electricity equals to electricity supplied to the grid minus electricity purchased from the grid minus electricity purchased from the 10kv backup power.</p>	<p>The description of monitoring of 10kv backup line, and measurement methods of net electricity supplied to the grid in the revised PDD are confirmed sufficient and appropriate.</p> <p>The CL is therefore resolved and closed.</p>
<p><b>CL17</b></p> <p>Please clarify the CDM monitoring structure and the indicate person</p>	8.13 8.16	<p>There is a CDM team underway for the proposed project comprising of personnel picked from the power plant who will perform the dual functions of power plant O&amp;M and compliance with the CDM</p>	<p>The clarification is to the Audit Team's satisfaction.</p>

<p>who hold the overall responsibility.</p>		<p>procedures to monitor the project emission reductions and any leakage effects to make sure that the project compliance with the CDM monitoring and verification requirements.</p> <p>The plant manager will be in charge of approving the monitoring report, appointing the CDM manager and the relevant monitoring team members and responsible for the monitoring outcome.</p> <p>The CDM manager will be responsible for liaising with DOE and the buyers, organizing the relevant training, reviewing all the documents related to the monitoring of the project, correcting any errors in time and acting as the quality supervisor of the monitoring process.</p> <p>The Operating Manger will be responsible for the monitoring associated with operation of the plant, the net electricity generation, the heat generation, the start-up diesel consumption and the dry biomass combusted. In addition, the Operating Manager will supervise meter maintenance and manage the calibration process.</p> <p>The Biomass Collecting Manager will be responsible for the monitoring associated with biomass collection, the transportation emission, the mechanical biomass pretreatment emission and assisting the annual leakage analysis.</p> <p>The Financing &amp;Data filing Manager will prepare the available original invoices or receipts associated with the whole monitoring process. Besides, the Financing &amp;Data filing Manager will collect the relevant data from the Operating Manger and the Biomass Colleting Manager summarizes the data, file the data and submit reports to the CDM manager in time.</p> <p>For more details, please refer to B.7.2 of the PDD and the “Manual on the Monitoring and QA&amp;QC of the Wanzai Kaidi CDM Biomass Power Plant”.</p>	<p>The CL is therefore resolved and closed.</p>
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Table 3: List of forward action requests (FARs)			
FAR number	Reference	Summary of project owner response	Validation team conclusion
FAR01			
FAR02			
...			



## Appendix B

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### CERTIFICATES OF COMPETENCE

## Qualification

A, Qingxing (Sequoia) /

### Emission Trading United Nations Framework Convention on Climate Change

Auditor No.:  
(AuditorenRegNr)

Appointed:  
(Zugelassen)

☒ ja

Qualification Level:  
(Qualifikationsstufe)

Auditor

External:  
(Externer)

☐ ja

Add. reviewer:  
(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:  
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)  
CDM 04 – Manufacturing industries

Add. qualification:  
(zus. Qualifikation)

First Appointment:  
(Erstberufung)

2008/05/20

Valid to:  
(Gültig bis)

2011/05/19

Remarks:

Limitations:  
CDM 4 b) (Process Industries)

Languages:

Chinese  
English

### Experience Exchange

Date

Location

Remarks

Accreditation(s)

### Monitoring

Latest Monitoring:  
(letzte Beurteilung)

Next Monitoring:  
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

### History of scope allocation

Date: 2008-05-20  
Change: EAC CDM, CDM added  
By: Manfred Brinkmann  
Reason:

### History

Created: 2008/05/19 18:35:31 Sequoia A/Shg/Chn/TUV

Modified: 2010/09/13 16:07:36 Manfred Brinkmann/Jpn/TUV

## Qualification

Zhu, Jiang /

### Emission Trading United Nations Framework Convention on Climate Change

Auditor No.:  
(AuditorenRegNr)

Appointed:  
(Zugelassen)

☒ ja

Qualification Level:  
(Qualifikationsstufe)

Auditor

External:  
(Externer)

☐ ja

Add. reviewer:  
(Zusätzlicher Prüfer)

☐ yes

EAC Scopes:  
(EAC Branchen)

CDM 01 – Energy industries (renewable – / non-renewable sources)

Add. qualification:  
(zus. Qualifikation)

First Appointment:  
(Erstberufung)

2009/03/09

Valid to:  
(Gültig bis)

2012/03/08

Remarks:

Languages:

Chinese  
English

### Experience Exchange

Date

Location

Remarks

Accreditation(s)

### Monitoring

Latest Monitoring:  
(letzte Beurteilung)

Next Monitoring:  
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

### History of scope allocation

Date: 2009-03-08  
Change: EAC CDM added  
By: Manfred Brinkmann  
Reason:

### History

Created: 2008/03/20 14:56:52 Daxun Li/Bj/Chn/TUV  
Modified: 2008/03/20 14:57:07 Daxun Li/Bj/Chn/TUV

## Qualification

Brinkmann, Manfred /

## Emission Trading United Nations Framework Convention on Climate Change

Auditor No.:  
(AuditorenRegNr)

Appointed:  
(Zugelassen)

☒ ja

Qualification Level:  
(Qualifikationsstufe)

Lead Auditor

External:  
(Externer)

☐ ja

Add. reviewer:  
(Zusätzlicher Prüfer)

☒ yes

EAC Scopes:  
(EAC Branchen)

CDM 03 – Energy demand  
CDM 04 – Manufacturing industries  
CDM 05 – Chemical industry  
CDM 10 – Fugitive emissions from fuels (solid; oil and gas)  
CDM 11 – Fugitive emissions from production and consumption of  
halocarbons and sulphur hexafluoride  
CDM 12 – Solvents use  
CDM 01 – Energy industries (renewable – / non-renewable sources)  
CDM 06 – Construction  
CDM 13 – Waste handling and disposal

Add. qualification:  
(zus. Qualifikation)

First Appointment:  
(Erstberufung)

2004/03/03

Valid to:  
(Gültig bis)

2013/03/03

Remarks:

Languages:

German  
English  
French

## Experience Exchange

Date

Location

Remarks

Accreditation(s)

## Monitoring

Latest Monitoring:  
(letzte Beurteilung)

Next Monitoring:  
(nächste Beurteilung)

Remarks:

[View / Edit Monitoring](#)

## History of scope allocation

Date: 2004-03-05  
Change: EAC CDM, CDM added  
By: Klaus-Dieter Fritsch  
Reason:  
  
Date: 2004-03-03  
Change: EAC CDM, CDM, CDM, CDM, CDM, CDM added  
By: Klaus-Dieter Fritsch  
Reason: Qualification is based on the applicant's ISO 14001 auditor qualification.

## History

Created: 2003/12/11 14:27:13 –  
Modified: 2010/04/02 11:36:57 Manfred Brinkmann/Jpn/TUV