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# VALIDATION REPORT

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## HEBEI CHENGAN BIOMASS COGENERATION PROJECT IN CHINA

REPORT No. 2007-1115

REVISION No. 01

DET NORSKE VERITAS



# VALIDATION REPORT

|                                                |                                   |                                                                          |
|------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------|
| Date of first issue:<br>13 July 2007           |                                   | Project No.:<br>PRJC-128390-2009-CCS-CHN                                 |
| Recommended for approval:<br>Hendrik W. Brinks | Approved by:<br>Hendrik W. Brinks | Organisational unit:<br>DNV Climate Change and<br>Environmental Services |
| Client:<br>National Bio Energy Co., Ltd        |                                   | Client ref.:<br>Ms. Chen Fang                                            |

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| Summary:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p><b>Project Name:</b> Hebei ChengAn Biomass Cogeneration Project</p> <p><b>Country:</b> China</p> <p><b>Methodology:</b> ACM0006</p> <p><b>Version:</b> 9</p> <p><b>GHG reducing Measure/Technology:</b> Biomass based power generation to grid</p> <p><b>ER estimate:</b> 145 604 tCO<sub>2</sub>e</p> <p><b>Size</b></p> <p><input checked="" type="checkbox"/> Large Scale</p> <p><input type="checkbox"/> Small Scale</p> <p><b>Validation Phases:</b></p> <p><input checked="" type="checkbox"/> Desk Review</p> <p><input checked="" type="checkbox"/> Follow up interviews</p> <p><input checked="" type="checkbox"/> Resolution of outstanding issues</p> <p><b>Validation Status</b></p> <p><input type="checkbox"/> Corrective Actions Requested</p> <p><input type="checkbox"/> Clarifications Requested</p> <p><input checked="" type="checkbox"/> Full Approval and submission for registration</p> <p><input type="checkbox"/> Rejected</p> <p>In summary, it is DNV's opinion that the "Hebei ChengAn Biomass Cogeneration Project" in China, as described in the PDD, final version 3 dated 13 May 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0006, version 9. DNV thus requests the registration of the project as a CDM project activity.</p> |

|                                                                                                       |                                        |                |
|-------------------------------------------------------------------------------------------------------|----------------------------------------|----------------|
| Report No.:<br>2007-1115                                                                              | Date of this revision:<br>17 June 2010 | Rev. No.<br>01 |
| Report title:<br>Hebei ChengAn Biomass Cogeneration Project<br>in China                               |                                        |                |
| Work carried out by:<br>Chee Keong Lai, Wu Lin, Zheng Gong, Ming<br>Yue                               |                                        |                |
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|                                                                                                                              |
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## VALIDATION REPORT

### Abbreviations

|                    |                                                          |
|--------------------|----------------------------------------------------------|
| BM                 | Build Margin                                             |
| CAR                | Corrective Action Request                                |
| CDM                | Clean Development Mechanism                              |
| CEF                | Carbon Emission Factor                                   |
| CER                | Certified Emission Reduction                             |
| CH <sub>4</sub>    | Methane                                                  |
| CL                 | Clarification request                                    |
| CM                 | Combined Margin                                          |
| CO <sub>2</sub>    | Carbon dioxide                                           |
| CO <sub>2</sub> e  | Carbon dioxide equivalent                                |
| DNA                | Designated National Authority                            |
| DNV                | Det Norske Veritas Certification AS                      |
| NCPG               | North China Power Grid                                   |
| EIA                | Environmental Impact Assessment                          |
| EPB                | Environmental Protection Bureau                          |
| FAR                | Forward Action Request                                   |
| FSR                | Feasibility Study Report                                 |
| GHG                | Greenhouse gas(es)                                       |
| GWP                | Global Warming Potential                                 |
| IPCC               | Intergovernmental Panel on Climate Change                |
| IRR                | Internal Return Rate                                     |
| LoA                | Letter of Approval                                       |
| MP                 | Monitoring Plan                                          |
| NCV                | Net Caloric Value                                        |
| NDRC               | National Development and Reform Committee                |
| NGO                | Non-governmental Organisation                            |
| ODA                | Official Development Assistance                          |
| OM                 | Operation Margin                                         |
| PDD                | Project Design Document                                  |
| PPA                | Power Purchase Agreement                                 |
| RMB                | Renminbi, Chinese currency (Yuan)                        |
| SRFSR              | Supplement Report for Feasibility Study Report           |
| tCO <sub>2</sub> e | Tonnes of CO <sub>2</sub> equivalents                    |
| UK                 | The United Kingdom of Great Britain and Northern Ireland |
| UNFCCC             | United Nations Framework Convention on Climate Change    |
| VAT                | Value-added tax                                          |



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Appendix A: Validation Protocol

Appendix B: Certificates of Competence



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### 1 EXECUTIVE SUMMARY – VALIDATION OPINION

*Det Norske Veritas Certification AS (DNV) has performed a validation of the project activity “Hebei ChengAn Biomass Cogeneration Project” in China. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.*

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

*The host Party is China and the Annex I Party is the United Kingdom of Great Britain and Northern Ireland. Both Parties fulfill the participation criteria and have approved the project and authorized the project participants as National Bio Energy Co., Ltd and Natixis Environment & Infrastructures respectively. The DNA from China confirmed that the project assists in achieving sustainable development.*

*The project correctly applies the baseline and monitoring methodology ACM0006, version 9 “Consolidated methodology electricity generation from biomass residues”.*

*Through generation of electricity from biomass residues, the project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The total emission reductions from the project are estimated to be on the average 145 604 tCO<sub>2</sub>e per year over the selected 7 year renewable crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.*

*The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is DNV’s opinion that the project participants are able to implement the monitoring plan.*

*In summary, it is DNV’s opinion that the project activity “Hebei ChengAn Biomass Cogeneration Project” in China, as described in the PDD, final version 3 dated 13 May 2010, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0006, version 9. Hence, DNV requests the registration of the project as a CDM project activity.*



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## VALIDATION REPORT

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## 2 INTRODUCTION

National Bio Energy Co., Ltd has commissioned Det Norske Veritas Certification AS (DNV) to perform the validation of the “Hebei ChengAn Biomass Cogeneration Project” in China (hereafter called “the project”). This report summarizes the findings of the validation of the project, performed on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, and the subsequent decisions by the CDM Executive Board.

### 2.1 Objective

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

### 2.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0006 /38/. The validation was based on the recommendations in the Validation and Verification Manual /37/.

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

## 3 METHODOLOGY

The validation consisted of the following three phases:

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

The following sections outline each step in more detail.

### 3.1 Desk Review of the Project Design Documentation

The following tables list the documentation that was reviewed during the validation.

#### 3.1.1 Documentation provided by the project participants

/1/ Easy Carbon Consultancy Co., Ltd: CDM-PDD for project activity “Hebei ChengAn



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- Biomass Cogeneration Project” in China, initial version 1 dated 8 December 2006 and final version 3 dated 13 May 2010*
- /2/ Hebei Electric Power Design & Research Institute: *Feasibility study report (FSR) for the installed capacity of 48 MW and heat supply*, August 2005
  - /3/ Shandong Province Engineering Consultant Institute: *Appraisal report on FSR (installed capacity of 48 MW and heat supply) of Hebei ChengAn Biomass Cogeneration Project*, 21 October 2005
  - /4/ Hebei Electric Power Design & Research Institute: *Supplement report of FSR for the installed capacity of 30 MW and without heat supply*, January 2006
  - /5/ Hebei Province Development and Reform Commission: *Approval on FSR for the installed capacity of 48 MW and heat supply*, 7 June 2006
  - /6/ Hebei Province Development and Reform Commission: *Approval of Hebei ChengAn Biomass Generation Project with installed capacity of 30 MW and without heat supply*, 25 September 2009
  - /7/ Hebei Province Zhonglian Energy Environmental Protection Science Co., Ltd: *Environmental impact assessment (EIA)*, January 2006
  - /8/ Hebei Province Environmental Protection Bureau: *Letter of approval on EIA*, 8 March 2006
  - /9/ ChengAn County Development and Plan Bureau: *Notice about cancellation the heat component of Hebei ChengAn Biomass Cogeneration Project*, 15 November 2005
  - /10/ National Bio Energy Co., Ltd and Hebei Province Power Company: *Grid connection agreement*, 22 March 2006
  - /11/ National Bio Energy Co., Ltd and Hebei Province Power Company: *Power purchase agreement (PPA)*, 3 November 2007
  - /12/ Hebei Province Price Bureau: *Letter of approval on grid-connection tariff for Hebei ChengAn Biomass Cogeneration Project*, 30 December 2006
  - /13/ Hebei Province Price Bureau: *Notification of tariff implementation in coal fired plant*  
[http://law.baidu.com/pages/chinalawinfo/1684/64/620123c103ed129661faef67a8d1b9c9\\_0.html](http://law.baidu.com/pages/chinalawinfo/1684/64/620123c103ed129661faef67a8d1b9c9_0.html)
  - /14/ National Bio Energy Co., Ltd and Natixis Environnement & Infrastructures: *Emission Reduction Purchase Agreement*, 23 December 2009
  - /15/ National Bio Energy Co., Ltd and Easy Carbon Consultancy Co., Ltd: *CDM Development and Consultant Agreement*, 14 February 2006
  - /16/ China Minsheng Banking Co., Ltd: *The notification of loan granted*, 23 January 2006
  - /17/ National Bio Energy Co., Ltd and Shenzhen Guodian Kemao Logistics Group Co., Ltd: *Boiler Purchase Agreement*, 14 February 2006
  - /18/ National Bio Energy Co., Ltd and Qingdao Jieneng Turbine Co., Ltd: *Turbine Purchase Agreement*, 28 February 2006
  - /19/ National Bio Energy Co., Ltd and Shandong Jinan Generator Equipment Plant: *Generator Purchase Agreement*, 28 February 2006
  - /20/ National Bio Energy Co., Ltd and Hebei Province Electric Power Survey & Design Institute: *Construction agreement*, 20 March 2006
  - /21/ Hebei Electric Construction Supervision Co., Ltd: *Construction permission*, 10 June 2006



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- /22/ National Bio Energy Co., Ltd: *Board meeting minute about CDM consideration*, 8 February 2006
- /23/ National Bio Energy Co., Ltd: *Commission letter about the investigation of local biomass residues*, 29 November 2005
- /24/ Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd: *The investigation report of local biomass resource*, December 2005
- /25/ National Bio Energy Co., Ltd and biomass residues supplier: *Purchase contract of biomass residues*, 21 October 2009
- /26/ National Bio Energy Co., Ltd: *Stakeholder consultation questionnaires*, January 2006
- /27/ National Bio Energy Co., Ltd: *Training plan of plant staff*
- /28/ National Bio Energy Co., Ltd: *Purchase invoice of biomass residue cotton straw*, 5 May 2010
- /29/ Shandong Hengchengxin Engineering Consultant Co., Ltd: *The account auditing report of construction engineering completion for Hebei ChengAn Biomass Cogeneration Project*, 29 April 2008
- /30/ The development of biomass power project in China:  
<http://www.cqvip.com/qk/80913X/200809/28202636.html>  
<http://www.neoman.cn/neoman/29548/g.htm>  
[http://epaper.rmzxb.com.cn/2007/20070313/t20070313\\_126623.htm](http://epaper.rmzxb.com.cn/2007/20070313/t20070313_126623.htm)  
<http://www.crein.org.cn/2007news/2007020601.htm>
- /31/ Doctor Huang Jintao: *Economic evaluation and influence factors analysis on biomass combustion for power generation*, April 2008  
[http://d.wanfangdata.com.cn/Periodical\\_ncny200802027.aspx](http://d.wanfangdata.com.cn/Periodical_ncny200802027.aspx)
- /32/ Easy Carbon Consultancy Co., Ltd: *Financial analysis spreadsheet and emission reduction spreadsheet*

### 3.1.2 Letters of approval

- /33/ National Development and Reform Commission (DNA of China): *Letter of approval* dated 2 July 2007
- /34/ The website of DNA of China: The information of LoA for the proposed project  
<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File1231.pdf>
- /35/ Environment, Food and Rural Affairs (DNA of Annex I Party UK): *Letter of approval* dated 11 July 2008
- /36/ The website of DNA of UK: The information of LoA for the proposed project  
[http://www.decc.gov.uk/en/content/cms/what\\_we\\_do/change\\_energy/tackling\\_clima/intl\\_strat/mechanisms/clean\\_developm/clean\\_developm.aspx](http://www.decc.gov.uk/en/content/cms/what_we_do/change_energy/tackling_clima/intl_strat/mechanisms/clean_developm/clean_developm.aspx) (detail refers to Projects approved by the UK DNA as of 14 May 2010)

### 3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

- /37/ CDM Executive Board: *Validation and Verification Manual*, Version 1.1
- /38/ CDM Executive Board: *Consolidated methodology electricity generation from biomass residues*, ACM0006, Version 9
- /39/ CDM Executive Board: *Consolidated baseline methodology for grid-connected*



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- electricity generation from renewable sources, ACM0002, Version 10*
- /40/ CDM Executive Board: *Combined tool to identify the baseline scenario and demonstrate additionality, version 2.2*
  - /41/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system, Version 2*
  - /42/ CDM Executive Board: *Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion, Version 2*
  - /43/ CDM Executive Board: *Tool to calculate baseline, project and/or leakage emissions from electricity consumption, Version 1*
  - /44/ CDM Executive Board: *Guidance for request for deviation titled “Application of AM0005 and AMS-I.D in China” (<http://cdm.unfccc.int/Projects/Deviations>)*
  - /45/ CDM Executive Board: *Guidelines for completing the project design document (CDM-PDD) and the proposed new baseline and monitoring methodologies (CDM-NM), version 7, 2 August 2008*
  - /46/ CDM Executive Board: *Guidance on the Assessment of Investment Analysis, Version 3*

### 3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

- /47/ State Council Office: *Notice on Strictly Prohibiting the Installation of Fuel-fired Generators with the Capacity of 135 MW or below, No. 2002-6*
- /48/ China NDRC: *The emission factor calculation for each power grid of China, 2 July 2009*  
<http://cdm.ccchina.gov.cn/web/NewsInfo.asp?NewsId=3359>
- /49/ State Power Corporation of China: *Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects, 2003*
- /50/ China NDRC and National Construction Committee, *Economic Evaluation Code and Parameter for Construction Project, version 3 dated 2006*
- /51/ Compilation Committee of China Electric Power Yearbook: *China Electric Power Yearbook 2004-2008*
- /52/ Department of Industry and Transport Statistics of National Bureau of Statistics and Energy Bureau of NDRC of China: *China Energy Statistical Yearbook 2006-2008*
- /53/ Electricity Council of P. R. China: *Summary of Statistic Materials on Power Industry 2005 to 2007 (the values in 2005 to 2007)*
- /54/ IPCC: *2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2 Energy*
- /55/ IPCC: *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories: Reference manual (Energy)*
- /56/ NDRC: *Law of the People’s Republic of China on Conserving Energy, 25 August 2008*  
<http://www.chinatax.gov.cn/n480462/n480513/n480902/8083826.html>
- /57/ NDRC: *Power industry 11<sup>th</sup> Five-Year Plan of China, April 2007*  
<http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File186.pdf>
- /58/ National People’s Congress: *Air Pollution Prevention Law of China, 29 April 2000*
- /59/ Hebei Province Environmental Protection Bureau: *The emergency notice of strengthen*



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- prohibition on burning of biomass residues*, 15 June 2007  
<http://www.hebei.gov.cn/article/20070629/385543.htm>
- /60/ NDRC: *Tentative Management Measures for Pricing and Expense-sharing for Electricity Generated from Renewable Energy*, 1 January 2006  
<http://www.china.com.cn/chinese/2006/Feb/1118762.htm>
- /61/ Ministry of Finance of China: *Detailed Rules and Regulations for the Implementation of the Enterprise Income Tax Law of the People's Republic of China*, 4 February 1994  
<http://www.zjtax.gov.cn/sftd/flfgk/qysds/jbfg/200301010689.shtml>
- /62/ State Tax Bureau and Ministry of Finance: *Notification on value add tax for part of resource integrate utilization project and other product*, 1 December 2001  
<http://www.js-n-tax.gov.cn/Page/StatuteDetail.aspx?StatuteID=4991>
- /63/ State Council: *Interim Rules on Additional Tax for City Development*, 8 February 1985
- /64/ State Council: *Provisional Regulations of the People's Republic of China on Education Tax*, 20 August 2005  
<http://61.191.30.106:9080/slwz/gk/nr.jsp?opkey=1000226&type=30>
- /65/ Hebei Province Government: *Administrative Regulation of Hebei Province on Local Education Supplementary Tax*, 25 October 2003  
<http://221.195.72.70/xhdswz/list.asp?id=396>
- /66/ The similar biomass projects in Shandong Province  
<http://cdm.ccchina.gov.cn>  
<http://cdm.unfccc.int/Projects/registered.html>  
<http://cdm.unfccc.int/Projects/Validation/index.html>
- /67/ National Bureau of Statistics of China: *China Statistics Yearbook 2008*  
<http://www.stats.gov.cn/tjsj/ndsj/2008/indexch.htm>
- /68/ Price Bureau of NDRC of China: *The increasing trend of production and material price in 2007*  
[http://jgs.ndrc.gov.cn/jgqk/t20070116\\_111362.htm](http://jgs.ndrc.gov.cn/jgqk/t20070116_111362.htm)
- /69/ NDRC Website information about biomass residual price, 29 December 2005  
[http://www.sdpc.gov.cn/zdxm/t20051229\\_55135.htm](http://www.sdpc.gov.cn/zdxm/t20051229_55135.htm)
- /70/ The PDD, initial version 1 dated 8 December 2006, was made publicly available on the CDM website from 29 December 2006  
<http://cdm.unfccc.int/Projects/Validation/DB/B90WLUX8QKF2591LN21LEVJ82HO075/view.html>
- /71/ Hebei Province Power Company: *Monthly statistic form of electricity generation by Hebei ChengAn Biomass Generation Project*, January 2008 to December 2008
- /72/ State Tax Bureau: *Notification on determination of residual rate for enterprise fixed asset*, 14 September 2005  
<http://www.chinatax.gov.cn/n8136506/n8136563/n8193451/n8193526/n8194270/8245508.html>

The main differences between the web-hosted PDD and the final version submitted for registration are as follows:



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- Updated to use the current version of methodology ACM0006 “Consolidated methodology electricity generation from biomass residues”, (version 9 instead of version 4);
- Updated to use the latest approved versions of tools and methodology corresponding to ACM0006 version 9;
- The parameters indicated in the Supplement Report of the FSR for 30 MW installed capacity and without heat supply are applied in the investment analysis instead of the parameters used in the web-hosted PDD which were corresponding to the FSR with installed capacity of 48 MW and heat supply;
- The emission factor of 0.89353 tCO<sub>2</sub>/MWh for the grid issued by DNA of China most recently on basis of the latest data vintage available is used instead of the emission factor of 0.9825 tCO<sub>2</sub>/MWh stated in the web-hosted PDD, which is deemed to be conservative;
- Updated project starting date as 14 February 2006 instead of the date of 1 April 2006 in the web-hosted PDD;
- Updated the starting date of the first crediting period as 1 January 2011.

After reviewing the revised PDD final version 3 of 13 May 2010 /1/, DNV issued this final validation report and opinion.

### 3.2 Follow-up Interviews with Project Stakeholders

On 26 March 2007, auditor Yue Ming from DNV conducted on-site visit at works of National Bio Energy Co., Ltd and performed interviews with the project stakeholders.

|      | Date      | Name                                                                                                                                                | Organization                 | Topic                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| /73/ | 2007-3-26 | Mr. Yang Haigang, General manager<br>Mr. Li Yuhu, Vice general manager<br>Mr. Huang Weifeng, CFO<br>Mr. Liu Jun<br>Ms. Guo Xin, CDM project manager | National Bio Energy Co., Ltd | <ul style="list-style-type: none"> <li>➤ Project implementation</li> <li>➤ The development of biomass project in Hebei province</li> <li>➤ The approval status (incl. EIA approval, FSR approval, CDM project approval)</li> <li>➤ Project management</li> <li>➤ Emission reduction monitoring plan</li> <li>➤ Consulting process for stakeholder's comments</li> <li>➤ Investment risks and barriers</li> </ul> |



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|------|-----------|------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| /74/ | 2007-3-26 | Mr. Guan Yisong<br>Deputy director | Easy Carbon<br>Consultancy Co., Ltd | <ul style="list-style-type: none"> <li>➤ Baseline determination of the project</li> <li>➤ Applicability of selected methodology</li> <li>➤ Issues related to the additionality</li> <li>➤ Common practice analysis</li> <li>➤ Emission reductions calculation</li> <li>➤ Emission reduction monitoring plan and project management</li> </ul> |
|------|-----------|------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### 3.3 Resolution of Outstanding Issues

The objective of this phase of the validation was to resolve any outstanding issues which needed be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of two tables. The different columns in these tables are described in the figure below. The completed validation protocol for the "Hebei ChengAn Biomass Cogeneration Project" in China 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>                                                                                                                                                                                                                                   |  |  |
| The requirements the project must meet.                                               | Gives reference to the legislation or agreement where the requirement is found. | This is either acceptable based on evidence provided ( <b>OK</b> ), 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. |  |  |

  

| <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>                                                                                                                                                                                                                                                              |
| 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. | Gives reference to documents where the answer to the checklist question or item is found. | 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. | 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. | This is either acceptable based on evidence provided ( <b>OK</b> ), 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. |

  

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

**Figure 1: Validation protocol tables**



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### 3.4 Internal Quality Control

The final validation report has undergone a technical review performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

### 3.5 Validation Team

| <b>Role/Qualification</b>                    | <b>Last Name</b> | <b>First Name</b> | <b>Country</b> | <b>Type of involvement</b> |             |                         |           |                     |                  |              |
|----------------------------------------------|------------------|-------------------|----------------|----------------------------|-------------|-------------------------|-----------|---------------------|------------------|--------------|
|                                              |                  |                   |                | Administrative             | Desk review | Site visit / Interviews | Reporting | Supervision of work | Technical review | Expert input |
| CDM validator / technical team leader        | Lai              | Chee Keong        | China          |                            | ✓           |                         | ✓         | ✓                   |                  |              |
| GHG auditor / project manager                | Lin              | Wu                | China          | ✓                          | ✓           |                         | ✓         |                     |                  |              |
| GHG auditor                                  | Yue              | Ming              | China          |                            | ✓           | ✓                       | ✓         |                     |                  |              |
| GHG auditor with sectoral working experience | Gong             | Zheng             | China          |                            | ✓           |                         | ✓         |                     |                  | ✓            |
| Technical reviewer (draft report)            | Chandrashekar    | Kumaraswamy       | India          |                            |             |                         |           |                     | ✓                |              |
| Technical reviewer (final report)            | Astakala         | Vidyacharan       | India          |                            |             |                         |           |                     | ✓                |              |

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



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### 4 VALIDATION FINDINGS

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

The final validation findings relate to the project design as documented and described in the PDD, final version 3 dated 13 May 2010 /1/.

#### 4.1 Participation Requirements

The project participants are National Bio Energy Co., Ltd of China and Natixis Environnement & Infrastructures of the United Kingdom of Great Britain and Northern Ireland (UK). The host Party (China) and the Annex I Party (United Kingdom) meet all relevant participation requirements.

A letter of approval (LoA) /33/ was issued by DNA of China in 2 July 2007, authorizing National Bio Energy Co., Ltd as project participant and confirming that the project assists in achieving sustainable development. The DNA of United Kingdom issued the LoA /35/ on 11 July 2008 and authorized Natixis Environnement & Infrastructures as project participant. DNV received these LoAs from the project participants and was able to verify DNAs' webpage to confirm that the LoAs are authentic /34//36/.

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.

#### 4.2 Project Design

The project is located in ChengAn County, Handan City, Hebei Province of China. The geographical coordinates of the site as sourced from the accredited third party are 114°39'19" E and 36°28'55" N /2/.

The project is a greenfield project, involving the installation of one set of biomass residue fired boiler with the capacity of 130 t/h and one set of steam turbine generator with installed capacity of 30 MW /4/. The initial designed capacity of the project was 48 MW with heat supply in the feasible study report (FSR), involving two sets of 130 t/h boilers and two sets of 24 MW turbine generators. The FSR was prepared by the accredited third party Hebei Electric Power Design & Research Institute in August 2005 /2/ and approved by Hebei Province Development and Reform Commission on 7 June 2006 /5/ based on the public assessment from the sector experts designated by the government on 21 October 2005 /3/. Due to the shortage of heat demand in the local region which can be confirmed by local government ChengAn County Development and Plan Bureau on 15 November 2005 /9/, the project cancelled the heat supply; in addition, suggesting by the boiler supplier, the turbine and generator of 30 MW equipped with 130 t/h boiler can perform better; hence, the turbine and generator of 30 MW was chosen by the project developer instead of 2x24 MW. Subsequently, the supplement report of feasibility study report (SRFSR) for the installed capacity of 30 MW and without heat supply was completed by Hebei Electric Power Design & Research Institute in January 2006 /4/ and was confirmed by Hebei Province Development and Reform Commission on 25 September 2009 /6/. DNV was able to verify the mentioned documents.



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The project's estimated annual net electricity exported is 158 400 MWh, which will be exported to the North China Power Grid (NCPG) under the grid connection agreement /10/ and power purchase agreement (PPA) /11/.

The applied technology essentially comprises of direct combustion of biomass residues in boilers to generate steam, which is subsequently expanded through turbines and then drives the generator to generate electricity. Other than the key component of boiler (BWE) that is imported from Denmark /17/, the generator, turbine and accessories are manufactured in China /18/ /19/. The biomass generation technology applied in this project activity is deemed to reflect current good practice in China.

The biomass residues of cotton straw consumed by the project activity are directly sourced from agriculture fields. The collected biomass residues will be transported by vehicles to biomass residue sheds at the project site before being burnt in boilers for electricity generation.

The project activity has defined the starting date of the project activity as 14 February 2006 /17/ when the boiler purchase agreement was signed, and this was verified to be the earliest financial commitment for the project activity, as compared to other project activities such as turbine and generator purchase agreement on 28 February 2006 /18/ /19/, construction agreement on 20 March 2006 /20/ and construction permission on 10 June 2006 /21/. The designed operation life of the project is 20 years according to the SRFSR /4/. The project activity did start operation in April 2007.

A renewable crediting period of 7 years is selected, starting on 1 January 2011 with a possibility of renewing twice. The estimated amount of emission reduction over the crediting period is 145 604 tCO<sub>2</sub>e per year /32/.

The project description is complete and accurate.

### 4.3 Application of selected baseline and monitoring methodology

The project applies the approved consolidated baseline methodology ACM0006, version 9 "Consolidated methodology electricity generation from biomass residues" /38/, which is applicable to the project activity as:

| Applicable conditions of Methodology ACM0006                                                                                                                                                                                | In the proposed project activity                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No other biomass types than biomass residues are used in the project plant and these biomass residues are the predominant fuel used in the project plant (some fossil fuels may be co-fired).                               | No other biomass types than biomass residues cotton straw, as defined in the baseline methodology, are used in the project and cotton straw is the only fuel used in the project as per the SRFSR /4/ and the survey report of local biomass resource by a third party Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd /24/. No fossil fuel will be co-fired as per the SRFSR /4/. |
| For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project shall not result in an increase of the processing capacity of raw input | The biomass residues cotton straw used in the project activity are sourced from the agricultural fields. The implementation of the project activity will not increase the biomass production in the identified region, which can be verified through the survey report of local biomass resource by a                                                                                                 |



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|                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (e.g. sugar, rice, logs, etc.) or in other substantial changes (e.g. product change) in this process.                                                                                                                                                                                    | third party Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd /24/.                                                                                                                                                                                                                                                                                                                                                       |
| The biomass residues used by the project facility should not be stored for more than one year.                                                                                                                                                                                           | Due to the volatility and deterioration of biomass residues, the performance of the power plant equipments will be affected by the calorific value decreasing. Therefore, the biomass residues used in the proposed project will not be stored for more than 1 year, which has to be again monitored during the verification. In addition, the biomass fuels will be consumed on a first-come-first-used basis as stated in the SRFSR /4/. |
| No significant energy quantities, except from transportation or mechanical treatment of the biomass residues, are required to prepare the biomass residues for fuel combustion, i.e. projects that process the biomass residue prior to combustion (e.g. desertification of waste oils). | There is no significant energy quantities except from transportation and mechanical treatment of the biomass residues required. The project activity is estimated to only consume diesels of 30 tons to prepare and on-site transport the biomass residues for fuel combustion and start-up, which will be monitored during the operation.                                                                                                 |

As per the following baseline determination, only one single combined Scenario 2 of the methodology can be applied for this CDM project activity. DNV thus concluded that the application of the baseline methodology is transparent.

### 4.4 Baseline determination

#### 4.4.1 Baseline determination

The project activity complies with project Scenario 2 of ACM0006, version 9 /38/, i.e. the project activity involves the installation of a new biomass residue fired power plant at a site where no power generation occurred (Greenfield power project). The power generated by the project activity is fed into the NCPG or would in the absence of the project activity be supplied by the NCPG. The biomass residues would in the absence of the project activity be dumped or left to decay without utilizing it for energy purposes, which has been verified through on-site visit and the description of biomass residues usage and availability in the SRFSR and EIA /4/ /7/. The selection of the different scenarios has been elaborated in section 4.5.2 below. The selected baseline scenario is that, in the absence of the project activity, equivalent electricity would have been provided from the power plants connected to the NCPG and the biomass residues would be dumped or left to decay without utilizing it for energy purposes. In conclusion, the Scenario 2 is the most realistic baseline scenario in line with ACM0006, version 9:

|                                  |                                                                                     |
|----------------------------------|-------------------------------------------------------------------------------------|
| For power generation:            | P4- The generation of power in the grid                                             |
| For the use of biomass residues: | B1-The biomass residues are dumped or left to decay under mainly aerobic conditions |

The approved consolidated methodology ACM0002, version 10 “*Consolidated baseline methodology for grid-connected electricity generation from renewable sources*” is applied to



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calculate the grid emission factor /39/. This is reflected in the combined margin (CM), consisting of the weighted average of operating margin (OM) and build margin (BM), and is calculated as per the procedures prescribed in the “*Tool to calculate the emission factor for an electricity system*” of version 2 /41/. The selected electricity system NCPG is dominated by coal-fired power plants. It is deemed likely that coal-fired power plants will continue to dominate the power sector due to the local availability of low-cost coal. It is expected that renewable capacity additions will not have significant effects on the mix of the grid during the crediting period. The *ex-ante* estimation method was identified on OM and BM calculation. Detailed calculating process refers to section 4.5 below.

### 4.4.2 Project boundary

The spatial extent of the project boundary encompasses the power plant at the project site, the means for transportation of biomass residues to the project site, all power plants connected physically to the NCPG to which the proposed project is connected, and the site (within 30 km away around the project plant) where the biomass residues would have been left to decay or dumped /1/ /38/. The NCPG comprises Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia /48/. The selected sources and gases are justified for the project activity.

The system boundaries are presented in the following table:

|                    | GHGs involved   | Description                                                                                                                                                                |
|--------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Baseline emissions | CO <sub>2</sub> | Emissions for electricity generation by the NCPG with the same amount as generated by the project activity                                                                 |
|                    | CH <sub>4</sub> | Emissions from the uncontrolled burning or decay of surplus biomass residues                                                                                               |
| Project emissions  | CO <sub>2</sub> | i. Emission from on-site fossil fuel and electricity consumption due to the pre-treatment for the biomass residues<br>ii. Emission from transportation of biomass residues |
|                    | CH <sub>4</sub> | Emissions from the combustion of biomass residues in the power plant                                                                                                       |

## 4.5 Additionality

The additionality of the project has been demonstrated using the “Combined tool to identify the baseline scenario and demonstrate additionality”, version 2.2 /40/.

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

The boiler purchase agreement was signed on 14 February 2006 /17/, which has been considered as the starting date of the project activity. DNV has verified that this is the earliest start date compared to the turbine and generator purchase agreement on 28 February 2006 /18/ /19/, construction agreement on 20 March 2006 /20/ and construction permission on 10 June



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2006 /21/, and hence in DNV's opinion the start date is in line with the EB guidelines.

DNV has assessed the evidence and timeline for demonstration of serious CDM consideration of the project activity as follows:

- The SRFSR for the installed capacity of 30 MW and without heat supply was completed by Hebei Electric Power Design & Research Institute in January 2006 and the project developer was suggested to consider CDM benefit to improve the financial attractiveness /4/; and the SRFSR was confirmed by Hebei Province Development and Reform Commission on 25 September 2009 /6/;
- The loan application for the proposed project was accepted by China Minsheng Banking Co., Ltd on 23 January 2006 /16/, whereas two prerequisites should be met: one is that the project should be approved by local government and another is that the project is able to pay off the loan only in case the project obtains the CDM revenues;
- The project developer identified CDM as a mean on 8 February 2006 to overcome the investment barriers to proceed with the project, as evidenced in the meeting minutes of Board of Directors /22/.

The continued actions to secure CDM status in parallel with the implementation of the project activity have been demonstrated by the following actions:

- The agreement about CDM development was signed with the consultancy company 14 February 2006 /15/;
- PDD was published for global stakeholder consultation from 29 December 2006 /70/;

Hence, there were no gaps of more than two years with efforts to secure CDM status between the starting date of the project activity and the start of the validation. Hence in DNV's opinion, it is adequately demonstrated that continuous actions were undertaken to secure CDM status in parallel with the implementation of the project activity.

### 4.5.2 Identification of alternatives to the project activity

As defined in ACM0006 version 9 /38/, realistic and credible power generation alternatives include P1 to P11 in absence of the project activity.

#### POWER (P)

Through the site visit and perusal of the project design documents, DNV confirms that there was no existing captive power plant (cogeneration using fossil fuels, or biomass residues or co-fired) in operation at the project site. Hence alternatives P2, P3, P7, P8 and P11 are all not realistic and credible. The project is a greenfield power plant, not cogeneration plant, which was justified by local government /9/ although it was originally designed as cogeneration project in the original FSR /2/. Hence, P10 was not a realistic alternative.

According to current China power regulation, coal-fired power plants with installed capacity less than 135 MW are strictly prohibited in the areas covered by large grids such as provincial grids /47/, and hence scenario P9 can not be considered as a realistic and credible alternative since it is not in compliance with the mandatory laws and regulations in China.

China started to build biomass power generation plants from 2003, and the first biomass power generation project in China started operation in November 2006 /30/. Besides the



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proposed project, other similar biomass projects in the Hebei Province applied a high efficiency and advanced technology of electricity generation /66/. Hence, the lower efficiency of electricity generation is not common practice in China. In addition, according to “Law of the People’s Republic of China on Conserving Energy” /56/ and “Power industry 11<sup>th</sup> Five-Year Plan of China” /57/, the advanced technology and high efficiency of electricity generation are recommended to be applied in the newly built power plants. The low efficiency of electricity generation is thus deemed to be not complying with the developing trend of power industry in China, and is also not economically viable as indicated in the technical article “Economic evaluation and influence factors analysis on biomass combustion for power generation” by Doctor Huang Jintao /31/, which states that the cost of generation increases with lower efficiency. Hence DNV was able to conclude that the alternatives P5 and P6 can be excluded since it is not a viable option for the project developer to install a lower efficiency power generation plant than the proposed project.

Hence, the remaining realistic and credible alternatives for Power of the project are P1 or P4.

### BIOMASS RESIDUES (B)

As defined in the ACM0006 version 9 /38/, realistic and credible alternatives for biomass residues usage include B1 to B8 in absence of the project activity.

DNV confirms based on the sectoral knowledge, that the practice of land filling and other planned dumping of agricultural biomass residues in anaerobic conditions (deep landfills) in rural areas is not a common practice; hence the scenario B2 is excluded.

The scenario B3 of direct biomass residues burning in uncontrolled manner is excluded as it is forbidden by “Air Pollution Prevention Law of China” /58/ and local regulation /59/.

Through the site visit and perusal of the project design documents and the construction permits and commissioning certificates, DNV confirms that there was no existing captive power plant or cogeneration using fossil fuels, or biomass residues or co-firing in operation on the project site. Hence scenarios B5 and B6 are not realistic alternatives.

The scenario of B7, usage of the biomass residues for other energy purposes as bio-fuel generation is excluded as the biomass residues used in the project are not suitable for other sources of energy. Also as confirmed from the site visit, there are no existing projects utilizing the biomass residues for energy purpose.

There is a small amount of biomass residue that has been used as fertilizer around the project site, but the biomass consumption of the proposed project is derived from local surplus biomass residues within the identified boundary. DNV has verified from the biomass assessment survey report /24/ that there is surplus biomass available. Hence the scenario B8 is excluded.

DNV has verified from the statistical data issued by a third party Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd /24/, that the quantity of the cotton straw available in the region within a radius of 30 km is 185.6% larger than the quantity of cotton straw utilized in the region. The surplus biomass residue which cannot be utilized for any other purpose is thus left to decay in the baseline scenario, since the market is restricted. In the project scenario, the cost associated with the biomass is reasonable as there are costs associated with collection, distribution and transport of the biomass residues. In addition, the fact that the biomass residues can be used as fuel in the project activity creates a market and



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also leads to an escalation in the cost of the biomass residues. Hence while the baseline is that of biomass left to decay, at the same time the biomass carries a cost.

DNV confirms, by review of the assessment report of biomass residue's price issued by Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd in December 2005 /24/, that the expected price of biomass residues has been estimated based on the cost for purchasing from farmer, pre-treatment and storage, transportation and profit of biomass residue supplier. DNV can confirm that the estimated biomass residue's price of 210 RMB/ton (excl. 13% VAT) is appropriate and reasonable, as other projects apply biomass price in the same range.

Furthermore, as mentioned in section 4.5.5, the technology of large-scale biomass power generation project is still in the stage of research and project demonstration in China. China started to build biomass power generation plants from 2003, and the first biomass power generation project in China started to operation in November 2006 /30/. Thus, it is reasonable to assume that would have been left unused in the baseline in the absence of the proposed project activity.

Hence, the remaining realistic and credible alternative for biomass residues of the project is B1 and B4.

### HEAT (H)

The alternatives of heat have not been considered as the project activity does not supply/use heat energy except for power generation. This is evident from the fact that the project uses straight condensing steam turbines where no steam can be extracted, which can be verified by the specification in the turbine purchase agreement /18/.

Based on the analysis above, the alternatives P1, P4, B1 and B4 are in compliance with all applicable legal and regulatory requirements, and two combined alternative scenarios are conducted as follow:

**Alternative 1:** P1 and B4. The biomass residues are used for electricity generation at the project site. The proposed project activity not undertaken as a CDM project activity;

**Alternative 2:** P4 and B1. The project activity involves the installation of a new biomass residue fired power plant at a site where no power was generated prior to the implementation of the project activity. The power generated by the project plant is fed into the grid or would in the absence of the project activity be purchased from the grid. The biomass residues would in the absence of the project activity be dumped or left to decay without utilizing it for energy purposes.

DNV considers the determination of these two combined alternatives is complete and accurate.

### 4.5.3 Barrier analysis

Not applicable as no barriers for the two combined alternatives were identified.

### 4.5.4 Investment analysis

#### Choice of approach



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Since the project activity generates financial and economic benefits through the sales of electricity other than CDM related income and the alternative does not involve any investment, a benchmark analysis is applicable.

### Benchmark selection

According to the “Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects” issued by State Power Corporation of China /49/, a project-IRR of 8% (post-tax) for total investment is regarded as a benchmark for investing in renewable energy generation projects in China. DNV was able to confirm the selection of benchmark is suitable and it is still valid to date based on the followings:

- The benchmark was determined by the national administration of the industry in China /49/;
- The benchmark is corresponding to the project and after tax, while the investment analysis for the proposed project is the same;
- The “*Interim Rules on Economic Assessment of Electrical Engineering Retrofit Projects*” /49/ is referred to the risk premiums of power project, and this file is still valid now.

### Input parameters

The input parameters used in the financial analysis are taken from the SRFSR developed by Hebei Electric Power Design & Research Institute in January 2006 /4/. Information contained in the SRFSR can be considered information provided by an independent and recognized source.

DNV compared the input parameters for the financial analysis included in the PDD and IRR spreadsheet with the parameters stated in the SRFSR /4/ and was able to confirm that all the values applied are consistent with the value stated in the SRFSR.

The SRFSR was completed in January 2006 /4/, and thus only about one month prior to the decision to proceed with the project activity (i.e. the starting date of the project) which was on 14 February 2006 /17/. Although the date of the investment decision is before the SRFSR’s approval date of 25 September 2009 /6/, the validity of the input parameters in the investment analysis has been demonstrated by comparing the actual investment costs with those estimated in the SRFSR as well as comparing the input parameters in the investment analysis to the data reported for other similar CDM projects in Hebei Province as demonstrated in the following comparison. Furthermore, given this relatively short period of time between the completeness of the SRFSR and the decision to proceed with the project activity, it is unlikely in the context of the project that the input values would have materially changed; it is thus reasonable to assume that the approved FSR has been the basis of the decision to proceed with the investment in the project.

The input parameters used in the financial analysis were compared with the data reported for other similar biomass CDM projects registered in the same region, regarding the investment costs per MW, operating hours, applied tariff, biomass residue price (incl. 13% VAT), percentage of O&M costs (excluding the cost of biomass residues) relative to total investment costs as following table. Since there was only one similar biomass project registered as CDM project (excluding biomass cogeneration projects) in Hebei Province, to be conservative, the selected comparative region is expanded to the whole power grid North China Power Grid (NCPG), which includes Beijing, Tianjin, Hebei, Shanxi, Shandong and Inner Mongolia.



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| Project name                                           | CDM Status          | Capacity (MW) | Investment cost million RMB/kW | Operating hours | O&M cost/ investment cost | Tariff RMB/kWh                                            | Biomass residue price RMB/ton |
|--------------------------------------------------------|---------------------|---------------|--------------------------------|-----------------|---------------------------|-----------------------------------------------------------|-------------------------------|
| Straw generating project in Wei county Hebei province  | Registered Ref.1546 | 25            | 10 561                         | 5 500           | 7.8%                      | 0.589 for first 15 years/0.339 for remaining years        | 208.3                         |
| Shandong Shanxian 1*25MW Biomass Power Plant Project   | Registered Ref.1032 | 25            | 11 767                         | 6 000           | 5.0%                      | -                                                         | 300                           |
| Shandong Wudi Biomass Generation Project               | Registered Ref.1263 | 24            | 10 323                         | 5 500           | 5.4%                      | -                                                         | 200                           |
| Shandong Gaotang 30MW Biomass Power Generation Project | Registered Ref.1375 | 30            | 9 699                          | 5 500           | 4.6%                      | -                                                         | 280                           |
| <b>Proposed project</b>                                | -                   | <b>30</b>     | <b>9 009</b>                   | <b>6 000</b>    | <b>5.1%</b>               | <b>0.589 for first 15 years/0.339 for remaining years</b> | <b>237.3</b>                  |

### **Static Investment Cost:**

The static investment cost used in the financial analysis for the project activity was compared with the data reported for other similar projects in the NCPG. The investment cost of 9 009 RMB/kW for the proposed project is lower than the investment cost of other similar projects. This is deemed to be more conservative by DNV.

In addition, the static investment cost was cross checked against actual investment costs since the project has already been implemented. The actual static investment cost (254.89 million RMB) for the project stated in the Audit report of final account issued by Shandong Hengchengxin Engineering Consultant Co., Ltd on 29 April 2008 /29/ is almost matched (94%) with the estimated static investment cost (270.26 million RMB) in the SRFSR /4/. Considering the allowable deviation between the designed values in the feasibility study stage and the actual values after the project implementation, DNV can thus confirm that the static investment cost estimated in the SRFSR is reasonable.

### **Operating & Maintenance (O&M) Cost (excluding the cost of biomass residues):**

As shown in the table above, the percentage of O&M cost (excluding the cost of biomass residues) relative to investment cost of the project (5.1%) is deemed to be within the range of other similar projects, and enable DNV to confirm that the O&M cost is reasonable.

### **Biomass residue cost**

At the time of the SRFSR completion in January 2006 /4/, there were very few biomass power generation projects operating in China (the first large-scale biomass power generation project (Shanxian, Ref. No.: 1032) of China started to operate in November 2006 in Shandong Province) /30/. Prior to the decision on project implementation, Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd was commissioned on 29 November 2005 to



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evaluate the biomass residue in local region /23/. The survey report indicated the biomass price to be 210 RMB/ton (excl. VAT of 13%) for the cotton straws which consists of the following costs /24/:

|              | Purchase from farmers RMB/ton | Cost for pre-treatment & storage RMB/ton | Cost for transportation RMB/ton | Other cost RMB/ton | Final cost at the project site RMB/ton |
|--------------|-------------------------------|------------------------------------------|---------------------------------|--------------------|----------------------------------------|
| cotton straw | 70                            | 88                                       | 27                              | 25                 | 210                                    |

As stated in the biomass assessment survey report in the region of the project activity /24/, there is an abundant surplus of the cotton straw which is not utilized. The surplus biomass residue cotton straw which cannot be utilized for any other purpose is thus left to decay in the baseline scenario, since the market is restricted. In the project scenario, the cost for purchasing cotton straw from farmers is associated with collection, distribution and transport of the biomass residues. In addition, the fact that the biomass residues can be used as fuel in the project activity creates a market and also leads to an escalation in the cost of the biomass residues. Hence while the baseline is that of biomass residues are left to decay, at the same time the biomass carries a cost.

In order to validate the cost of 210 RMB/ton above, which also indicated in the SRFSR and applied in the PDD, DNV has assessed the following evidences:

- The biomass residue cost of 210 RMB/ton is derived from the evaluating conclusion issued by the third party Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd /24/. The value can be thus regarded as an accurate and trustworthy source of information.
- As listed in the table above, the biomass fuel price of 210 RMB/ton for the project was found to be within the range of 200-300 RMB/ton for similar projects in the same region, NCPG.
- Purchase contract /25/ and invoices /28/ of the cotton straws for the proposed project enable DNV to confirm that the actual price for cotton straws is 230 RMB/ton (excl. VAT), which is slightly higher than the estimated price of 210 RMB/ton (excl. VAT) used for IRR calculation. This is deemed to be conservative for the investment analysis.

Hence, it is concluded that the biomass fuel price for the project applied in the investment analysis is deemed to be reasonable.

### **Electricity Tariff**

DNV was able to confirm that the electricity tariff of the project (0.589 RMB/kWh for the first 15 years and 0.339 RMB/kWh for the remaining years) indicated in the SRFSR /4/ and PDD is consistent. According to the “Tentative management measures for pricing and expense-sharing for electricity Generated” as part of Chinese renewable energy law promulgated by China’s National Development and Reform Commission (NDRC) /60/, a consolidated tariff guidance for biomass projects in China should be followed. As per the guidance, the tariff of biomass power projects shall be the tariff of desulphurization coal fired units in the regional grid in the year 2005 plus subsidy composition of 0.250 RMB/kWh, and the preferential policy will be valid within 15 operational years. Moreover, since the year 2010 the subsidy composition for the new approved biomass power projects shall be reduced by 2% yearly on that of the previous approved biomass power projects. Hence, in order to be



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in compliance with this guidance, considering the benchmark tariff of 0.339 RMB/kWh in desulphurization coal fired unit in Hebei Province /13/, the tariff of 0.589 RMB/kWh shall be applied to the project activity in the first 15 operational years and 0.339 RMB/kWh for the remaining years. Hereinto, to be conservative for investment analysis, the 2% decreasing yearly for the tariff since 2010 will not be considered. In fact, the actual tariff for the project activity has been confirmed to be 0.589 RMB/kWh by a) the tariff approval issued by Hebei Province Price Bureau on 30 December 2006 /12/, b) the PPA signed by project owner and Hebei Province Power Company on 3 November 2007 /11/.

In addition, in China, most policies are promulgated at provincial level by combining the national policy with the region's condition. The electricity tariff for power plant is under strict control of government and will be determined by taking into consideration the regional resources, power grid status, economic development and other comprehensive index. Hence, DNV has verified the similar biomass project (Straw generating project in Wei county Hebei province, CDM Ref: 1546) in the same region Hebei Province, and confirmed that the applied tariff for the project of Ref 1546 also followed up the Tentative Management Measures for Pricing and Expense-sharing for Electricity Generated to obtain the same tariffs of 0.589 RMB/kWh for the first 15 operational years and 0.339 RMB/kWh for the remaining years /66/.

Hence, DNV was able to confirm the tariffs of 0.589 RMB/kWh for the first 15 operational years and 0.339 RMB/kWh for the remaining years applied in the SRFSR and the PDD are reasonable and appropriate.

### **Operating hours**

In order to validate the operating hours of 6 000 hours reported in the PDD, DNV has assessed the followings:

- CDM EB48 annex 11 gives a guideline for validation of plant load factor for renewable energy. One option is to use plant load factor provided to the government while applying the project activity for implementation approval. The SRFSR is meant for this purpose and hence according to current CDM regulation, the SRFSR should be considered sufficient for validation of plant load factor. DNV was able to confirm that the values of operating hours of the proposed project in the PDD and the IRR calculation spreadsheet are fully consistent with the parameters defined in the SRFSR, which was prepared by the accredited party Hebei Electric Power Design & Research Institute in January 2006 /4/.
- Comparing with the operating hour reported for other similar biomass projects in the NCPG, the operating hour was found to be of a similar level (5 500 - 6 000 hours).
- DNV was also able to confirm that the annual operating hours of the project activity are already higher than the average operating hours of fossil-fuel based power plants in Hebei Province (5 869 hours for year 2007, 5 270 hours for year 2008) according to China Electric Power Yearbook /51/. Hence, comparing with the mature fossil-fuel based power plant, the operating hours of 6 000 hours is considered conservative.
- By review the actual power generation of the proposed project activity in the period of one whole calendar year span (1 January 2008 to 31 December 2008) /71/, DNV was able to verify that the actual operating hours in 2008 was 5 872 hours and lower than the designed value of 6 000 hours.

Hence, it is concluded by DNV that the estimated operating hours applied in the investment



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analysis is reasonable and acceptable.

### ***Taxes and depreciation***

According to the “Guidance on the Assessment of Investment Analysis” (Version 3) issued in CDM EB51 /46/, since a post-tax benchmark of 8% is applied on the project activity, the actual interest payable has been taken into account in the calculation of income tax.

The income tax rate used in the financial analysis for this project activity is 33%, which is in compliance with the “Detailed rules and regulations for the implementation of the enterprise income tax law of the People's Republic of China” issued in 1994 (still valid when the SRFSR was completed in January 2006) /61/.

In terms of the “Notification on value add tax for part of resource integrate utilization project and other product” /62/, the VAT for biomass power industry shall be 17% and 13% for the fuel, which is consistent with the value applied in the Supplement Report of the FSR and the PDD.

According to the “Interim Rules on Additional Tax for City Development” /63/, the tax rate for city maintenance and construction will be determined as per taxpayer’s location: 7% for urban, 5% for county and town, and 1% for others. Due to project owner’s location in the city, 7% of VAT for additional tax for city maintenance and construction shall be applied for the project activity. The education tax (of the VAT) of 4%, including the national education tax (3%), and the local education supplementary tax (1%) are respectively following the national regulation for education tax /64/ and the local regulation for education supplementary tax /65/. In addition, compared with other similar biomass generation projects in Hebei Province, it can be confirmed by DNV that these tax rates are same as the corresponding values of other similar projects in Hebei Province. The tax rates used in the SRFSR and the PDD for this project activity are thus reasonable.

The depreciation has been taken into account in the income tax calculation. The depreciation period of 15 years is with normal accounting practice of those similar biomass power projects in China. The residual value of 5% is derived from the SRFSR and recovered at the end year of the operational time in IRR calculation, which is verified by DNV based on the relevant regulation /72/ and local sectoral expertise.

In conclusion, based on the sectoral expertise and public information available, DNV considers that the input values used in the financial analysis are reasonable and are likely to adequately represent the economic situation of the project.

#### **4.5.4.1 Calculation and conclusion**

The project-IRR calculations were provided in a spreadsheet /32/. The calculations were verified and found to be correct. The project-IRR without CDM revenues was verified to be 5.15% and below the benchmark of 8% (post-tax), which confirms that the project in the absence of CDM benefits is not financially attractive.

#### **4.5.4.2 Sensitivity analysis**

A sensitivity analysis has been carried out for parameters contributing more than 20% to revenues or costs to check the robustness of the financial analysis. Reasonable variations of the static total investment, annual O&M costs, on-grid tariff, annual supplied power and cost of biomass consumption were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen. None of the parameters in the sensitivity analysis are considered to have any significant positive correlation.



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| Total static investment | Annual O&M cost | Tariff | Annual power supply | Straw price |
|-------------------------|-----------------|--------|---------------------|-------------|
| -15.85%                 | -42.8%          | +8.18% | +8.18%              | -16.9%      |

**Total Static investments:** If the total investments decrease by 15.85%, the project-IRR reaches the benchmark of 8%. DNV is able to verify the static investment price index has been growing in the past five years (2004 - 2007) issued by National Bureau of Statistics of China /67/. In addition, as stated earlier, the actual investment cost of the project was verified to be slight 5.7% lower than that estimated in the SRFSR. Hence, a 15.85% decrease in the total investment is unlikely.

**Annual O&M cost:** Only if reducing the O&M cost by 42.8%, the project-IRR can be equal to the benchmark of 8%. The annual O&M cost is unlikely to drop as the material price and static investment price index show an increasing trend /67/ /68/.

**Straw price:** DNV was able to verify through NDRC website /69/ that the biomass residual cost is increasing and this could hamper the biomass utilization project development in China. In addition, compared with the actual price of cotton straw by the biomass residues purchase contract /25/ and invoices /28/, an increasing trend can be observed. Hence, a 16.9% decrease in the cost of biomass residue consumption is unlikely.

**Annual power supply:** To reach the 8% benchmark, the annually operating hours must increase by 8.18%, i.e. 6 491 hours, which is not likely to happen, since the technology of the large-scale biomass power generation is still in the stage of research and development /30/. Moreover, as stated earlier, it was found that the expected electricity generation is deemed to be reasonable and appropriate.

**Tariff:** Compliance with the guidance *Tentative Management Measures for Pricing and Expense-sharing for Electricity Generated* as part of *Chinese Renewable Energy Law* issued by NDRC /60/, the tariffs of 0.589 RMB/kWh for the first 15 operational years and 0.339 RMB/kWh for the remaining years shall be used for the project activity, and can be confirmed by the tariff approval issued by Hebei Province Price Bureau on 30 December 2006 /12/ and PPA signed by project owner and Hebei Province Power Company on 3 November 2007 /11/. Therefore, the tariff applied of the project is deemed to be stable and an increase of 8.18% is unlikely.

The sensitivity analysis shows that without the income from CERs sales the IRR of the proposed project is lower than the benchmark, even when the possible variations of the main parameters are considered. It is thus considered that the combined alternative 1 (combine P1 and B4) of the project activity not undertaken as a CDM project activity is economically less attractive than the combined alternative 2 (combine P4 and B1) of the generation of power in the grid.

### 4.5.5 Common practice analysis

In China, most policies are promulgated in provincial level by combining the national policy with the region's condition. In addition, as abundant biomass residue resources in Hebei



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Province make this region different from other regions in the aspect of electricity output. Hence, it is reasonable that Hebei Province is selected as the boundary for common practice analysis.

There are seven similar biomass residue based power generation projects (capacity range of 15 MW - 45 MW) identified in Hebei Province (including electricity generation and cogeneration), of which, all are applying for CDM benefits due to the similar economical unattractiveness faced by the proposed project /66/.

| Project name                                          | Capacity (MW) | Function               | CDM Status           |
|-------------------------------------------------------|---------------|------------------------|----------------------|
| Hebei Jinzhou 24 MW Straw-fired Power Project         | 24            | Cogeneration           | Registered Ref. 778  |
| Straw generating project in Wei county Hebei province | 25            | Electricity generation | Registered Ref. 1546 |
| Hebei Guantao Biomass Cogeneration Project            | 2×24          | Cogeneration           | Validation           |
| Zhuolu Huada Biomass Cogeneration Project             | 2×25          | Cogeneration           | Validation           |

Hence, DNV was able to confirm that the biomass residue for power generation project is not a common practice in Hebei Province.

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

### 4.6 Monitoring

The project applies the approved monitoring methodology ACM0006 version 9, “Consolidated methodology electricity generation from biomass residues” /38/.

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

The application of the monitoring methodology is transparent as following elaboration, and DNV considers the project participants are capable to implement the monitoring plan.

#### 4.6.1 Parameters determined ex-ante

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

| Data and Parameters           | Unit                  | Value applied | Source of data used                                                      |
|-------------------------------|-----------------------|---------------|--------------------------------------------------------------------------|
| Operating margin of NCPG (OM) | tCO <sub>2</sub> /MWh | 1.0069        | China Electric Power Yearbook<br>China Energy Statistic Yearbook<br>IPCC |
| Build Margin of NCPG (BM)     | tCO <sub>2</sub> /MWh | 0.7802        |                                                                          |
| Emission factor of            | tCO <sub>2</sub> /MWh | 0.89353       |                                                                          |



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|                                      |                                    |    |      |
|--------------------------------------|------------------------------------|----|------|
| NCPG                                 |                                    |    |      |
| Global warming potential for methane | tCO <sub>2</sub> /tCH <sub>4</sub> | 21 | IPCC |

### 4.6.2 Parameters monitored ex-post

The following data and parameters will be monitored in accordance with ACM0006:

#### Monitoring of emission reductions due to displacement of electricity

- Net quantity of electricity delivered to the NCPG by the project activity  $EG_{project\ plant,y}$ . The net electricity supplied by the project will be measured continuously by electricity meters and will be cross-checked against the electricity sales. The meters are bidirectional type with 0.2S accuracy and will be calibrated annually in line with the relevant standard.

#### Monitoring of emission reductions due to natural decay of anthropogenic sources of biomass residues

- Quantity of biomass residues combusted in the project plant  $BF_{k,y}$ . The quantity will be measured continuously by weight meter and cross-checked with an annual energy balance based on purchased quantities and stock changes. The weighing system will be calibrated annually in line with the relevant standard.
- Product of net calorific value of the biomass residues  $NCV_k$  and methane emission factor for uncontrolled burning of the biomass residue  $EF_{burning,CH_4,k,y}$ . For the  $EF_{burning,CH_4,k,y}$ , the IPCC default value for agricultural residues at 0.0027 tCH<sub>4</sub>/tonne will be used, and will be updated annually. The NVC of the biomass will be analysed every six months.

#### Monitoring of project emissions from transportation of biomass residues

- Average round trip distance (from and to) between biomass residue supply sites and the project site  $AVD_y$ . The distance will be recorded continuously. To be conservative, the longest distance between biomass residues supply sites and the project site (30x2 = 60 km) is used.
- To be conservative, the heavy duty diesel trucks will be chosen as considering the average load of the trucks used for transportation of biomass residues  $TL_y$ , which will be recorded continuously and aggregated annually.
- Average CO<sub>2</sub> emission factor of the diesel trucks (heavy duty diesel trucks)  $EF_{km,CO_2,y}$ . Since there is not value for this emission factor referring from IPCC 2006, the default value for moderate control US heavy duty diesel trucks of 0.001011 tCO<sub>2</sub>/km from Revised IPCC 1996 is applied /55/, and will be updated annually.

#### Monitoring of project emissions from on-site consumption of diesel by the project activity

- CO<sub>2</sub> emission factor of the diesel  $EF_{CO_2,i,y}$ . The IPCC default emission factor of 0.0748 tCO<sub>2</sub>/GJ at the upper limit of the uncertainty at a 95% confidence interval is applied, and will be updated in compliance with any future revision of the IPCC Guidelines.



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- Net calorific value of diesel  $NCV_{i,y}$ . The value refers to the national data of China Energy Statistical Yearbook, and will be updated annually.
- Quantity of diesel consumed by the project activity  $FC_{i,y}$ . The quantity will be measured continuously by the volume meter and cross-checked against the diesel purchase invoice. The flow meter will be calibrated annually in line with the relevant standard.

### Monitoring of project emissions from consumption of electricity

- On-site electricity consumption attributable to the project activity  $EG_{PJ,y}$ . The on-site electricity consumption attributable to the project activity mainly use for treating and transporting the biomass residues by machines. By interview with the project participant and check of the SRFSR, DNV can confirm that the biomass residues have been shredded by the farmer prior to transport to power plant and the biomass residues' transportation on-site was done by the machines using diesel as energy. Hence, there is little on-site electricity consumption attributable to the project activity and will be integrated into net quantity of electricity delivered to the grid. However, this parameter will be required to be reviewed on-site during the periodic verification of the project activity. In addition, since there is little off-site electricity consumption in the biomass residues collecting stations, which results in the project emissions less than 1% of the total emission reductions and is also not mentioned by the methodology, the project emissions due to off-site electricity consumption will be not considered.
- Average technical transmission and distribution losses  $TDL_{j,y}$ . According to the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption", the default value of 20% is used, and will be updated annually.

### Monitoring of project emissions from combustion of biomass residues

- Quantity of biomass residues combusted in the project plant  $BF_{k,y}$ . The relevant information has mentioned before.
- Moisture content of each kind of biomass residue. The moisture content will be measured continuously by moisture analyzer, and the analyzer will be calibrated annually in line with relevant standard.
- Net calorific value of each kind of biomass residues combusted in the project activity  $NCV_k$ . The net calorific value will be measured at least every six months by the accredited third party in line with relevant international standards, and the measurement is based on the dry biomass by taking at least three samples for each measurement.

### Monitoring of leakage

- Quantity of biomass residues available in the defined geographical region. The quantity will be derived from the biomass residues surveys or statistics by the accredited third party, and will be updated annually.
- Quantity of biomass residues that are utilized including the project plant, in the defined geographical region. The quantity will be derived from the biomass residues surveys or statistics by the accredited third party, and will be updated annually.



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All data collected as part of monitoring plan will be archived electronically and be kept for at least 2 years after the end of the last crediting period.

### 4.6.3 Management system and quality assurance

The project's monitoring plan includes:

- Introduction of the monitoring plan;
- Description for users of the monitoring plan & procedure;
- Key definitions;
- Description of monitoring;
- Quality assurance and quality control;
- Data management system;
- Verification and monitoring results.

The responsibility and authority for registration, monitoring, measurement, reporting activities and QA/QC have been properly addressed in the PDD.

### 4.7 Estimate of GHG Emissions

The GHG emission reduction calculations are in accordance with the formulae given in the baseline and monitoring methodology ACM0006 version 9 /38/.

Since the proposed project is just a biomass for power generation without heat generation, the emission reductions ( $ER_y$ ) by the project activity during the crediting period are the sum of emission reductions ( $ER_{electricity,y}$ ) due to displacement of electricity and the emission reductions ( $ER_{biomass,y}$ ) due to natural decay of anthropogenic sources of biomass residue minus project emissions ( $PE_y$ ) and emissions due to leakage ( $L_y$ ), as follows:

$$ER_y = ER_{electricity,y} + BE_{biomass,y} - PE_y - L_y$$

#### 4.7.1 Baseline emissions

##### (1) Emission reductions ( $ER_{electricity,y}$ ) due to displacement of electricity

The emission reductions ( $ER_{electricity,y}$ ) due to displacement of electricity during the year y is the product of the ex-ante calculated grid emission factor ( $EF_{electricity,y}$ , in tCO<sub>2</sub>/MWh) and the net electricity generation as a result of the project activity ( $EG_y$  in MWh), which will otherwise be supplied by the grid without the project activity:

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

The emission factor of the NCPG is determined *ex-ante* as a combined margin of the OM and BM (the weighted average  $w_{OM}=0.5$ ;  $w_{BM}=0.5$ ) based on the most recent information available at the time when the PDD was web-hosted according to "Tool to calculate the emission factor for an electricity system", version 2 /41/.

The emission factor used, 0.8955 tCO<sub>2</sub>/MWh is based on data published in July 2009, but this is conservative compared to the value for the time of web-hosting the PDD (0.9782 tCO<sub>2</sub>/MWh) and all CM emission factors to July 2009. The emission factor used in the web-hosted PDD was 0.9825 tCO<sub>2</sub>/MWh. Hence the conservative value was accepted by DNV. This value was derived the following way:

According to the data from China Electric Power Yearbook 2004-2008 /51/, the low-cost/must-run resources constitute less than 50% of the total grid generation. The OM is thus



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justified to calculate by using the “simple OM” method. Aggregated generation and fuel consumption data are used due to the fact that more specific data for the power plants are not available in the NCPG (option B). The OM was calculated to be 1.0069 tCO<sub>2</sub>e/MWh as a generation weighted average for the years 2005, 2006 and 2007 /32/. The input values are by DNV accepted as follows:

- The county specific data for electricity generation and installed capacity within the NCPG from the China Electric Power Yearbook /51/;
- The country specific data for net calorific value and the statistic data for fuel consumption of fossil fuels within the NCPG from the China Energy Statistical Yearbook /52/;
- The electricity imports in the NCPG from the Northeast China Power Grid and the Center China Power Grid from the Summary of Statistic Materials on Power Industry /53/;
- The IPCC 2006 for the fuel emission factors /54/.

Because plant specific fuel consumption and electricity generation data are not publicly available in China, the guidance requested by DNV from the CDM Executive Board for a deviation of the baseline methodology of AM0005 has been applied for calculation of the build margin (BM) emission factor for this project /44/:

- Use of capacity additions from the years 2005 to 2007 is chosen and reaches 32.98% of the total installed capacity /51/.
- Use of weights estimated using installed capacity in place of annual electricity generation. Thermal power plant accounts for 95.25% of the total installed capacity additions in this period /51/. Since specific data for each technology is not available, the fraction of fuels (coal 98.63%; gas 1.30%; oil 0.07%) was estimated from the CO<sub>2</sub> intensity for the fuels used in the NCPG /51/.
- Efficiencies of 38.10% for coal power plants and 49.99% for oil or gas power plants are defined as the best technology commercially available in China by the DNA of China /48/.

The BM is calculated to be 0.7802 tCO<sub>2</sub>e/MWh /32/. The resulting combined margin emission factor is 0.89353 tCO<sub>2</sub>e/MWh is fixed *ex-ante* for the first crediting period. The baseline emission estimate can be replicated using the data and parameter values provided in the PDD and supporting files submitted for registration. The data sources mentioned have been verified by DNV.

### (2) Emission reductions ( $BR_{biomass,y}$ ) due to natural decay of anthropogenic sources of biomass residue

The emission reductions ( $BR_{biomass,y}$ ) due to natural decay of anthropogenic sources of biomass residue during the year y is calculated as the product of the amount of biomass residues used ( $BE_{biomass,CH_4,y}$ ) multiplies the biomass net calorific value, methane emission factor and the global warming potential of methane:

$$BE_{biomass,y} = GWP_{CH_4} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k \cdot EF_{burning,CH_4,k,y}$$

According to the methodology ACM0006 version 9 /38/, 0.0027 tCH<sub>4</sub>/t is recommended to be used as the default value for the product of  $NCV_k$  and  $EF_{burning,CH_4,k,y}$  when more accurate information is absent. As 0.0027 tCH<sub>4</sub>/t is used, the uncertainty is deemed greater than 100%,



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resulting in a conservativeness factor of 0.73. Thus an emission factor of 0.001971 tCH<sub>4</sub>/t is used, which is reasonable. All other parameters will be monitored *ex-post*. The calculation in the PDD has been checked and found appropriate.

### 4.7.2 Project emissions

According to the methodology ACM0006 /38/, project emissions include i) project emissions from transportation of biomass residues, ii) project emissions from on-site consumption of fossil fuel by the project, iii) project emissions from consumption of electricity, and iv) methane emissions from combustion of biomass residues:

$$PE_y = PET_y + PEFF_y + PE_{EC,y} + GWP_{CH_4} \times PE_{biomass,CH_4,y}$$

#### (1) Project emissions from transportation of biomass residues ( $PET_y$ )

Option 1 was selected to determine the emission from combustion of fossil fuels arising from the transportation of biomass residues to the project plant on the basis of distance and the number of trips:

$$PET_y = \frac{\sum_k BF_{T,k,y}}{TL_y} \times AVD_y \times EF_{km,CO_2,y}$$

Since there is not value for this emission factor referring from IPCC 2006, the default value for moderate control US heavy duty diesel trucks of 0.001011 tCO<sub>2</sub>/km from Revised IPCC 1996 is applied /55/ for the average CO<sub>2</sub> emission factor ( $EF_{km,CO_2,y}$ ) of the diesel trucks /54/. The average round trip distance (from and to) between biomass residue supply sites and the project site, and average load of the trucks used for the transportation of biomass residues will be monitored *ex-post*.

#### (2) Project emissions from on-site consumption of diesel by the project ( $PEFF_y$ )

The emission from on-site consumption of fossil fuels is calculated using the “Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion”, version 2 /42/:

$$PEFF_y = \sum FC_{i,y} \times NCV_{i,y} \times EF_{CO_2,i,y}$$

The fossil fuels combusted in the project plant and fossil fuels combusted at the project site for other purposes that are attributable to the project activity are both considered in the calculation and will be monitored *ex-post*. The IPCC default of 0.0748 tCO<sub>2</sub>/GJ at the upper limit of the uncertainty at a 95% confidence interval was applied for the CO<sub>2</sub> emission factor ( $EF_{CO_2,i,y}$ ) of the diesel /54/, and the net calorific value of diesel refers to latest reliable national data of China Energy Statistical Yearbook /52/.

#### (3) Project emissions from consumption of electricity ( $PE_{EC,y}$ )

The emissions ( $PE_{EC,y}$ ) due to on-site consumption of electricity are calculated based on the quantify of electricity consumed, emission factor for electricity generation and a factor to account for transmission losses according to the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”, version 1 /43/:

$$PE_{EC,y} = \sum_j EC_{PJ,j,y} \times EF_{EL,j,y} \times (1 + TD L_{j,y})$$



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Since the electricity consumption is purchased from the grid only, the Scenario A mentioned is applicable to the proposed project. The combined margin emission factor of the NCPG is applied for the emission factor for electricity generation ( $EF_{EL,j,y}$ ), and 20% was chosen as the default value of TDL in line with the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”.

On-site electricity consumption attributable to the project activity  $EG_{PJ,y}$ . The on-site electricity consumption attributable to the project activity mainly use for treating and transporting the biomass residues by machines. By interview with the project participant and check the SRFSR, DNV can confirm that the biomass residues have been shredded by the farmer prior to transport to power plant and the biomass residues’ transportation on-site was done by the machines using diesel as energy. Hence, there is little on-site electricity consumption attributable to the project activity and will be integrated into net quantity of electricity delivered to the grid. However, this parameter will be required to be reviewed on-site during the periodic verification of the project activity.

### (4) Methane emissions from combustion of biomass residues ( $PE_{biomass,CH_4,y}$ )

The methane emissions from combustion of biomass residues in the project ( $PE_{biomass,CH_4,y}$ ) is determined as below,

$$PE_{biomass,CH_4,y} = EF_{CH_4,BF} \times \sum_k BF_{k,y} \times NCV_k$$

According to the methodology ACM0006 /38/, when the IPCC default methane emission factor of 30 kgCH<sub>4</sub>/TJ for combustion of biomass residues is applied, the uncertainty of the methane emission factor is estimated to be 300%, resulting in a conservativeness factor of 1.37. Thus, the methane emission factor of 41.1 kgCH<sub>4</sub>/TJ ( $EF_{CH_4,BF}$ ) is used in the emission reduction calculation.

### 4.7.3 Leakage

According to the methodology ACM0006 /38/, the probable source identified for the leakage is that the project diverts biomass from other users and thereby increases fossil fuel use. Approach L<sub>2</sub> was selected to demonstrate that the annual biomass requirement of the project activity is at least 25% larger than the biomass utilized in the region.

Based on the survey report of local biomass resource by a third party Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd /24/, geographical region has been defined covering radius of 30 km. It has been demonstrated that the use of biomass residues cotton straws in the project does not result in the leakage since the quantity of available cotton straws in the region is 185.6% larger than the quantity of cotton residues utilized.

In case of the leakage effects of a certain type of biomass residues used in the project activity cannot be ruled out with the mentioned above, leakage effects for the project activity shall be calculated as follow:

$$L_y = EF_{CO_2,LE} \cdot \sum_k BF_{PJ,k,y} \cdot NCV_k$$

The IPCC default value of 0.0946 tCO<sub>2</sub>/GJ is applied for the CO<sub>2</sub> emission factor of the most carbon intensive fuel used in China ( $EF_{CO_2,LE}$ ) /54/ and will be updated annually as necessary.



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### 4.7.4 Emission reductions

The calculations are in accordance to the methodology ACM0006, and a spreadsheet for the CERs calculation has been reviewed. The expected net electricity generation is 158 400 MWh/year and the estimated emission reductions are 145 604 tCO<sub>2</sub>/year over the selected seven years crediting period /32/.

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

### 4.8 Environmental Impacts

An Environmental Impact Assessment (EIA) has been conducted by Hebei Province Zhonglian Energy Environmental Protection Science Co., Ltd in January 2006 /7/ according to relevant Chinese law & regulation. The potential environmental impacts were sufficiently identified and no significant environmental impacts are expected from the project activity. Hebei Province Environmental Protection Bureau approved the project activity on 8 March 2006 /8/.

### 4.9 Comments by Local Stakeholders

Besides the stakeholder consultation process stipulated in the Chinese EIA regulation /7/, project developer conducted an additional stakeholder consultation as part of the CDM project. Local residents and government officials were invited to participant in the stakeholder consultation by questionnaire in January 2006 /26/. In the survey, 49 questionnaires were distributed and received a 100% of responses. DNV have checked all the questionnaires received and confirmed that the project received strong support from the local stakeholders.

DNV can confirm the adequacy of the local stakeholder consultation process.

### 4.10 Comments by Parties, Stakeholders and NGOs

The PDD, initial version 1 dated 8 December 2006, was made publicly available on the CDM website /70/ and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 29 December 2006 to 27 January 2007. No comments were received.

## **APPENDIX A**

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### **CDM VALIDATION PROTOCOL**

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

| Requirement                                                                                                                                                                                                                                                                                                          | Reference                                                       | Conclusion                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <b>About Parties</b>                                                                                                                                                                                                                                                                                                 |                                                                 |                                                                                                                 |
| The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3.                                                                                                                                                                          | Kyoto Protocol Art.12.2                                         | OK                                                                                                              |
| The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.                                                                                                                                                                                                                | Kyoto Protocol Art.12.2.                                        | OK                                                                                                              |
| The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.                                                                                                                                                                                | Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a   | <del>CAR-1</del><br>OK                                                                                          |
| The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof.                                                                                                                                                                  | Kyoto Protocol Art. 12.2, CDM Modalities and Procedures §40a    | <del>CAR-1</del><br>OK                                                                                          |
| In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties. | Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2 | OK                                                                                                              |
| Parties participating in the CDM shall designate a national authority for the CDM.                                                                                                                                                                                                                                   | CDM Modalities and Procedures §29                               | OK. China: National Development and Reform Commission<br>UK: Department for Environment, Food and Rural Affairs |
| The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.                                                                                                                                                                                                                           | CDM Modalities §30/31a                                          | OK. China ratified the Kyoto Protocol on 30 August 2002.                                                        |

| Requirement                                                                                                                                                                                                                                                                                                                                                   | Reference                                                    | Conclusion                                                                                                                               |
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|                                                                                                                                                                                                                                                                                                                                                               |                                                              | UK has ratified the Kyoto Protocol on 31 May 2002                                                                                        |
| The participating Annex I Party's assigned amount shall have been calculated and recorded.                                                                                                                                                                                                                                                                    | CDM Modalities and Procedures §31b                           | OK. The assigned amounts of the United Kingdom have been calculated. The United Kingdom assigned amount is 92% of the emissions in 1990. |
| The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7.                                                                                                                                                                                 | CDM Modalities and Procedures §31b                           | OK. The United Kingdom has in place a national registry and annually reports its GHG inventory to the UNFCCC.                            |
| <b>About additionality</b>                                                                                                                                                                                                                                                                                                                                    |                                                              |                                                                                                                                          |
| Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.                                    | Kyoto Protocol Art. 12.5c, CDM Modalities and Procedures §43 | OK                                                                                                                                       |
| <b>About forecast emission reductions and environmental impacts</b>                                                                                                                                                                                                                                                                                           |                                                              |                                                                                                                                          |
| The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.                                                                                                                                                                                                                                    | Kyoto Protocol Art. 12.5b                                    | OK                                                                                                                                       |
| <b>For large-scale projects only</b>                                                                                                                                                                                                                                                                                                                          |                                                              |                                                                                                                                          |
| Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out. | CDM Modalities and Procedures §37c                           | OK                                                                                                                                       |

| Requirement                                                                                                                                                                                                             | Reference                                             | Conclusion |
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| <b>About stakeholder involvement</b>                                                                                                                                                                                    |                                                       |            |
| Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.                                                                                    | CDM Modalities and Procedures §37b                    | OK         |
| Parties, stakeholders and UNFCCC accredited NGOs shall have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available. | CDM Modalities and Procedures §40                     | OK         |
| <b>Other</b>                                                                                                                                                                                                            |                                                       |            |
| The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.                                                                                                                        | CDM Modalities and Procedures §37e                    | OK         |
| A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.                                              | CDM Modalities and Procedures §45c,d                  | OK         |
| The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.                                                                              | CDM Modalities and Procedures §47                     | OK         |
| The project design document shall be in conformance with the UNFCCC CDM-PDD format.                                                                                                                                     | CDM Modalities and Procedures Appendix B, EB Decision | OK         |
| Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.                                              | CDM Modalities and Procedures §37f                    | OK         |

**Table 2 Requirements Checklist**

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                  |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>Draft Concl.</b> | <b>Final Concl.</b> |
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| <b>A General Description of Project Activity</b><br><i>The project design is assessed.</i>                                     |  |             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                     |
| <b>Project Boundaries</b><br><i>Project Boundaries are the limits and borders defining the GHG emission reduction project.</i> |  |             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                     |
| Are the project's spatial boundaries (geographical) clearly defined?                                                           |  | /1/         | DR<br>I     | <p>The project is located in ChengAn County, Handan City, Hebei Province, China. The spatial extent of the project boundary encompasses the power plant at the project site, the means for transportation of biomass residues to the project site and all power plants connected physically to the NCPG.</p> <p>According to ACM0006 version 4, the spatial boundaries should also include the site where the biomass residues would have been left for decay or dumped.</p> <p>It is mentioned in the PDD that the ash from biomass residues combustion are packed for sales as fertilizer. It needs to be clarified included in the boundary and whether the emissions from the transportation are considered in the emission reductions calculation.</p> | CAR-2<br><br>CL-1   | OK                  |
| Are the project's system boundaries (components and facilities used to mitigate GHGs) clearly defined?                         |  | /1/         | DR<br>I     | The projects system boundaries have been clearly defined.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                     | OK                  |
| <b>Participation Requirements</b>                                                                                              |  |             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     |                     |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                            | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                      | <b>Draft Concl.</b> | <b>Final Concl.</b> |
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| <i>Referring to Part A, Annex 1 and 2 of the PDD as well as the CDM glossary with respect to the terms Party, Letter of Approval, Authorization and Project Participant.</i>             |             |             |                                                                                                                                                                                                                                                                                                                                      |                     |                     |
| Which Parties and project participants are participating in the project?                                                                                                                 | /1/         | DR          | The project participants are National Bio Energy Co., Ltd from China and Natixis Environnement & Infrastructures from the UK.                                                                                                                                                                                                        |                     | OK                  |
| Have all involved Parties provided a valid and complete letter of approval and have all private/public project participants been authorized by an involved Party?                        | /1/         | DR          | The letters of approval from the DNA of China and the UK have not been obtained.                                                                                                                                                                                                                                                     | <del>CAR-1</del>    | OK                  |
| Do all participating Parties fulfil the participation requirements as follows:<br>- Ratification of the Kyoto Protocol<br>- Voluntary participation<br>- Designated a National Authority | /1/         | DR          | Yes.<br>China ratified the Kyoto Protocol on 30 August 2002.<br>UK's assigned amount is 92% of the emission level in 1990.<br>Both parties fulfil the voluntary participation requirement.<br>Chinese DNA is the National Development and Reform Commission.<br>DNA of UK is the Department for Environment, Food and Rural Affairs. |                     | OK                  |
| Potential public funding for the project from Parties in Annex I shall not be a diversion of official development assistance.                                                            | /1/         | DR          | The validation did not reveal any information that indicates that the project can be seen as a diversion of ODA funding towards China.                                                                                                                                                                                               |                     | OK                  |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                                                                            | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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| <b>Technology to be employed</b><br><i>Validation of project technology focuses on the project engineering, choice of technology and competence/ maintenance needs. The validator should ensure that environmentally safe and sound technology and know-how is used.</i> |             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                         |                         |
| Does the project design engineering reflect current good practices?                                                                                                                                                                                                      | /1/         | DR<br>I     | The main component of the project activity, the boiler system is based on technology from Denmark. The generating set and the turbine is being sourced from China itself. Hence the project design engineering reflects current good practices.<br><br>There appears to be a mismatch in the data provided the PDD and the feasibility report: <ul style="list-style-type: none"> <li>- The installed capacity is 2×24 MW in the FSR and 1×30 MW in the project design; the capacity of boiler is 130 t/h in the FSR and 175 t/h in the PDD;</li> <li>- Clarity on the type of biomass residues used in the project activity.</li> </ul> | <del>CL2</del>          | OK                      |
| Does the project use state of the art technology or would the technology result in a significantly better performance than any commonly used technologies in the host country?                                                                                           | /1/         | DR<br>I     | The proposed advanced technology adopted for the project activity is expected to result in good performance.<br><br>Technical specifications of key equipment such as the boiler, turbine etc., is requested to be provided in the PDD.                                                                                                                                                                                                                                                                                                                                                                                                  | <del>CL3</del>          | OK                      |
| Does the project make provisions for meeting training and maintenance needs?                                                                                                                                                                                             | /1/         | DR          | Yes. The training needs will be met by the                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         | OK                      |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                            | Ref. | MoV* | COMMENTS                                                                                                                                                                                                                                                          | Draft Concl. | Final Concl. |
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|                                                                                                                                                                                                                          |      | I    | project proponent and the technology supplier/manufacturers.                                                                                                                                                                                                      |              |              |
| <b>Contribution to Sustainable Development</b><br><i>The project's contribution to sustainable development is assessed.</i>                                                                                              |      |      |                                                                                                                                                                                                                                                                   |              |              |
| Has the host country confirmed that the project assists it in achieving sustainable development?                                                                                                                         | /1/  | DR   | The letter of approval from the DNA of China confirming the project being in line with the sustainable development policies of host party has not been received.                                                                                                  | CAR-1        | OK           |
| Will the project create other environmental or social benefits than GHG emission reductions?                                                                                                                             | /1/  | DR   | Yes. The project will lead to other benefits such as creating new employment opportunities and contributing to reduce energy requirements to the country, apart from reducing methane emissions caused by biomass residues left to decay or uncontrolled burning. |              | OK           |
| <b>B Project Baseline</b><br><i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i> |      |      |                                                                                                                                                                                                                                                                   |              |              |
| <b>Baseline Methodology</b><br><i>It is assessed whether the project applies an appropriate baseline methodology.</i>                                                                                                    |      |      |                                                                                                                                                                                                                                                                   |              |              |
| Does the project apply an approved methodology and the correct version thereof?                                                                                                                                          | /1/  | DR   | Yes. The project applies the approved consolidated baseline methodology for grid-connected electricity generation from biomass residues, ACM0006 version 4. For the calculation of the baseline emission factor                                                   |              | OK           |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | for electricity displacement the approved consolidated methodology ACM0002 version 6 has been applied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |
| Are the applicability criteria in the baseline methodology all fulfilled?                     | /1/         | DR          | <p>The methodology ACM0006 version 4 is applicable to the project for the following reasons:</p> <p>The project activity is a new power generation plant at a site where currently no power generation occurs (green field power project);</p> <p>No other biomass types than biomass residues will be used in the project plant and only small amount of diesel is expected to be used for start ups;</p> <p>The biomass residues shall not be stored for more than a year;</p> <p>No significant energy quantities, except for transportation of biomass residues and mechanic treatment for the biomass (straw collection and treatment system), are required to prepare the biomass residues for fuel combustion.</p> <p>However, it It is requested to be justified as to how the requirement of the methodology that – for projects that use biomass residues from a production process (e. g. production of sugar or wood panel boards), the implementation of the project shall not result</p> | <del>CL</del> 4         | OK                      |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                                                                                       | Ref.       | MoV* | COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Draft Concl. | Final Concl. |
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|                                                                                                                                                                                                                                                                                     |            |      | in an increase of the processing capacity of raw input – is demonstrated through the survey on the total production of biomass straws in project location ChengAn County.                                                                                                                                                                                                                                                                                                              |              |              |
| <b>Baseline Scenario Determination</b><br><i>The choice of the baseline scenario will be validated with focus on whether the baseline is a likely scenario, and whether the methodology to define the baseline scenario has been followed in a complete and transparent manner.</i> |            |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |              |              |
| What is the baseline scenario?                                                                                                                                                                                                                                                      | /1/        | DR   | The chosen scenario 2 of ACM0006 is the most plausible baseline scenario among the identified alternatives. The chosen baseline is a combination of the following scenarios as stipulated in ACM0006:<br>P4 - The generation of power in existing and/or new grid-connected power plants;<br>H6 – Since heat is not being generated in the project, heat component is being considered as 0;<br>B1 – The biomass residues are dumped or left to decay under mainly aerobic conditions. |              | OK           |
| What other alternative scenarios have been considered and why is the selected scenario the most likely one?                                                                                                                                                                         | /1/<br>/2/ | DR   | Other alternative scenarios considered for power generation are:<br>(1) The proposed project activity is not undertaken as a CDM project activity;<br>(2) The generation of an equivalent amount of electricity using the same type of biomass residues but with a lower efficiency;                                                                                                                                                                                                   |              | OK           |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | <p>(3) The generation of power in an existing plant, on-site or nearby the project site, using only fossil fuels;</p> <p>(4) Supply of equivalent power output by the grid where the proposed project is connected;</p> <p>(5) The continuation of power generation in an exiting power plant, fired with the same type of biomass residues as (co-) fired in the project activity, and implementation of the project activity, not undertaken as a CDM project activity, at the end of the lifetime of the existing plant;</p> <p>(6) The continuation of power generation in an exiting power plant, fired with the same type of biomass residues as (co-) fired in the project activity and, at the end of the lifetime of the exiting plant, replacement of that plant by a similar new plant.</p> <p>Other alternatives considered for the use of biomass residues are:</p> <p>(1) The biomass residues are dumped or left to decay under mainly aerobic conditions. For example, dumping and decay of biomass residues on fields;</p> <p>(2) The biomass residues are dumped or left to decay under clearly anaerobic conditions;</p> <p>(3) The biomass residues are burnt in an uncontrolled manner without utilizing it for</p> |                         |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | energy purposes;<br>(4) The biomass residues are used for heat and/or electricity generation at the project site;<br>(5) The biomass residues are used for power generation, including cogeneration, in other exiting or new grid-connected power plants;<br>(6) The biomass residues are used for heat generation in other exiting or new boilers at other site;<br>(7) The biomass residues are used for other energy purposes, such as the generation of bio-fuels;<br>(8) The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes.<br>The selected baseline scenario is justified as:<br>For power generation:<br>(4) P4 – The generation of power in existing and/or new grid-connected power plants. This is the only plausible scenario while there is no fossil fuel fired power plant and biomass around the project site. Besides, the development of new biomass power projects without CDM is unlikely to be the baseline scenario due to the barriers discussed below.<br>For the use of biomass residues:<br>(1) B1 – The biomass residues are dumped or |                         |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                          |     | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                               | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                                                                                        |     |             |             | left to decay under mainly aerobic conditions. However, as per the regulations in Hebei Province, the uncontrolled burning of biomass residues is not allowed. Hence, the project participant is requested to clarify how B3 is eliminated during the baseline determination. | <del>CL-5</del>         |                         |
| Has the baseline scenario been determined according to the methodology?                                                                                | /1/ | DR          |             | Yes and as discussed above.                                                                                                                                                                                                                                                   |                         | OK                      |
| Has the baseline scenario been determined using conservative assumptions where possible?                                                               | /1/ | DR          |             | Yes.                                                                                                                                                                                                                                                                          |                         | OK                      |
| Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations? | /1/ | DR          |             | Yes. The project has taken into account relevant national and local policies, such as the Renewable Energy Law. There are no regulations requiring the use of biomass residues for power generation.                                                                          |                         | OK                      |
| Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?                       | /1/ | DR          |             | Yes.                                                                                                                                                                                                                                                                          |                         | OK                      |
| Have the major risks to the baseline been identified?                                                                                                  | /1/ | DR          |             | The major risk to the baseline is the lack of biomass residues or an increase in their utilization for other purposes.<br>It needs to be demonstrated regarding sufficient availability and the various usages of the straws, and availability for this project.              | <del>CL-5</del>         | OK                      |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                              | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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| <b>Additionality Determination</b><br><i>The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.</i> |             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |                         |
| Is the project additionality assessed according to the methodology?                                                                                                        | /1/         | DR          | <p>The project's additionality is demonstrated by applying the "Tool for the demonstration and assessment of additionality" version 2. "Tool for the demonstration and assessment of additionality" version 3 should be used.</p> <p><i>Step 1: Identification of the alternatives to the project activity consistent with the current laws and regulations.</i></p> <p>Alternatives to the project activity consistent with current laws and regulation were identified, simulating how electric power would be generated in the absent of the CDM project activity and what would happen to the biomass residues in the absence of the project activity.</p> <p>The only practical and feasible alternative for power generation is "supply of equivalent power output by the grid where the proposed project is connected".</p> <p>The only practical and feasible alternative for the use of the biomass residues is "the biomass residues are dumped or left to decay under mainly aerobic conditions". For example, by dumping and decay of biomass</p> | <del>CAR-3</del>        | OK                      |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | <p>residues on fields or the biomass residues are burnt in an uncontrolled manner without utilizing it for energy purposes.</p> <p><i>Step 2: Investment analysis</i></p> <ul style="list-style-type: none"> <li>- The benchmark analysis has been demonstrated to be the most appropriate option for the investment analysis. An IRR of 8% has been chosen as the benchmark rate, which is deemed to be justified in China.</li> <li>- The installed capacity and annual electricity output are at variance between the feasibility report and the, i.e. 30 MW and 165 GWh, which is for 1×130 t/h boiler and 1×30 MW generator in the investment analysis. However, other basic assumptions (total investment and etc.) are still derived from the feasibility study report, which is for 2×130 t/h boilers and 2×24 MW generators. The discrepancy needs to be justified.</li> <li>- The project participant is sought to clarify the inconsistency of electricity tariff and electricity VAT between the GSP PDD and updated PDD. In addition, the basic parameters such as the annual biomass residues</li> </ul> |                         |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | <p>consumption and the price for the biomass residues need to be included.</p> <ul style="list-style-type: none"> <li>- Sensitivity analysis is required to demonstrate that each input parameter at which the project-IRR will be equal to the benchmark and assess the likelihood of attaining the arrived values against each parameter and confirm that it is not likely that the project-IRR will become equal to the benchmark. In addition, the sufficient evidences are requested to provide as cross-check on the suitability of the assumptions used for each parameters.</li> </ul> <p><i>Step 3: Barrier analysis</i></p> <ul style="list-style-type: none"> <li>- Barrier analysis has been conducted as supplementary to the investment analysis.</li> <li>- Technological barriers: Reference needs to be provided to the statement that no such large-scale grid-connected biomass power generation capacity has been installed in China.</li> </ul> <p>The barrier mentioned above would not prevent the alternatives that electricity service provided by the north China power grid and the biomass residues being dumped,</p> |                         |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                                                                                      | Ref. | MoV* | COMMENTS                                                                                                                                                                                                                                                                                | Draft<br>Concl.  | Final<br>Concl. |
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|                                                                                                                                                                                                                                                                                    |      |      | left to decay or burned in an uncontrolled manner without utilizing it for energy purposes from implementation.<br><i>Step 4: Common practice analysis</i><br>Reference needs to be provided on the biomass based power generation plants in China to substantiate the common practice. |                  |                 |
| Are all assumptions stated in a transparent and conservative manner?                                                                                                                                                                                                               | /1/  | DR   | Refer to CAR 3.                                                                                                                                                                                                                                                                         | <del>CAR 3</del> | OK              |
| Is sufficient evidence provided to support the relevance of the arguments made?                                                                                                                                                                                                    | /1/  | DR   | Refer to CAR 3.                                                                                                                                                                                                                                                                         | <del>CAR 3</del> | OK              |
| If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?                                                | /1/  | DR   | Evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity need to be provided.                                                                                                                                             | <del>CL-6</del>  | OK              |
| <b>Calculation of GHG Emission Reductions – Project emissions</b><br><br><i>It is assessed whether the project emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i> |      |      |                                                                                                                                                                                                                                                                                         |                  |                 |
| Are the calculations documented according to the approved methodology and in a complete and transparent manner?                                                                                                                                                                    | /1/  | DR   | Direct on-site emissions are restricted to:<br>- CH <sub>4</sub> emissions from controlled combustion of biomass residues;<br>The emissions are calculated as the product of the amount of biomass residues used                                                                        |                  | OK              |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | <p>multiplies the biomass net calorific value, methane emission factor and a conservativeness factor.</p> <p>CO<sub>2</sub> emissions from on-site combustion of fossil fuels in the power plant or other fossil fuel consumption at the project site that is attributable to the project activity;</p> <p>The emissions are calculated as the product of the amount of diesel used times a diesel emission factor.</p> <ul style="list-style-type: none"> <li>- CO<sub>2</sub> emissions from biomass residues transportation.</li> </ul> <p>The emissions are calculated based on the amount of biomass residues transported, the average truck load, the average round trip distance and the emission factor for the type of trucks used.</p> <ul style="list-style-type: none"> <li>- CO<sub>2</sub> emissions due to electricity consumption at the project site that is attributable to the project activity.</li> </ul> <p>The emissions are calculated as the product of the on-site electricity consumption times the grid emission factor.</p> <p>The PDD does not specify what equipments will be used in the collection stations and the power plant for the mechanical treatment of straws and preparation and the respective fuels used, if any. It is not shown</p> | CL7                     |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | transparently that whether this part of emissions are included in the CO <sub>2</sub> emissions from on-site combustion of fossil fuels in the power plant or other fossil fuel consumptions at the project site that is attributable to the project activity or in the CO <sub>2</sub> emissions due to electricity consumption at the project site that is attributable to the project activity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |                         |
| Have conservative assumptions been used when calculating the project emissions?               | /1/         | DR          | <p>For CH<sub>4</sub> emissions from controlled combustion of biomass residues, the methane emission factor of 15 kgCH<sub>4</sub>/TJ is used, which is not the IPCC default value of methane emission factor for straws combustion.</p> <p>For CO<sub>2</sub> emissions from on-site combustion of fossil fuels due to the project activity, the default values in IPCC are used except for the diesel NCV (0.0427 TJ/ton). The project developer is requested to specify the source of this value.</p> <p>For CO<sub>2</sub> emissions from biomass residues transportation, the average load per trip (10 tonnes) and the average return trip for transportation (60 km) are used for calculation, which is reasonable according to the materials provided by the project owner.</p> <p>For CO<sub>2</sub> emissions due to electricity consumption at the project site that is attributable to the project activity, the</p> | <del>CL</del> 8         | OK                      |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                                                                                        | Ref. | MoV* | COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Draft<br>Concl. | Final<br>Concl. |
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|                                                                                                                                                                                                                                                                                      |      |      | approach applied for calculating the build margin emission factor (BM) of the grid needs to be justified more in detail.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                 |                 |
| Are uncertainties in the project emissions estimates properly addressed?                                                                                                                                                                                                             | /1/  | DR   | The uncertainty of the CH <sub>4</sub> emission factor has been taken into account and a conservativeness factor of 1.37 applied.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | OK              |
| <b>Calculation of GHG Emission Reductions – Baseline emissions</b><br><br><i>It is assessed whether the baseline emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i> |      |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 |                 |
| Are the calculations documented according to the approved methodology and in a complete and transparent manner?                                                                                                                                                                      | /1/  | DR   | Baseline emissions are:<br>CO <sub>2</sub> emissions due to natural decay or uncontrolled burning of biomass residues<br>The emissions are calculated as the product of the amount of biomass residues used multiplies the biomass net calorific value, methane emission factor, a conservativeness factor and the global warming potential of CH <sub>4</sub> . The IPCC default methane emission factor of 300 kgCH <sub>4</sub> /TJ is used, which is not the conservative IPCC default value recommended in the methodology.<br>Emission reductions due to displacement of grid electricity<br>The emissions are calculated as the product of the electricity supplied to the grid annually | CL8             | OK              |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Draft Concl.</b> | <b>Final Concl.</b> |
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|                                                                                               |  |             |             | <p>times the emission factor of North China Power Grid. The grid emission factor is calculated ex-ante in line with ACM0002 version 6 as a combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM).</p> <p>For the calculation of the baseline emissions the boundaries are defined as the project site and for the emissions due to the displacement of electricity from the grid, the North China Power Grid is correctly included in the baseline boundaries.</p> <p>CO<sub>2</sub> emissions from grid connected plants and CH<sub>4</sub> emissions due to the uncontrolled burning or decay of the biomass residues used by the project are included in the baseline boundaries.</p> |                     |                     |
| Have conservative assumptions been used when calculating the baseline emissions?              |  | /1/         | DR          | <p>For CO<sub>2</sub> emissions due to natural decay or uncontrolled burning of biomass residues, the IPCC default methane emission factor of 300 kgCH<sub>4</sub>/TJ is used, which is not the conservative IPCC default value recommended in the methodology.</p> <p>Biomass net calorific value of 0.0148 TJ/ton is used. The project developer is requested to specify the source of this value.</p> <p>For emission reductions due to displacement of grid electricity, the approach applied for</p>                                                                                                                                                                                                                             | CL-8                | OK                  |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                                                                    |     | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                                                                                                                                                                                                  |     |             |             | calculating the build margin emission factor (BM) of the grid needs to be justified more in detail.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                         |                         |
| Are uncertainties in the baseline emission estimates properly addressed?                                                                                                                                                                                         | /1/ | DR          |             | The uncertainty of the CH <sub>4</sub> emission factor has been taken into account and a conservativeness factor of 0.73 applied.                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         | OK                      |
| <b>Calculation of GHG Emission Reductions – Leakage</b><br><i>It is assessed whether leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values – where applicable – is justified.</i> |     |             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                         |                         |
| Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?                                                                                                                                          | /1/ | DR          |             | <p>The probable source identified leakage is that the project diverts biomass from other users and thereby increases fossil fuel use. Leakage will be accounted for only if the biomass supply is not abundant around the power plant. To account for this, option L2 of the methodology is selected. If the quantity of available biomass in the region is at least 25% larger than the biomass utilized, no leakage needs to be considered.</p> <p>It needs to be demonstrated regarding sufficient availability and the various usages of the straws, and availability for this project.</p> | CL 5                    | OK                      |
| Have conservative assumptions been used when calculating the leakage emissions?                                                                                                                                                                                  | /1/ | DR          |             | Refer to CL 5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | CL 5                    | OK                      |
| Are uncertainties in the leakage emission estimates properly addressed?                                                                                                                                                                                          | /1/ | DR          |             | No uncertainties have been identified regarding the leakage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                         | OK                      |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                      |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                               | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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| <b>Emission Reductions</b><br><i>The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.</i>                                                    |  |             |             |                                                                                                                                                                               |                         |                         |
| Are the emission reductions real, measurable and give long-term benefits related to the mitigation of climate change.                                                                                              |  | /1/         | DR          | Yes.                                                                                                                                                                          |                         | OK                      |
| <b>Monitoring Methodology</b><br><i>It is assessed whether the project applies an appropriate baseline methodology.</i>                                                                                            |  |             |             |                                                                                                                                                                               |                         |                         |
| Is the monitoring plan documented according to the approved methodology and in a complete and transparent manner?                                                                                                  |  | /1/         | DR          | The monitoring plan is in accordance with the approved monitoring methodology ACM0006 version 4, and is in a complete and transparent manner.                                 |                         | OK                      |
| Will all monitored data required for verification and issuance be kept for two years after the end of the crediting period or the last issuance of CERs, for this project activity, whichever occurs later?        |  | /1/         | DR          | Yes.                                                                                                                                                                          |                         | OK                      |
| <b>Monitoring of Project Emissions</b><br><i>It is established whether the monitoring plan provides for reliable and complete project emission data over time.</i>                                                 |  |             |             |                                                                                                                                                                               |                         |                         |
| Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period? |  | /1/         | DR          | The monitoring plan provides for the collection of the following data:<br><i>Monitoring of project emissions from transportation of biomass residues to the project site:</i> |                         | OK                      |

| CHECKLIST QUESTION<br>* MoV = Means of Verification, DR= Document Review, I= Interview |  | Ref. | MoV* | COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Draft<br>Concl. | Final<br>Concl. |
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|                                                                                        |  |      |      | <ul style="list-style-type: none"> <li>- Average round trip distance of the trucks between the biomass residue fuel supply sites and the site of the project plant (monitored continuously).</li> <li>- Average truck load of the trucks used (measured)</li> <li>- Average emission factor for transportation of biomass residues with trucks</li> <li>- Quantity of the biomass combusted in the project plant (measured)</li> <li>- Moisture content of the biomass residues (monitored continuously)</li> </ul> <p>The project developer is requested to clarify the monitoring frequency for the parameters of average truck load of the trucks used, average emission factor for transportation of biomass residues with trucks and quantity of the biomass combusted in the project plant.</p> <p><i>Monitoring of project emissions from on-site consumption of diesel:</i></p> <ul style="list-style-type: none"> <li>- Quantity of fossil fuel combusted in the straw-fired boiler (monitored continuously)</li> <li>- Quantity of fossil fuel combusted at the project site for other purposes that</li> </ul> | CL-9            |                 |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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|                                                                                               |             |             | <p>attributable to the project activity (monitored continuously)</p> <ul style="list-style-type: none"> <li>- Fossil fuel emission factor</li> </ul> <p>The project developer is requested to clarify the monitoring frequency for the parameter of the fossil fuel emission factor and whether the parameters of NCV and EF are to be measured or default values are to be used.</p> <p><i>Monitoring of project emissions from electricity consumption:</i></p> <ul style="list-style-type: none"> <li>- On-site electricity consumption attributable to the project activity (monitored continuously)</li> <li>- CO<sub>2</sub> emission factor for grid electricity (calculated)</li> </ul> <p><i>Monitoring of project emissions from biomass combustion:</i></p> <ul style="list-style-type: none"> <li>- Quantity of the biomass residues fuel combusted (measured)</li> <li>- NCV of the biomass residues fuel type (measured at least every six month)</li> <li>- Methane emission factor for combustion of biomass residues (CH<sub>4</sub> emission factor of controlled</li> </ul> | CL-9                    |                         |

| CHECKLIST QUESTION<br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                            | Ref. | MoV* | COMMENTS                                                                                                                                                                                        | Draft<br>Concl. | Final<br>Concl. |
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|                                                                                                                                                                   |      |      | combustion of biomass, conservativeness factor of 1.37)<br>The data will be archived two years after the end of the last crediting period.                                                      |                 |                 |
| Are the choices of project GHG indicators reasonable and conservative?                                                                                            | /1/  | DR   | Yes, the above mentioned GHG indicators are reasonable.                                                                                                                                         |                 | OK              |
| Is the measurement <i>method</i> clearly stated for each GHG value to be monitored and deemed appropriate?                                                        | /1/  | DR   | Yes.                                                                                                                                                                                            |                 | OK              |
| Is the measurement <i>equipment</i> described and deemed appropriate?                                                                                             | /1/  | DR   | It needs to clarify the measurement equipment for the parameters that will be measured in the monitoring plan.                                                                                  | CL 10           | OK              |
| Is the measurement <i>accuracy</i> addressed and deemed appropriate? Are procedures in place on how to deal with erroneous measurements?                          | /1/  | DR   | It needs to clarify the measurement accuracy of the measurement equipment.                                                                                                                      | CL 10           | OK              |
| Is the measurement <i>interval</i> identified and deemed appropriate?                                                                                             | /1/  | DR   | Refer to CL 10                                                                                                                                                                                  | CL 10           | OK              |
| Is the <i>registration, monitoring, measurement</i> and <i>reporting</i> procedures defined?                                                                      | /1/  | DR   | Yes.                                                                                                                                                                                            |                 | OK              |
| Are procedures identified for <i>maintenance</i> of monitoring equipment and installations? Are the calibration intervals being observed?                         | /1/  | DR   | The procedures for maintenance of the monitoring equipment and installations are not identified, and procedures for day-to-day records handling and the calibration intervals are not observed. | CL 11           | OK              |
| Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)? | /1/  | DR   | Refer to CL 11                                                                                                                                                                                  | CL 11           | OK              |
| <b>Monitoring of Baseline Emissions</b><br><i>It is established whether the monitoring plan provides for</i>                                                      |      |      |                                                                                                                                                                                                 |                 |                 |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                    |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Draft Concl.</b> | <b>Final Concl.</b> |
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| <i>reliable and complete baseline emission data over time.</i>                                                                                                   |  |             |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |                     |
| Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period? |  | /1/         | DR          | <p>Baseline emissions are those related to the displacement of grid electricity and baseline emissions due to natural decay or uncontrolled burning of biomass residues.</p> <p>The monitoring plan includes the following variables:</p> <p>Monitoring of emission reductions due to displacement of electricity:</p> <ul style="list-style-type: none"> <li>- Net quantity of electricity delivered to the grid by the project activity (hourly measured and monthly recorded);</li> <li>- CO<sub>2</sub> emission factor for the electricity displaced due to the project activity (calculated ex-ante).</li> </ul> <p>Monitoring of baseline emissions due to natural decay or uncontrolled burning of anthropogenic sources of biomass residues:</p> <ul style="list-style-type: none"> <li>- The quantity of biomass residues (measured)</li> <li>- Global warming potential of methane (IPCC default value);</li> <li>- CH<sub>4</sub> emission factor for uncontrolled burning of the biomass residue (the CH<sub>4</sub> emission factor, conservativeness factor of 0.73).</li> </ul> |                     | OK                  |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                    | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                         | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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| Are the choices of baseline GHG indicators reasonable and conservative?                                                                                          | /1/         | DR          | Yes.                                                                                                                                    |                         | OK                      |
| Is the measurement method clearly stated for each baseline indicator to be monitored and also deemed appropriate?                                                | /1/         | DR          | Yes.                                                                                                                                    |                         | OK                      |
| Is the measurement equipment described and deemed appropriate?                                                                                                   | /1/         | DR          | It needs to clarify the measurement equipment for the parameters that will be measured in the monitoring plan.                          | CL 10                   | OK                      |
| Is the measurement accuracy addressed and deemed appropriate?<br>Are procedures in place on how to deal with erroneous measurements?                             | /1/         | DR          | It needs to clarify the measurement accuracy of the measurement equipment.                                                              | CL 10                   | OK                      |
| Is the measurement interval for baseline data identified and deemed appropriate?                                                                                 | /1/         | DR          | The project developer is requested to clarify the monitoring frequency for the quantity of the biomass combusted in the project plant.  | CL 10                   | OK                      |
| Is the registration, monitoring, measurement and reporting procedure defined?                                                                                    | /1/         | DR          | Yes.                                                                                                                                    |                         | OK                      |
| Are procedures identified for maintenance of monitoring equipment and installations? Are the calibration intervals being observed?                               | /1/         | DR<br>I     | Procedures for maintenance of monitoring equipment and installations are not identified and the calibration intervals are not observed. | CL 11                   | OK                      |
| Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation) | /1/         | DR          | Refer to CL 11                                                                                                                          | CL 11                   | OK                      |
| <b>Monitoring of Leakage</b>                                                                                                                                     |             |             |                                                                                                                                         |                         |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                                           | Ref. | MoV* | COMMENTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Draft<br>Concl. | Final<br>Concl. |
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| <i>It is assessed whether the monitoring plan provides for reliable and complete leakage data over time.</i>                                                                                                            |      |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                 |
| Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?                                                                                               | /1/  | DR   | The project developer applies approach L2 for the estimation of leakage effects (to demonstrate that available biomass residues in the region are at least 25% larger than utilized biomass residues).<br>Parameters that monitored: <ul style="list-style-type: none"> <li>- Quantity of biomass residues that are utilized (e.g. for energy generation or as feedstock) in the defined geographical region;</li> <li>- Quantity of available biomass residues in the region.</li> </ul> |                 | OK              |
| Are the choices of project leakage indicators reasonable and conservative?                                                                                                                                              | /1/  | DR   | Yes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 | OK              |
| Is the measurement method clearly stated for each leakage value to be monitored and deemed appropriate?                                                                                                                 | /1/  | DR   | These indicators will be monitored annually using statistic or survey conducted by local government.                                                                                                                                                                                                                                                                                                                                                                                      |                 | OK              |
| <b>Monitoring of Sustainable Development Indicators/<br/>Environmental Impacts</b><br><br><i>It is assessed whether choices of indicators are reasonable and complete to monitor sustainable performance over time.</i> |      |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 |                 |
| Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?                                                                                            | /1/  | DR   | No. Neither the baseline nor monitoring methodology applied by the project or the DNA of China requires monitoring of sustainable development indicators.                                                                                                                                                                                                                                                                                                                                 |                 | OK              |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                 |  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                                                                                              | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
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| Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?                     |  | /1/         | DR          | As above. The indicators of environmental impacts will be stipulated by local environmental authority.                                                                       |                         | OK                      |
| Are the sustainable development indicators in line with stated national priorities in the Host Country?                                                       |  | /1/         | DR          | As above.                                                                                                                                                                    |                         | OK                      |
| <b>Project Management Planning</b><br><i>It is checked that project implementation is properly prepared for and that critical arrangements are addressed.</i> |  |             |             |                                                                                                                                                                              |                         |                         |
| Is the authority and responsibility of overall project management clearly described?                                                                          |  | /1/         | DR          | Yes. The authority and responsibility of overall project management is clearly described.                                                                                    |                         | OK                      |
| Are procedures identified for training of monitoring personnel?                                                                                               |  | /1/         | DR          | Procedures for training of monitoring personnel have not been identified.                                                                                                    | CL12                    | OK                      |
| Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?                                              |  | /1/         | DR          | It is not likely unintended emissions to happen due to an emergency situation. In any case those situations will be contemplated in the emergency procedures of the company. |                         | OK                      |
| Are procedures identified for review of reported results/data?                                                                                                |  | /1/         | DR          | There procedures have not identified.                                                                                                                                        | CL12                    | OK                      |
| Are procedures identified for corrective actions in order to provide for more accurate future monitoring and reporting?                                       |  | /1/         | DR          | These procedures have not identified.                                                                                                                                        | CL12                    | OK                      |
| <b>C Duration of the Project/ Crediting Period</b><br><i>It is assessed whether the temporary boundaries of the project are</i>                               |  |             |             |                                                                                                                                                                              |                         |                         |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                | Ref.       | MoV*    | COMMENTS                                                                                                                                                                                                                                                                | Draft<br>Concl.  | Final<br>Concl. |
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| <i>clearly defined.</i>                                                                                                                                                                      |            |         |                                                                                                                                                                                                                                                                         |                  |                 |
| Are the project's starting date and operational lifetime clearly defined and evidenced?                                                                                                      | /1/<br>/2/ | DR<br>I | It needs to be specified the project's starting date 1 April 2006 is which of the three, implementation, construction or real action. The estimated lifetime of the project is 20 years.                                                                                | <del>CL-13</del> | OK              |
| Is the start of the crediting period clearly defined and reasonable?                                                                                                                         | /1/        | DR      | A renewable crediting period (7 years) is selected. The start date of the crediting period needs to be updated.                                                                                                                                                         | <del>CL-13</del> | OK              |
| <b>D Environmental Impacts</b><br><i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i> |            |         |                                                                                                                                                                                                                                                                         |                  |                 |
| Has an analysis of the environmental impacts of the project activity been sufficiently described?                                                                                            | /1/        | DR      | Yes. An EIA was prepared and approved by the Hebei Province Environmental Protection Bureau.<br>The main impacts on the air, water and impacts of waste and noise are analyzed.                                                                                         |                  | OK              |
| Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?                                                                          | /1/        | DR      | Yes. The project has been approved by the Hebei Province Environmental Protection Bureau.                                                                                                                                                                               |                  | OK              |
| Will the project create any adverse environmental effects?                                                                                                                                   | /1/<br>/7/ | DR<br>I | Not likely, the impacts have been identified and mitigation action proposed.<br>It has been confirmed that the technology used allows the project to comply with the applicable air pollution regulations. Soot emissions and SO <sub>2</sub> emissions are expected to |                  | OK              |

| CHECKLIST QUESTION<br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                               |            | Ref.    | MoV* | COMMENTS                                                                                                                                                                                                                                                             | Draft<br>Concl. | Final<br>Concl. |
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|                                                                                                                                                                                                      |            |         |      | be below the legal limits.<br>The ash from the boiler can be used as fertilizer.                                                                                                                                                                                     |                 |                 |
| Are transboundary environmental impacts considered in the analysis?                                                                                                                                  | /1/<br>/7/ | DR<br>I |      | There are no trans-boundary environmental impacts foreseen for the project.                                                                                                                                                                                          |                 | OK              |
| Have identified environmental impacts been addressed in the project design?                                                                                                                          | /1/<br>/7/ | DR      |      | Yes.                                                                                                                                                                                                                                                                 |                 | OK              |
| Does the project comply with environmental legislation in the host country?                                                                                                                          | /1/<br>/7/ | DR      |      | Yes.                                                                                                                                                                                                                                                                 |                 | OK              |
| <b>E Stakeholder Comments</b><br><i>The validator should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.</i> |            |         |      |                                                                                                                                                                                                                                                                      |                 |                 |
| Have relevant stakeholders been consulted?                                                                                                                                                           | /1/        | DR<br>I |      | Yes. Besides the stakeholder consultation process required by Chinese EIA regulations, an additional stakeholder consultation process has been performed through inviting different stakeholders to comment on the project activity.                                 |                 | OK              |
| Have appropriate media been used to invite comments by local stakeholders?                                                                                                                           | /1/        | DR<br>I |      | Information discussion, hearing of witness and visiting the stakeholders were the means adopted to invite comments. The project developer also sent out questionnaires in the surrounding area of the proposed project to invite comments on the construction of the |                 | OK              |

| <b>CHECKLIST QUESTION</b><br>* MoV = Means of Verification, DR= Document Review, I= Interview                                                                                                  | <b>Ref.</b> | <b>MoV*</b> | <b>COMMENTS</b>                                                                                         | <b>Draft<br/>Concl.</b> | <b>Final<br/>Concl.</b> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|---------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|
|                                                                                                                                                                                                |             |             | proposed project.<br>The related documents (questionnaires and responses received) need to be provided. | CL-14                   |                         |
| If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws? | /1/         | DR          | Yes. The stakeholder consultation process is in accordance with Chinese EIA regulations.                |                         | OK                      |
| Is a summary of the stakeholder comments received provided?                                                                                                                                    | /1/         | DR          | Yes. A summary of the stakeholder comments received is described in the PDD.                            |                         | OK                      |
| Has due account been taken of any stakeholder comments received?                                                                                                                               | /1/         | DR          | This can be concluded only after the evidence of the stakeholder consultation is provided.              | CL-14                   | OK                      |

**Table 3 Resolution of Corrective Action and Clarification Requests**

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                               | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                | Validation team conclusion                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>CAR 1</p> <p>The letters of approval from the DNA of China and the UK have not been obtained.</p>                                                                                                                                                                                                                        | A                                     | <p>The LoA from Chinese DNA was issued on 2 July 2007, and the LoA from UK's DNA was issued on 11 July 2008, both of which were delivered to the DOE.</p>                                                                                                                                                                                                                        | <p>OK.</p> <p>The LoAs from the DNA of China and UK have been provided and verified by DNV /33/ /35/. DNV received these LoAs from the project participants and was able to verify that the LoAs are authentic /34/ /36/.</p> <p>CAR 1 is closed.</p>                                                                                                                  |
| <p>CAR 2</p> <p>According to ACM0006 version 4, the spatial boundaries should also include the site where the biomass residues would have been left for decay or dumped.</p>                                                                                                                                                | A                                     | <p>The site where the biomass residues would have been left for decay or dumped in the absent of the proposed project has been included in the spatial boundary, which is the areas within 30 km away around the project site.</p> <p>Refer to revised PDD.</p>                                                                                                                  | <p>OK.</p> <p>Though ACM0006 version 9 has been applied /38/, the same corrective action request for the spatial boundaries is still valid for this project. DNV can verify that the relevant description has been in place in the revised PDD /1/.</p> <p>CAR 2 is closed.</p>                                                                                        |
| <p>CAR 3</p> <p>The PDD applies "Tool for the demonstration and assessment of additionality" version 2, but version 3 should be used.</p> <p>The following shall be clarified / demonstrated:</p> <ol style="list-style-type: none"> <li>1. The installed capacity and annual electricity output are at variance</li> </ol> | B                                     | <p>As the updated PDD applies methodology of ACM0009 version 9, which requires to use "combined tool to identify the baseline scenario and demonstrate additionality (version 2.2)" to replace "Tool for the demonstration and assessment of additionality". Hence, "combined tool to identify the baseline scenario and demonstrate additionality (version 2.2) was used in</p> | <p>OK.</p> <p>As per applied methodology ACM0006 version 9, the <i>Combined tool to identify the baseline scenario and demonstrate additionality</i> (version 2.2) /40/ shall be used and can be observed in the revised PDD /1/.</p> <ol style="list-style-type: none"> <li>1. DNV was able to confirm that due to the shortage of heat requirement in the</li> </ol> |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Validation team conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p>between the feasibility report and the, i.e. 30 MW and 165 GWh, which is for 1×130 t/h boiler and 1×30 MW generator in the investment analysis. However, other basic assumptions (total investment and etc.) are still derived from the feasibility study report, which is for 2×130 t/h boilers and 2×24 MW generators. The discrepancy needs to be justified.</p> <p>2. The project participant is sought to clarify the inconsistency of electricity tariff and electricity VAT between the GSP PDD and updated PDD. In addition, the basic parameters such as the annual biomass residues consumption and the price for the biomass residues need to be included.</p> <p>3. Sensitivity analysis is required to demonstrate that each input parameter at which the project-IRR will be equal to the benchmark and assess the likelihood of attaining the arrived values against each parameter and confirm that it is not likely that the project-IRR will become equal to the</p> |                                       | <p>the updated PDD.</p> <p>1. The Feasibility Study Report (FSR) of the proposed project was developed by Hebei Electric Power Design &amp; Research Institute in August 2005. In the FSR, the proposed project was designed to be a newly-built cogeneration project fired with biomass residues, with 2×24 MW and 2×130 t/h boilers. At the time of the preparation for the proposed project, there is no similar biomass direct combustion project developed in China, and the first biomass power generation project in China finished test operation in 18 Nov 2006. So there is lack of mature operation technologies of biomass direct combustion in China, the boiler employed by the proposed project was imported from Denmark BWE Company. In the course of the negotiations with the boiler manufacturer, the scheme of 130 t/h boiler equipped with 30 MW steam generator turbine was a better option suggested by the manufacturer. Moreover, as there is no ready heat grid</p> | <p>local region which can be confirmed by local government ChengAn County Development and Plan Bureau 15 November 2005, the proposed project cancelled the heat supply /9/; in addition, suggesting by the boiler supplier, since the turbine and generator of 30 MW equipped with 130 t/h boiler can occupy better performance; the turbine and generator of 30 MW was chosen by the project developer instead of 24 MW corresponding to 130 t/h boiler. Hence, the SRFSR related to financial assessment for 30 MW and without heat supply was completed by Hebei Electric Power Design &amp; Research Institute in January 2006 /4/, which is the source of all the parameters applied in the PDD.</p> <p>2. DNV can verify that the tariff of 0.59812 RMB/kWh used in the GSP PDD is estimated and derived from the original FSR completed in August 2005. Before the SRFSR was prepared, China's NDRC firstly issued the consolidated tariff guidance for</p> |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                                                                                                                                                                        | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Validation team conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <p>benchmark. In addition, the sufficient evidences are requested to provide as cross-check on the suitability of the assumptions used for each parameters.</p> <p>4. Reference needs to be provided to the statement that no such large-scale grid-connected biomass power generation capacity has been installed in China.</p> <p>5. Reference needs to be provided on the biomass based power generation plants in China to substantiate the common practice.</p> |                                       | <p>in local area, the proposed project was changed to be a 30 MW and one 130 t/h boiler newly-built power plant fired with biomass residues for electricity generation only. So later, the project owner commissioned Hebei Electric Power Design &amp; Research Institute to develop the Supplement Report for 30 MW scheme, which was completed in the January 2006. All parameters in investment analysis are derived from the Supplement Report for 30 MW scheme.</p> <p>2. The FSR of the proposed project was developed by Hebei Electric Power Design &amp; Research Institute in August 2005. At that time, there are no regulations about determining biomass projects tariff, the tariff 0.59812 RMB/kWh used in the GSP PDD derived from FSR is estimated by the design institute.</p> <p>On 4 January 2006, <i>Interim Regulation for Tariff of Renewable Energy Power Generation and Appointment of Expenses</i> was issued by the NDRC and has taken effect since 1 January 2006.</p> | <p>biomass projects in January 2006 /60/. Following the guidance, the tariff of biomass power projects shall be the tariff of desulphurization coal fired units in the regional grid in the year 2005 plus subsidy composition of 0.250 RMB/kWh, and the preferential policy will be valid within 15 operational years. Moreover, since the year 2010 the subsidy composition for the new approved biomass power projects shall be reduced by 2% yearly on that of the previous approved biomass power projects. Hence, in order to be in compliance with this guidance, considering the benchmark tariff of 0.339 RMB/kWh in desulphurization coal fired unit in Hebei Province /13/, the tariff of 0.589 RMB/kWh shall be applied to the project activity in the first 15 operational years and 0.339 RMB/kWh for the remaining years. Hereinto, to be conservative for investment analysis, the 2% decreasing yearly for the tariff since 2010 will not be considered. Hence, in the Supplement Report of the FSR, tariffs of 0.589 RMB/kWh</p> |

| Draft report clarifications and corrective action requests by validation team | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Validation team conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|                                                                               |                                       | <p>According to the law, the tariff for biomass generation project is fixed by government. The guided tariff is constituted by the tariff of coal fired power plants in the year 2005 in the province and the compensation tariff of 0.25 RMB/kWh. The tariff subsidy will be enjoyed by the power generation project within 15 operational years and then will be abolished. The tariff after the first 15 years is the same as the tariff of coal fired power plants in the province. The tariff of coal fired power plants in 2005 in Hebei province is 0.339 RMB/kWh. Therefore, the tariff for the proposed project from year 2 to year 16 is 0.589 RMB/kWh (0.339+0.25), and from year 17 to year 22 is 0.339 RMB/kWh. This tariff was used in the Supplement Report for 30 MW scheme, which was completed in the January 2006. So the electricity tariff between the GSP PDD and updated PDD are inconsistent.</p> <p>The electricity VAT 8.5% used in the GSP PDD is a typo mistake. It should be 17%, which was revised in the</p> | <p>for the first 15 operational years and 0.339 RMB/kWh for the remaining years were used to financial assessment /4/. DNV was able to confirm that the tariffs were the latest values available when the investment decision was made.</p> <p>In terms of the <i>Notification on value add tax for part of resource integrate utilization project and other product</i> /62/, the VAT for biomass power industry shall be 17%, which is consistent with the value applied in the Supplement Report of the FSR.</p> <p>The missing parameters have been in place in the revised PDD /1/.</p> <p>3. Sensitivity analysis has been updated in the revised PDD and the relevant evidences have been in place /1/.</p> <p>4. Besides the insufficient financial returns, there are no investment barriers for the project activity. Since the technology of directly burning of biomass residues for power generation has been eventually applied on some</p> |

| Draft report clarifications and corrective action requests by validation team                   | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Validation team conclusion                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                 |                                       | <p>updated PDD.</p> <p>The basic parameters such as the annual biomass residues consumption and the price for the biomass residues had been added in the uploaded PDD.</p> <p>3. Sensitivity analysis was revised. Please refer to the updated PDD. The relevant evidences are provided to the DOE.</p> <p>4. The statement was revised in the updated PDD. The barriers that would prevent the implementation of the proposed project are not identified yet. So investment analysis was used. Please refer to the uploaded PDD.</p> <p>5. Reference about all the similar projects in Hebei Province was added in the uploaded PDD to substantiate the common practice.</p> | <p>similar biomass projects operating, there are no obvious and direct technological barriers for the project activity.</p> <p>5. The relevant references have been in the common practice analysis of the updated PDD /1/.</p> <p>CAR 3 is closed.</p> |
| <p>CL 1</p> <p>It is mentioned in the PDD that the ash from biomass residues combustion are</p> | A                                     | <p>Ash is a good fertilizer directly used in the field. Ash will be transported away by vehicles that transport biomass to the plant on their way back. Therefore,</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>OK. The average round trip distance (from and to) between biomass residue supply sites and the project site will be monitored ex-post.</p>                                                                                                           |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                                                                                                    | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                        | Validation team conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| packed for sales as fertilizer. It needs to be clarified whether the means of transportation of ash is included in the boundary and whether the emissions from the transportation are considered in the emission reductions calculation.                                                                                                                                                         |                                       | means for transportation of ash is already included in the boundary and the emissions from the transportation have been considered in the emissions reductions calculation.<br>Please refer to the revised PDD.                                                                                          | CL 1 is closed.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p>CL 2</p> <p>There appears to be a mismatch in the data provided the PDD and the feasibility report :</p> <ul style="list-style-type: none"> <li>the installed capacity is 2×24 MW in the FSR and 1×30 MW in the project design; the capacity of boiler is 130 t/h in the FSR and 175 t/h in the PDD;</li> <li>Clarity on the type of biomass residues used in the project activity</li> </ul> | A                                     | <p>The installed capacity of the proposed project is 1×30 MW. The boiler capacity in GSP PDD (175 t/h) is a typo mistake. It should be 130 t/h according to the FSR and SRFSR. The revision was made in the updated PDD.</p> <p>The biomass residues used is cotton straw. Refer to the revised PDD.</p> | <p>OK. As stated in the CAR 3 above, the turbine and generator of 30 MW was chosen by the project developer instead of 24 MW corresponding to 130 t/h boiler, and the total installed capacity also was changed from 2×24 MW to 1×30 MW, which can be verified by the SRFSR /4/ and the equipment purchase agreements /18/ /19/.</p> <p>By check the SRFSR /4/, it can be confirmed that the biomass residues used is cotton straw.</p> <p>CL 2 is closed.</p> |
| <p>CL 3</p> <p>Technical specifications of key equipment such as the boiler, turbine etc. is requested to be provided in the PDD</p>                                                                                                                                                                                                                                                             | A                                     | The relevant specification of key equipment was added in the Section A.4.3 of the revised PDD. Please refer to the revised PDD.                                                                                                                                                                          | <p>OK. The relevant description has been in place /1/.</p> <p>CL 3 is closed.</p>                                                                                                                                                                                                                                                                                                                                                                              |
| <p>CL 4</p> <p>It is requested to be justified as to how the</p>                                                                                                                                                                                                                                                                                                                                 | B                                     | Biomass residues that are used for the proposed project is directly from                                                                                                                                                                                                                                 | OK.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                                                                                               | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Validation team conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| <p>requirement of the methodology that - for projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project shall not result in an increase of the processing capacity of raw input – is demonstrated through the survey on the total production of biomass straws in project location ChengAn County.</p> |                                       | <p>agriculture, not from the production process, therefore the implementation of the proposed project will not increase the biomass production in the facility. Please refer to the updated PDD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>CL 4 is closed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>CL 5</p> <p>As per the regulations in Hebei Province, the uncontrolled burning of biomass residues is not allowed. Hence, the project participant is requested to clarify how B3 is eliminated during the baseline determination.</p> <p>It needs to be demonstrated regarding sufficient availability and the various usages of the straws, and availability for this project.</p>      | <p>B</p>                              | <p>Hebei government forward the emergency notice of strengthen prohibition on burning of biomass residues issued by state environmental protection bureau, burning the biomass residues is not allowed and effect measures should be taken to ensure the prohibition of burning biomass residues. Therefore, alternative B3 is not a realistic alternative for the use of biomass and should be eliminated. Please refer to the updated PDD.</p> <p>The straw used is cotton straw in radius of 30 km around the proposed project. According to the feasibility study report, the amount of cotton straw is 530 000 tonnes annually, among which, 15 600 tonnes is utilized for</p> | <p>The scenario B3 of direct biomass residues burning in uncontrolled manner is excluded as it is forbidden by “Air Pollution Prevention Law of China” /58/ and local regulation /59/.</p> <p>Based on the survey report of local biomass resource by a third party Shandong Province Taian City Jiuxin Agriculture Equipment Co., Ltd /24/, geographical region has been defined covering radius of 30 km. It has been demonstrated that the use of biomass residues cotton straws in the project does not result in the leakage since the quantity of available cotton straws in the region is 185.6% larger than the quantity of cotton residues utilized.</p> <p>CL 5 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team                                                                                  | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Validation team conclusion                                                                                                                                                                                                             |
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|                                                                                                                                                                |                                       | fertilizing, forage and cooking etc by local farmers. The implementation of the proposed project needs 170 000 tonnes cotton straw. Therefore, the quantity of available biomass residues in the region is over 185.6% larger than the quantity of biomass residues that is utilized. Please refer to the updated PDD.                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                        |
| <p>CL 6</p> <p>Evidence that the incentive from the CDM was seriously considered in the decision to proceed with the project activity need to be provided.</p> | B                                     | <p>The Supplement Report for 30 MW scheme was completed in the January 2006. In the Supplement Report for 30 MW scheme, the Project IRR of was only 5.15% without CDM revenue. However, with the CDM revenue, project IRR is significantly improved and reaches 11.04%, which exceeds the benchmark. CDM support was required for the project and seriously considered in the Supplement Report for 30 MW scheme. To ensure the successful implementation of the proposed project, the project owner held a board meeting of discussing the application for CDM support on 8 February 2006. The consultant agreement was signed between the project owner and Easy Carbon Consultancy Co. Ltd. on 14</p> | <p>OK.</p> <p>In DNV's opinion, it is adequately demonstrated that CDM benefits were seriously considered in the decision to proceed with the project activity based on the relevant evidences /4/ /15/ /16/ /22/. CL 6 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Validation team conclusion        |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       | <p>February 2006. Later, the scheme of 130 t/h boiler equipped with 30 MW steam generator turbine was purchased for the project.</p> <p>The project owner had seriously considered the CDM before the proposed project started.</p> <p>All relevant evidences have been provided to the DOE.</p>                                                                                                                                                                                                                                                                                                                                                                                                                      |                                   |
| <p>CL 7</p> <p>The PDD does not specify what equipments will be used in the collection stations and the power plant for the mechanical treatment of straws and preparation and the respective fuels used, if any. It is not shown transparently that whether this part of emissions are included in the CO<sub>2</sub> emissions from on-site combustion of fossil fuels in the power plant or other fossil fuel consumption at the project site that is attributable to the project activity or in the CO<sub>2</sub> emissions due to electricity consumption at the project site that is attributable to the project activity.</p> | B                                     | <p>Several straw collections and storage stations are planned to be established around the site of the power plant. There is no need to mechanical treat with straws as the straws are already packaged when purchased from the farmers. Hence, there is no electricity and fossil fuel consumed by straw crushing machine, the weighing and packaging system in the collection stations.</p> <p>The main fossil fuel consumption source of the proposed project is the diesel required to operate the machines in project site and to start-up the power boiler. When the proposed project put into operating, any fossil fuel consumed by equipments and machines of the proposed project will be monitored and</p> | <p>OK.</p> <p>CL 7 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Validation team conclusion                                            |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                       | calculated as project emissions. Please refer B 7.1 in the updated PDD for details.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                       |
| <p>CL 8</p> <ol style="list-style-type: none"> <li>For CH<sub>4</sub> emissions from controlled combustion of biomass residues, the methane emission factor of 15 kgCH<sub>4</sub>/TJ is used, which is not the IPCC default value of methane emission factor for straws combustion.</li> <li>For CO<sub>2</sub> emissions from on-site combustion of fossil fuels due to the project activity, the default values in IPCC are used except for the diesel NCV (0.0427 TJ/ton). The project developer is requested to specify the source of this value.</li> <li>For CO<sub>2</sub> emissions due to electricity consumption at the project site that is attributable to the project activity, the approach applied for calculating the build margin emission factor (BM) of the grid needs to be justified more in detail.</li> </ol> | B                                     | <ol style="list-style-type: none"> <li>IPCC default value of methane factor of 30 kgCH<sub>4</sub>/TJ has been used. Please refer to the revised PDD.</li> <li>The NCV of diesel is country specific value for diesel provided in <i>China Energy Statistics Yearbook 2008</i> p284, and the data used has been revised to 0.042652 TJ/ton.</li> <li>The GSP PDD was uploaded on 29 Dec 2006. The approach applied for calculating the build margin emission factor (BM) of the grid in the GSP PDD was calculated according to <i>Bulletin on Baseline Emission Factor of China Region Grid in 2006 year</i>-the calculation of baseline Build Margin emission factor for China Grid issued by the National Development and Reform Commission (NDRC) on 15</li> </ol> | <p>OK.</p> <p>All updates can be accepted.</p> <p>CL 8 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                   | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Validation team conclusion                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| <p>4. The IPCC default methane emission factor of 300 kgCH<sub>4</sub>/TJ is used, which is not the conservative IPCC default value recommended in the methodology.</p> <p>5. Biomass net calorific value of 0.0148 TJ/ton is used. The project developer is requested to specify the source of this value.</p> |                                       | <p>December 2006. The BM is 0.9066 tCO<sub>2</sub>/ MWh in the GSP PDD. On 2 July 2009, NDRC issued <i>Bulletin on Baseline Emission Factor of China Region Grid in 2009 year</i>-the calculation of baseline Build Margin emission factor for China Grid, in which the BM was 0.7802 tCO<sub>2</sub>/ MWh, which is lower than the data in 2006 year. To be conservative, 0.7802 tCO<sub>2</sub>/ MWh was applied in the updated PDD.</p> <p>4. IPCC default value of methane factor of 0.0027 tCO<sub>2</sub>/ton biomass was used.</p> <p>5. According to China Energy Statistics Yearbook 2008 p284, the NCV of cotton straw was revised to be 0.012545 TJ/tonne. All relevant data was recalculated accordingly. Please refer to the revised PDD.</p> |                                                         |
| <p>CL 9</p> <p>The project developer is requested to clarify the monitoring frequency for the</p>                                                                                                                                                                                                               | B                                     | <p>- Parameter of average truck load of the truck is monitored continuously and aggregated annually.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>OK. All updates can be accepted. CL 9 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                                                                                                                                                                       | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Validation team conclusion                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <p>parameters of average truck load of the trucks used, average emission factor for transportation of biomass residues with trucks and quantity of the biomass combusted in the project plant.</p> <p>The project developer is requested to clarify the monitoring frequency for the parameter of the fossil fuel emission factor and whether the parameters of NCV and EF are to be measured or default values are to be used.</p> |                                       | <ul style="list-style-type: none"> <li>- The Emission Factor of truck transportation is derived from 1996 revised IPCC default value for Moderate control US Heavy Duty Diesel Trucks, and 0.001011 tCO<sub>2</sub>/km is used.</li> <li>- Quantity of the biomass combusted in the project plant is monitored continuously, which has already been clarified in the PDD.</li> <li>- Default values from China Energy Statistical Yearbook of NCV<sub>i</sub> will be used for the net calorific value of fossil fuel.</li> <li>- IPCC default of EF is used for the fossil fuel emission factor.</li> </ul> <p>Please refer to Section B.7.1 of the revised PDD.</p> |                                                                                                           |
| <p>CL 10</p> <p>The project participant is requested to clarify the measurement equipment for the parameters that will be measured in the monitoring plan and the measurement accuracy of the measurement equipment.</p> <p>The project developer is requested to clarify the monitoring frequency for the quantity of the biomass combusted in the</p>                                                                             | B                                     | <p>An agreement should be signed between the project owner and the Grid that defines the metering arrangements and the required quality control procedures to ensure accuracy. The accuracy of the ammeter will be 0.2s.</p> <p>Refer to the revised PDD.</p>                                                                                                                                                                                                                                                                                                                                                                                                         | <p>OK.</p> <p>The relevant description has been found in the revised PDD /1/.</p> <p>CL 10 is closed.</p> |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                         | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Validation team conclusion                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| project plant.                                                                                                                                                                                                                        |                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                           |
| <p>CL 11</p> <p>The procedures for maintenance of the monitoring equipment and installations and procedures for day-to-day records handling are not identified and the calibration intervals are not observed.</p>                    | B                                     | <p>The procedures for maintenance of the monitoring equipment and installations and procedures for day-to-day records handling and the calibration intervals were added in the revised PDD. Please refer to the Section B.7.2 of the revised PDD.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>OK.</p> <p>The relevant description has been found in the revised PDD /1/.</p> <p>CL 11 is closed.</p> |
| <p>CL 12</p> <p>Procedures for training of monitoring of personnel, for review of reported results/data and for corrective actions in order to provide for more accurate future monitoring and reporting have not been identified</p> | B                                     | <p>Responsibilities of departments at power plant:</p> <p>Operating Manager of the plant: overall management of the implementation of the monitoring plan and quality control of data and records.</p> <p>Head of Staw Collection Stations: straw collection and summarizing the data collected at the collection stations in terms of types, amount, and transportation record, etc of straws.</p> <p>Ensuring the biomass at the sites will not be stored over half year.</p> <p>Engineering Department of the plant: in charge of the monitoring of electricity meters and calibration, biomass consumption and NCV of each kind of biomass, fossil fuel consumption within the power plant including boilers,</p> | <p>OK. The relevant description has been found in the revised PDD /1/.</p> <p>CL 12 is closed.</p>        |

| Draft report clarifications and corrective action requests by validation team                                                                                                                                                                                                    | Ref. to checklist question in table 2 | Summary of project owner response                                                                                                                                                                                                                                                               | Validation team conclusion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                  |                                       | crashing machines, etc, as well as maintenance of equipments<br>Please refer to B.7.2.                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>CL 13</p> <p>It needs to be specified the project's starting date 1 April 2006 is which of the three, implementation, construction or real action.</p> <p>A renewable crediting period (7 years) is selected. The start date of the crediting period needs to be updated.</p> | C                                     | <p>This is a typo mistake. The starting date of construction is on 10 June 2006 according to the <i>Order to Commence</i>, which has been revised in the PDD, and the proof of the project start date has been provided.</p> <p>The starting date of the crediting period has been updated.</p> | <p>The boiler purchase agreement was signed on 14 February 2006 /17/, which has been considered as the starting date of the project activity. DNV has verified that this is the earliest start date compared to the turbine and generator purchase agreement on 28 February 2006 /18/ /19/, construction agreement on 20 March 2006 /20/ and construction permission on 10 June 2006 /21/, and hence in DNV's opinion the start date is in line with the EB guidelines.</p> <p>A renewable crediting period of 7 years is selected as starting on 1 January 2011, which is deemed to be reasonable by DNV.</p> <p>CL 13 is closed.</p> |
| <p>CL 14</p> <p>The related documents (questionnaires and responses received) to the stakeholder consultation process shall be provided.</p>                                                                                                                                     | E                                     | The documents to the stakeholder consultation process were provided.                                                                                                                                                                                                                            | <p>OK. The Stakeholder questionnaires have been provided and verified by DNV /26/.</p> <p>CL 14 is closed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

## **APPENDIX B**

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### **CERTIFICATES OF COMPETENCE**



# CERTIFICATE OF COMPETENCE

***Chee Keong Lai***

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

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

Høvik, 18 November 2009

*Michael Lehmann*

Michael Lehmann

Technical Director, Climate Change Services



## CERTIFICATE OF COMPETENCE

### *Kumaraswamy Chandrashekara*

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

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

Høvik, 9 January 2009

*Michael Lehmann*

Michael Lehmann

Technical Director, Climate Change Services



# CERTIFICATE OF COMPETENCE

***Vidyacharan Astakala***

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

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

Høvik, 1 September 2009

*Michael Lehmann*

Michael Lehmann

Technical Director, Climate Change Services



# CERTIFICATE OF COMPETENCE

**Wu Lin**

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

| <b>GHG Auditor:</b>                | Yes                  |                     |                         |                      |                           |
|------------------------------------|----------------------|---------------------|-------------------------|----------------------|---------------------------|
| <b>Technical Area</b>              | <b>CDM Validator</b> | <b>CDM Verifier</b> | <b>Sector Knowledge</b> | <b>Sector Expert</b> | <b>Technical Reviewer</b> |
| Landfill gas                       |                      |                     |                         |                      |                           |
| Hydro power                        | Aug 2009             | Aug 2009            |                         |                      |                           |
| Renewables Wind power              | Jan 2009             | Sept 2009           |                         |                      |                           |
| Other renewable                    |                      | Sept 2009           |                         |                      |                           |
| Biomass                            |                      |                     |                         |                      |                           |
| Grid connection of isolated system |                      | Sept 2009           |                         |                      |                           |
| Cement                             |                      |                     |                         |                      |                           |
| Waste-heat / waste-gas recovery    |                      |                     |                         |                      |                           |
| Efficiency of thermal power plants |                      |                     | Nov 2009                |                      |                           |
| Coal mine methane                  |                      |                     |                         |                      |                           |
| Fuel switch                        |                      |                     |                         |                      |                           |
| Manure management                  |                      |                     |                         |                      |                           |
| Waste / wastewater treatment       |                      |                     |                         |                      |                           |
| Energy efficiency                  |                      |                     |                         |                      |                           |
| N <sub>2</sub> O                   |                      | Apr 2010            | Apr 2010                |                      |                           |
| HFCs                               |                      |                     | Apr 2010                |                      |                           |
| Flare reduction                    |                      |                     |                         |                      |                           |
| PFCs                               |                      |                     |                         |                      |                           |
| Charcoal                           |                      |                     |                         |                      |                           |
| CO <sub>2</sub> recovery           |                      |                     |                         |                      |                           |
| Transport                          |                      |                     |                         |                      |                           |
| Non-renewable biomass              |                      |                     |                         |                      |                           |
| Biofuel                            |                      |                     |                         |                      |                           |
| Pipeline leakage reduction         |                      |                     |                         |                      |                           |
| SF <sub>6</sub>                    |                      |                     |                         |                      |                           |

Høvik, 08 April 2010

*Michael Lehmann*

Michael Lehmann

Technical Director, Climate Change Services



# CERTIFICATE OF COMPETENCE

**Gong, Zheng (Justin)**

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

| <b>GHG Auditor:</b>                | Yes                  |                     |                         |                      |                           |
|------------------------------------|----------------------|---------------------|-------------------------|----------------------|---------------------------|
| <b>Technical Area</b>              | <b>CDM Validator</b> | <b>CDM Verifier</b> | <b>Sector Knowledge</b> | <b>Sector Expert</b> | <b>Technical Reviewer</b> |
| Landfill gas                       |                      |                     |                         |                      |                           |
| Hydro power                        |                      |                     |                         |                      |                           |
| Renewables Wind power              | Apr 2010             |                     |                         |                      |                           |
| Other renewable                    |                      |                     |                         |                      |                           |
| Biomass                            |                      |                     | Nov 2009                |                      |                           |
| Grid connection of isolated system |                      |                     |                         |                      |                           |
| Cement                             |                      |                     |                         |                      |                           |
| Waste-heat / waste-gas recovery    |                      |                     |                         |                      |                           |
| Efficiency of thermal power plants |                      |                     |                         |                      |                           |
| Coal mine methane                  |                      |                     |                         |                      |                           |
| Fuel switch                        |                      |                     |                         |                      |                           |
| Manure management                  |                      |                     |                         |                      |                           |
| Waste / wastewater treatment       |                      |                     |                         |                      |                           |
| Energy efficiency                  |                      |                     |                         |                      |                           |
| N <sub>2</sub> O                   |                      |                     |                         |                      |                           |
| HFCs                               |                      |                     |                         |                      |                           |
| Flare reduction                    |                      |                     |                         |                      |                           |
| PFCs                               |                      |                     |                         |                      |                           |
| Charcoal                           |                      |                     |                         |                      |                           |
| CO <sub>2</sub> recovery           |                      |                     |                         |                      |                           |
| Transport                          |                      |                     |                         |                      |                           |
| Non-renewable biomass              |                      |                     |                         |                      |                           |
| Biofuel                            |                      |                     |                         |                      |                           |
| Pipeline leakage reduction         |                      |                     |                         |                      |                           |
| SF <sub>6</sub>                    |                      |                     |                         |                      |                           |

Høvik, 8 April 2010

*Michael Lehmann*

Michael Lehmann

Technical Director, Climate Change Services



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## CERTIFICATE OF COMPETENCE

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***Mindy (Ming) Yue***

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

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

Høvik, 24 January 2007

Einar Telnes   Michael Lehmann  
*Director, International Climate Change Services   Technical Director*