



# **VALIDATION REPORT**

**Zhejiang Zhe'neng jiahua Power  
generation Co., Ltd.**

**zhejiang Jiaxing Ultra-supercritical Power  
Generation Project**

**REPORT NO.10011064**

**REPORT DATE: 02/03/2012**

**China Environmental United Certification Center Co., Ltd. (CEC)**

No.1 Yuhuinan Road, Chaoyang District, Beijing, China, 100029

[www.mepcec.com](http://www.mepcec.com)



<b>Date of First Issue:</b>	<b>Report No:</b>		
13/03/2010	10011064		
<b>Organizational Unit:</b>	<b>Client:</b>		
China Environmental United Certification Center Co., Ltd (CEC)	Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd.		
<b>Project Title:</b>	<b>Country:</b>		
Zhejiang Jiaying Ultra-supercritical Power Generation Project	China		
<b>Methodology and Version</b>	<b>Sectoral Scope:</b>		
ACM0013 version.4.0.0	1		
<b>PDD for GSP</b>	<b>Final PDD</b>		
Date of Finalization: 09/09/2010 Version:01	Date of Finalization: 01/06/2011 Version:02		
<b>GHG Reducing Measure/Technology</b>	<b>ER Estimate:</b>		
Using a less GHG intensive technology	336,640 tCO <sub>2</sub> e annually during the first crediting period		
<p>Summary:</p> <p>China Environmental United Certification Center Co., Ltd (CEC) has performed the validation of the Zhejiang Jiaying Ultra-supercritical Power Generation Project of Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd on the basis of all applicable CDM requirements. The CDM requirements include the CDM modalities and procedures and subsequent decisions by the CMP and documents released by the CDM Executive Board and available on the UNFCCC CDM website.</p> <p>The validation scope is defined as an independent and objective review of the Project design document, the Project's baseline study, monitoring plan and other relevant documents, and consisted of the following three phases: i) desk review of the Project design and the baseline and monitoring plan; ii) follow-up interviews with Project stakeholders; iii) resolution of outstanding issues and the issuance of the final validation report and opinion. The overall validation, from contract review to validation report &amp; opinion, was conducted using CEC internal procedures.</p> <p>The first output of the validation process is a list of Clarification and Corrective Actions Requests (CLs and CARs), presented in Appendix A. Taking into account this output, the Project participant took corrections and revised its Project design document.</p> <p>In summary, it is CEC's opinion that the "Zhejiang Jiaying Ultra-supercritical Power Generation Project", as described in the PDD ver.03 dated 01/03/2012, meets all relevant UNFCCC requirements for the CDM and all relevant Host Parties criteria and correctly applied the baseline and monitoring methodology ACM0013 ver.4.0.0. CEC thus requests the registration of the Project as a CDM Project activity.</p>			
<b>Work Carried out by:</b>	<b>Date of this revision</b>	<b>Rev. No.</b>	<b>Number of Pages:</b>
LIU Qingzhi, ZHANG Xiaohong, SHENG, Qionong, MA Xiao	02/03/2012	03	100
<b>Work Reviewed by:</b>	<input type="checkbox"/> Draft Validation Report <input checked="" type="checkbox"/> Final Validation Report <input checked="" type="checkbox"/> No Distribution (without permission from the client responsible organizational unit) <input type="checkbox"/> Limited Distribution <input type="checkbox"/> Unrestricted Distribution		
YIN Yun, WANG Yanping			
<b>Approved by:</b>			
TANG Dingding, Chairman of Board			



## Abbreviations

ACM	Approved Consolidated Methodology
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEC	China Environmental United Certification Center Co., Ltd
CEPG	China Eastern Power Grid
CER	Certified Emission Reductions
CH <sub>4</sub>	Methane
CL	Clarification Request
CM	Combined Margin
CO <sub>2</sub> eq	Carbon Dioxide Equivalent
DNA	Designated National Authority
DOE	Designated Operational Entity
DR	Document Review
EIA	Environmental Impact Assessment
EF	Emission Factor
ERPA	Emission Reduction Purchase Agreement
FSR	Project Feasibility Study Report
GHG	Green House Gas(es)
GSP	Global Stakeholders Consultation Process
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
LCOEP	Levelized Cost of Electricity Project
LoA	Letter of Approval
MoV	Means of Verification
MP	Monitoring Plan
N/A	Not Applicable
NDRC	China National Development Reform Commission(DNA)
NGO	Non Government Organization
ODA	Official Development Assistance
PDD	Project Design Document
PDR	Preliminary Project Engineering Report
OM	Operational Margin
PP	Project Participant
PPA	Power Purchase Agreement
UNFCCC	United Nations Framework Convention for Climate Change
VVM	Validation & Verification Manual



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# 1 INTRODUCTION

Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd. (the Project Participant) has commissioned and contracted CEC to validate the CDM Project "Zhejiang Jiaxing Ultra-supercritical Power Generation Project" (Hereafter called "the Project") at Liuli Bay, Pinghu City, Zhejiang Province, P.R. China.

This report summarizes the findings of the validation of this project, performed based on all applicable CDM requirements.

## 1.1 Objective

The purpose of validation is to ensure a thorough, independent assessment of proposed CDM project activities submitted for registration as proposed CDM project activity against the applicable CDM requirements. Validation is part of the CDM project cycle and will finally result in a conclusion by CEC whether a project activity is valid and should be submitted for registration of a proposed project activity rests at the CDM Executive Board and the Parties involved.

The project activity discussed by this validation report has been submitted under the project title: Zhejiang Jiaxing Ultra-supercritical Power Generation Project.

## 1.2 Scope

The validation scope is defined as an independent and objective review of the project design document, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against all applicable CDM requirements..

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

# 2 VALIDATION METHODS

The overall validation, from Contract Review to Validation Report& Opinion, was conducted using CEC internal procedures.

In order to ensure transparency, a validation protocol was customized for the project, in accordance with Version 01.2 of the Clean Development Mechanism Validation and Verification Manual (VVM) issued in EB55 Meeting on 30/07/2010. The protocol shows in a transparent manner, criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organizes, details and clarifies the requirements that 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 results of the validation.



The validation protocol consists of two tables. The different columns in these tables are described in below. The findings are the essential part of this validation report and the completed validation protocol is enclosed in Appendix A to this report.

**Table 1: Requirements checklist**

Checklist Question	Reference	Means of Verification(MoV)	Comment	Draft and/or Final Conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in several sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Give reference to documents where the answer to the checklist question or item is found.	Explain 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(OK), or a Corrective Action Request (CAR) due to non-compliance with the checklist question.(See below).Clarification Request(CL) is used when the validation team has identified a need for further clarification. Forward action request (FAR) is used for a need for review during the first verification.

**Table 2: Resolution of Corrective Action and Clarification Requests**

Report clarifications and corrective action requests	Ref. to checklist question in table 1	Summary of project participant response	Validation conclusion
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organized in several sections. Each section is then further subdivided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	The responses given by the project participants during the communications with the validation team should be summarized in this section.	This section should summarize the validation team's responses and final conclusions. The conclusions should also be reflected in Table 1,"Final conclusion"

## 2.1 Validation Team

According to the designation requirements on the validation team in the CDM accreditation standards of Executive Board, and following requirements from the technical scopes and professional characters in the sectoral scopes, CEC designated a validation team.



It is required that the validation team collectively has the required competencies in the technical, methodological and sectoral aspects of specific CDM project activities.

The validation team consists of the following members, the detailed personal information see Appendix B

Table 3: List of validation Team

Name	Role	Qualification	Specific Scope
LIU Qingzhi	Team Leader	Auditor	√
ZHANG Xiaohong	Team Member	Auditor	√
SHENG Qionong	Team Member	Technical Expert	√
MA Xiao	Team Member	Auditor Trainee	--

## 2.2 Document Review

The Project Design Document (PDD) ver.01/1/ dated 09/09/2010 and additional background documents related to the project design and baseline were submitted by China Carbon Technology Co., Ltd (the Consultant).

Once CEC receives the PDD ver.01 date 09/09/2010, it is made publicly available on the internet on the UNFCCC CDM web pages for starting a 30 days global stakeholder consultation process (GSP). The PDD version 03 date 01/03/2012 will form the basis for the final evaluation as presented by this report. The information of the PDD version is presented on Page 1.

To address the validation team's corrective action and clarification requests, the PP revised the PDD and resubmitted it on 01/03/2012 and the validation findings presented in this report related to the project are described in the PDD ver.03.date 01/03/2012.

## 2.3 Follow-up Interviews

The validation team performed on-site interviews with the relevant stakeholders and cross-checked information provided by interviewed personnel to ensure that no relevant information has been omitted from the validation. Representatives of the PP, the consultant and local stakeholders were interviewed on 11/11/2010-12/11/2010(See Reference), the main topics of the interview are summarized in Table 4.

Table 4 Interview topics and organization

<b>Date:</b> 11/11/2010-12/11/2010	
<b>Interview topics</b>	<b>Interview Organization</b>



<ul style="list-style-type: none"> <li>✓ Project background information and CDM consideration.</li> <li>✓ Project technology, operation, maintenance and monitoring capability.</li> <li>✓ Project monitoring and management plan.</li> <li>✓ Stakeholder consultation process.</li> <li>✓ Project approval status (incl. EIA approval, CDM project approval status)</li> <li>✓ Coal-fired Power Plants development in the area</li> <li>✓ Government policies related to coal-fired power projects</li> </ul>	Zhejiang Zhe'neng Jiahua Power Generation Co.,Ltd. (the PP)
<ul style="list-style-type: none"> <li>✓ Project background in details</li> <li>✓ Stakeholder comments</li> <li>✓ Social and environmental impact of the project</li> </ul>	Local Stakeholders.
<ul style="list-style-type: none"> <li>✓ Applicability of selected methodology.</li> <li>✓ Baseline determination</li> <li>✓ Emission reductions calculation.</li> <li>✓ Emission reduction monitoring plan.</li> </ul>	China Carbon Technology(the Consultant)

## 2.4 Resolution of CARs and CLs

During the validation of a project activity, CEC identifies issues that need to be further elaborated upon, researched or added to in order to confirm that the project activity meets the CDM requirements and can achieve credible emission reductions, CEC shall ensure that these issues are correctly identified, discussed and concluded in the validation report.

Corrective Action Requests (CARs) are issued, where:

- The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- The CDM requirements have not been met;
- There is a risk that emission reductions cannot be monitored or calculated.

The validation team may also use the term Clarification Request (CL), if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

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

To guarantee the transparency of the validation process, the concerns raised and responses that have been given are documented in more detail in the validation protocol in Appendix A.

The PDD Ver.03 that was submitted on 01/03/2012 presented herewith serves as the basis for





the final assessment.

**Table 5 Main Changes in the Content of the PDDs**

<b>Subject and Section in the PDD</b>	<b>Main Changes in the Revised PDD</b>
Section A General Description of Project Activity	The technical description of main equipments has been revised
Section B Application of a Baseline and Monitoring Methodology	The baseline scenarios have been identified as per the approved methodology ACM0013 ver.4.0.0. The start date of the project has been demonstrated according to the CDM glossary. Critical technical-economic parameters and assumptions have been revised to be clearly presented. And the difference of input values between the project activity and its alternatives have been substantiated.
Section C Duration of the Project Activity /Crediting Period	/
Section D Environmental Impacts	/
Section E Stakeholders' Comments	/

## 2.5 Internal Quality Control

As final step of a validation, the validation report and the validation protocol have to be reviewed by the technical reviewers, and then approved by Chairman of Board according to the regulations on technical review of CEC; the technical reviewers have to be independent from the validation team.

After confirmation of the PP, the validation opinion and relevant documents are submitted to the EB through the UNFCCC web-platform.

## 3 VALIDATION SUMMARY

The findings from the desk review of the original project design documents and the findings from interviews during the on-site visit are described in the Validation Protocol Appendix A.

The Clarification and Corrective Action Requests are stated, where applicable, in the following sections and are further documented in the Validation Protocol in Appendix A. The validation of the Project resulted in **8 Corrective Action Requests** and **6 Clarification Requests**.



### 3.1 Participants and Approval

During the beginning of the validation, the Letters of Approval from DNA of Annex I Party and Non-Annex I Party have not been provided, hence **CAR01** is raised. PP finally provides the Letters of Approval from the DNA of Annex I Party and Non-Annex I Party before submitting to request for registration, the written LoAs clearly states the four major requirements as indicated in the VVM ver.01.2, Hence CAR01 is closed.

The DNA of China has issued the LoA on 13/06/2011 authorizing Zhejiang Zhe'neng Jiahua Power Generation Co.,Ltd. as a project participant. The DNA of Annex 1 Country has also issued a LoA on 12/07/2011 authorizing the Nordic Carbon Fund Ky as a project participant. The validation team received these letters from the project participants directly and considers the provided letters as authentic.

The host Party China and the participating Annex I Party Finland both meet the requirements to participate in the CDM.

Non-Annex 1 Country: <http://maindb.unfccc.int/public/country.pl?country=CN>

And Annex 1 Country: <http://maindb.unfccc.int/public/country.pl?country=FI>

Both LoAs indicate that the participation in the “Zhejiang Jiaying Ultra-supercritical Power Generation Project” is voluntary. The Chinese LoA also confirms that the proposed CDM project activity contributes to the sustainable development of China (host country).

The China LoA has further been cross-checked with the CDM official website ([Http://cdm.ccchina.gov.cn](http://cdm.ccchina.gov.cn)), which confirms the approval of the proposed project.

Furthermore, after checking the provided LoAs, the validation team confirms that both letters refer to the precise proposed CDM project activity title in line with the title in the PDD “Zhejiang Jiaying Ultra-supercritical Power Generation Project”. The LoA does not specify a version number of the PDD or validation report. The corresponding references included in LoAs, PDD and validation report are consistent.

1 CAR is raised and successfully closed out; please see details in Appendix A.

The validation team concluded that the participants and approvals are in fully complying with the requirements of the CDM.

### 3.2 Project Design Document

The PDD is compliant with relevant form and guidance as provided by UNFCCC.

The most recent version 03.1 of the PDD form was used.

The validation team considers that the guidelines for the completion of the PDD in their most recent version have been followed. Relevant information has been provided by the participants in the corresponding PDD sections. Completeness was assessed by employing the validation protocol checklist included in Appendix A of this report.



### 3.3 Project Description

The following description of the project as per PDD could be verified during the on-site visit.

The Project is located on Liuli Bay, Pinghu City, Zhejiang Province, P.R. China, with the coordinate of 30° 36'10"N, 121°08'10"E. The project is to utilize ultra-supercritical coal-fired power generation technology, a more efficient coal-fired power generation technology to improve the power generating efficiency of coal-fired power plant.

The project involves the installation of two 1,000MW ultra-supercritical units of coal-fired generation in which each unit includes one boiler, one steam turbine and one generator thus the total installed capacity is 2,000MW.

The estimated electricity supplied to the China Eastern Power Grid (CEPG) by the project is 9,470GWh annually and the exported electricity from the project displaces the power generated by the existing power plants in the CEPG, thereby resulting in an estimated emission reduction of 3,366,400tCO<sub>2</sub>e in the fixed 10-year crediting period.

During on-site visit, the proposed project activities is under construction phase at the Zhapu Town, Pinghu City, Jiaying City, China and the project activity is expected to be commissioned On 01/09/2011.

During document review, the validation team finds that the net thermal efficiency up to 43.39% in Section A.2 and A.4.3 is not traceable, so **CL01** is raised. PP has supplemented the PDD and the efficiency is based on the formula (6) of ACM0013 ver.4.0.0, and the formula and the related data have been checked to be correct. So CL01 is closed.

The project technical description along with the specification of the project activity as mentioned in the PDD has been cross-checked from the FSR and the equipment purchase contract of turbine and generator dated on 12/09/2008 between Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd and Shanghai Electric Group Co., Ltd., and the equipment purchase contract of boiler dated on 12/09/2008 between Harbin Boiler Factory and Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd, the validation team finds that the reheat steam inlet/outlet pressure and temperature in the PDD is not in consistence with that mentioned in the purchase contract and the efficiency of generators in the PDD is not in consistence with the value in the purchase contract of generators, so **CL02** is raised. PP revises the key technical specifications of the Project in table 1, which are consistent with the equipment contract, so CL02 is closed.

Besides that, the approvals of EIA and FSR have been verified. All relevant approval documents have confirmed the project ownership along with the implementation of the proposed project activity at the indicated site as mentioned in the PDD.

2 CLs are raised and successfully closed out; please see details in Appendix A.

The validation team is able to confirm that the project description, as per the PDD, is sufficiently accurate and complete and therefore comply with CDM requirements.



### 3.4 Baseline and Monitoring Methodology

#### 3.4.1 Applicability of the Selected Methodology to the Project activity

The project uses the approved consolidated baseline and monitoring methodology ACM0013 .ver.03 in the PDD for global stakeholder consultation process (GSP), which is valid until 16/09/2010, so **CAR02** is raised that the latest Methodology ACM0013.ver.4.0.0 should be adopted during the DOE validation, including the application condition and data and parameters monitored. So PP revises the PDD and the project uses the approved consolidated baseline and monitoring methodology ACM0013 ver.4.0.0 –“Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology”, Hence CAR02 is closed.

The assessment of the relevant information contained in the PDD against each applicability condition is described below:

- The project activity is the construction and operation of a new fossil fuel fired grid—connected electricity generation plant that uses a more efficient power generation technology than what would otherwise be used with the given fossil fuel category;

Based on the document review of FSR and on-site visit, the validation team confirms that the proposed project involves the construction and operation of a new ultra-supercritical coal-fired grid-connected electricity generation plant. The steam pressure is 26.25MPa, the main steam pressure is 600°C and the reheat steam temperature is 600°C, which is the critical point of the steam/3.1/, higher than that the supercritical power generation unit (538°C and 24.9MPa).

- One fossil fuel category should be used as main fuel in the project power plant. In addition to this main fossil fuel category, small amounts of other fossil fuel categories can be used for start-up or auxiliary purpose, but they shall not comprise more than 3% of the total fuel used annually on an energy basis;

During on-site visit, the validation team finds that the proposed project is under construction, it can be confirmed that the start-up and auxiliary fossil fuel is diesel oil via verifying the FSR, which states that it can be only used during the start-up and short periods of interruption in the supply of the main fuel due to technical or operational problems. The consumption of diesel oil is about 2,016t/annually via verifying the annual diesel consumption in the approved FSR, equal to 2, 937.51t coal equivalent/3.2/ annually. So the diesel oil only comprised of 0.11% of the total fuel used annually on an energy basis.

- The project activity does not include the construction and operation of a co-generation power plant;

This has been confirmed via on-site visit and document review of FSR and approval of FSR.

- Data on fuel consumption and electricity generation of recently constructed power plants are available;

This has been verified by Baseline Emission Factor for Fossil Fuel Fired Power Plant Using Low Carbon Technology Connected to the Grid in 2010 published by DNA of China/3.3/;



- The identified baseline fuel category is used in more than 50% of total generation by utilities in the geographical area within the host country, as defined later in the methodology, or in the entire host country. To demonstrate this applicability condition data from the latest three years shall be used. Maximum value of same fossil fuel generation estimated for three years should be greater than 50%.

During document review, the PP cannot use the data from latest three years to meet one of the applicable conditions that the identified baseline fuel category used is more than 50% of total generation by utilities in the geographical area within the host country according to the latest methodology ACM0013 ver.4.0.0, so **CAR03** is raised. PP revises the PDD and adopts the data from the latest three years via cross-checking the information of China Power Yearbook(2008-2010)/3.4/, the validation team confirms that the coal-fired power generation in 2009 is 77.3% of the total, 76.8% in 2008, 77.7% in 2007, greater than 50%, which is consistent with the applied methodology. Hence CAR03 is closed.

Based on the on-site assessment, the validation team hereby confirms that as a result of the implementation of the proposed CDM project activity, there are no greenhouse gas emissions occurring within the proposed project boundary, which are expected to contribute no more than 1% of the overall expected average annual emissions reductions, which are not addressed by the applied methodology.

2 CARs are raised and successfully closed out, please see details in Appendix A..

The validation team hereby confirms that the chosen consolidated baseline and monitoring methodology ACM0013 ver.4.0.0 is correctly applied to the proposed project.

### 3.4.2 Project Boundary

The project boundary is assessed in the context of physical site visit, interviews and based on the secondary evidences received on the design of the project.

The proposed CDM project activity is the implementation of 2,000MW (2x1,000MW) ultra-supercritical thermal power plant therefore the spatial extent of the project boundary includes the project power plant and all power plants connected physically to China Eastern Power Grid.

In order to confirm the project boundary, the most relevant documentation is assessed as follows: Chinese Regional Baseline Emission Factor of New Grid Connected Fossil Fuel Fired Power Plants Using a Less GHG Intensive Technology in 2010 published by Chinese National Development and Reform Commission (NDRC) on 25/11/2010 (<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2537.pdf>)/3.5/ and Baseline Emission Factors for Regional Power Grids in China" issued by NDRC on 20/12/2010 (<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf>)/3.6/which are the latest available NDRC Documents for the PP at the time of submitting the project for validation.

The validation team confirms that the identification of Project Boundary is in compliance with the applied methodology and the identified boundary, the selected sources and gases as documented in the PDD are justified for the project activity.



### 3.4.3 Baseline Identification

According to the approved consolidated baseline and methodology “Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plant using a less GHG intensive technology” ACM0013 ver.4.0.0, but during document review and on-site visit, the selection of the most plausible and conservative baseline scenario needs to be substantiated in accordance with the Step 1 for identification of baseline scenario as mentioned under ACM0013 ver.4.0.0, so **CAR04** is raised, based on the following issues:

- All the alternatives should deliver similar services (e.g. peak vs. base load power) determined in the applied methodology ACM0013 ver.4.0.0, so please clarify and substantiate it.
- Please provide proper justification for choosing different installed capacity to arrive the levelized cost of unit electricity generation instead of the same capacity.
- Please clarify if all possible other power generation technologies are included.
- All the sources needs to be further substantiated, in particular it is mentioned in PDD, Page 10 that the domestic power plants with single unit of 600MW are based prevalently on two types of power generation; however, this statement has not been supported with traceable evidence. Furthermore, description in footnote 8 is not clear as to whether biomass power is unable to provide base load power.

PP revises the PDD and supplements the evidences, all data and information have been verified by the validation team to be reasonable, so CAR04 is closed.

Based on the revised PDD and PP’s response, the validation team validates the process as follows:

#### **Step 1: Identify plausible baseline scenarios**

Nine alternatives which shall be included are analyzed in the PDD, which complies with the approved methodology ACM 0013 ver.4.0.0.

(1): The project activity not implemented as a CDM project; namely:

##### **(A1) 2x1000MW Ultra-supercritical coal-fired power generation;**

Alternative (A1) is a plausible baseline scenario which can deliver similar services as the Project.

(2): The construction of one or several other power plants instead of the proposed project activity, including:

(2.1) Power generation technologies using the same fossil fuel category as in the project activity, but technologies other than that used in the project activity;

According to the local and sectoral knowledge of the validation team and technical experts and the realistic plants in China, the typical technologies using the coal for power generations in China include:



**(A2) 2 x600MW Super-critical coal-fired power generation;**

**(A3) 2 x600MW (4 x300MW) Sub-critical coal-fired power generation;**

As for different installed capacity between the alternative A2 and A3 and the proposed project, the validation team verifies as follows:

- Based on the latest public information of the power generation in China, the coal-fired installed capacity is 74% of total power generation capacity in 2010/3.7/ and this fact will not change in a quite long time ahead. So the validation team considers that construction of one or several coal-fired power plants with comparable total capacity is possible alternative.
- According to the information of China Power Yearbook 2008, 2009 and 2010, the above alternatives (A2)-(A3) are common practice in China.
- Based on the approved consolidated baseline and monitoring methodology ACM0013 ver.4.0.0, it states " *These alternatives need not consist solely of power plants of the same capacity, load factor and operational characteristics (i.e. several smaller plants, or the share of a larger plant may be a reasonable alternative to the project activity)*, the validation team considers that although the installed capacity of alternatives (A2)-(A3) is not equal to that of the proposed project, but several plants can provide the equal capacity of the proposed project. And the financial indicator is used as the levelized cost of electricity production in \$/kWh, which is not impacted by the difference between the installed capacity. Hence, the validation team considers that the alternatives (A2)-(A3) are appropriate and reasonable.
- Besides that, based on the definition of similar plants to the project activity about Baseline Emission in the methodology ACM0013 ver.4.0.0, it defines the comparable size of the project to be the range from 50% to 150% of the rated capacity of the project plant (2 x1,000 Ultra-supercritical coal-fired power generation plant), hence the validation team considers that the installed capacity of the alternatives (A2)-(A3) are consistent with the requirement of the applicable methodology ACM013 ver.4.0.0.

As for alternative (A2), the validation team checks that in China there are 27 new-built coal-fired power plants which have been approved by NDRC within the CEPG/3.8/, so this means that they are permitted to be constructed and operated. Besides that, the validation team has checked the China Power Yearbook (2008-2010) that mentions that there are total 15 coal-fired power generation plants which are put into operation in 2008 and 2009, and all of them use the supercritical technology. And according to the public information issued by NDRC/3.9/, the coal-fired power generation projects using a more advanced supercritical and ultra-supercritical technology are particularly encouraged by the government, so the validation team considers that the new-built coal-fired power generation project using the supercritical technology is the common practice. Hence, alternative (A2) is a plausible scenario.

As for alternative (A3), according to the "Guidance Category of Adjustment of Industrial Structure (2005) published by China NDRC/3.10/, it states the coal-fired power plants with unit





capacity not exceeding 300MW is prohibited, Besides that, based on the above assessment, the validation team considers that the coal-fired power generation projects using a more advanced supercritical and ultra-supercritical technology are particularly encouraged by the government since 2005 ,and supercritical technology has a better efficiency than subcritical technology, which will result in less emission reductions than subcritical technology, so alternative (A3) is excluded.

Therefore, alternative (A2)” 2\*600MW super-critical coal-fired power generation “is identified as a plausible baseline scenario.

(3): Power generation technologies using fossil fuel categories other than that used in the project activity;

#### **(A4) 2\* 300MW Natural gas power generation**

Based on the Natural Gas Industry Policy/3.11/, the natural gas power plant can only provide peak load service. Hence, the alternative (A4) is excluded.

#### **Issue 1:**

The DOE is requested to further justify how it has validated the baseline identification, in particular the exclusion of alternative A4 (natural gas power plants) based on the natural gas policy and base/peak load service, as per ACM0013 v04 page 8. In doing so, the DOE shall also explain the relevance of this natural gas policy to the project activity and whether the policy considers the same definition of base/peak load as per ACM0013. Please refer to ACM0013 v04 page 8, VVM version 01.2 para 84.

#### **Response to Issue 1:**

According to VVM, ver.01.2 para 84,

*The DOE shall determine whether the baseline scenario identified is reasonable by validating the assumptions, calculations and rationales used, as described in the PDD. It shall ensure that documents and sources referred in the PDD are correctly quoted and interpreted. The DOE shall cross check the information provided in the PDD with other verifiable and credible sources, such as local expert opinion, if available.*

(1) The proposed project will deliver the service of both base and peak load, which is derived from the FSR (prepared by East China Investigation and Design Institute under CHECC) and also approved by State Development and Reform Commission. However, according to the approved methodology ACM0013 ver.04.0.0, the alternatives need not consist solely of power plants of the same capacity, load factor and operational characteristics, however they should deliver similar services (e.g. peak vs. base load power).The validation team has checked the Notification of Natural Gas Utilization Policy<sup>1</sup> (Fagainengyuan[2007] No.2155),issued by NDRC, natural gas power plant is served as peak load within electricity load center region with sufficient natural gas supply. Hence, the exclusion of alternative A4 is reasonable. Please see attached Annex 1\_Natural Gas Policy

<sup>1</sup> [http://www.sdpc.gov.cn/zcfb/zcfbtz/2007tongzhi/t20070904\\_157244.htm](http://www.sdpc.gov.cn/zcfb/zcfbtz/2007tongzhi/t20070904_157244.htm)





(2) According to the applied methodology ACM0013 ver.04 page 8, the base/peak load is defined as: *At peak load (defined as a load factor of less than 3,000 hours per year) or base load (defined as a load factor of more than 3,000 hours per year).* The validation team has checked the China Power Yearbook 2009 page 704 and found that Xiaoshan Natural Gas Power Plant connected to CEPG, is served as peak load power plant( 1,907h), therefore the validation team confirms that the exclusion of the alternative of natural gas power plants based on base/peak load service is reasonable;

(3) The validation team has checked that the base/peak load is defined as the load above/below a level in the electric dictionary. Besides that, the validation team has checked the relative information on the website <http://wenku.baidu.com/view/ce863036eefdc8d376ee32a3.html?from=related> and considered that the peak load in natural gas policy is considered the same definition as defined in ACM0013 ver.04.0.0.

Based on the above, the validation team has ensured that the documents and sources referred in the PDD are correctly quoted and interpreted and has cross checked the information provided in the PDD with other verifiable and credible sources.

#### **(A5) 2\*300MW Fuel oil power generation**

The validation team has checked the “Tenth Five-year Plan for Conservation and Substitution of Fuel Oil”, which states that oil should be substituted by other energy in power generation in order to sharpen contradiction between supply and demand of oil, so it is considered to only provide the peak load within the grid. Hence, Alternative (A5) is excluded.

(4): Other power generation technologies, such as renewable power generation;

#### **(A6) Power generation using hydro power**

According to the energy resources distribution in China/3.12/, only 4.88% of hydropower resources are located in Eastern region of China where the project is located. and based on the survey from Agriculture Department of Zhejiang Province/3.13/, there is no sufficient hydro power resource remaining for new hydro power plants with comparable capacity. Besides that the validation team has checked the China Power Yearbook (2008-2010), it is confirmed that the hydropower generation in CEPG where the project is located is 44,187,000MWh in 2005 and 45,988,000MWh in 2009, the increased hydropower generation is 1,801,000MWh, which is less than the power generation of the Project 10,000,000MWh, so the power generation using hydro power(A6) is excluded since it can not provide comparable output as the project.

#### **(A7) Power generation using wind energy, biomass residues and solar energy**

Based on the public information/3.14/, the validation team confirms that the power generation using wind energy cannot provide similar service because of the wind power output is extremely unstable. So it is excluded.

Other renewable energy such as biomass residues/3.15//3.16//3.17//3.18/ and solar energy can not provide similar quantity of electricity to the grid due to small capacity.



Based on the data from China Power Yearbook 2010, the total electricity generation using renewable energy besides that hydropower and nuclear energy is only 1,880GWh in the CEPG, which is much smaller than the expected electricity supplied to the grid from the proposed project of 9,470GWh. So alternative (A7) is excluded.

#### **(A8) Power generation using nuclear energy**

Nuclear power plant cannot be operated as peak load/3.19/, so it does not provide similar services as the project, so the alternative (A8) is excluded.

(5): Import of electricity from connected grids, including the possibility of new interconnections.

#### **(A9) Import of electricity from connected grids**

The validation team has checked China Power Yearbook (2008-2010) and finds that the connected grid of CEPG is China Central Power Grid (CCPG), which usually provide base load. Besides that the hydropower capacity accounts for nearly 40% of total capacity in CCPG/3.20/, so the output of hydropower varies seasonally. The validation team considers that it is difficult for CCPG to provide stable peak load service as the proposed project. So the alternative (A9) is excluded.

Hence, the validation team confirms that all scenarios are considered by the PP and the documents and sources referred to in the PDD are correctly quoted and interpreted. The information of all alternative has been clearly identified in the PDD with clearly evidences. And the baseline scenarios that are not in compliance with the applicable legal requirement or can not provide the similar service as the project are excluded. All relevant policies and circumstances have been identified and correctly considered in the PDD.

Hence, the remaining alternative scenarios are alternative (A1) (The project activity not implemented as a CDM project) and alternative (A2) (2x600MW super-critical coal-fired power generation).

Step 2: Identify the economically most attractive baseline scenario alternative

The economically most attractive baseline scenario alternative is identified as below:

According to the approved baseline and monitoring methodology ACM0013 ver.4.0.0, the financial indicator for investment analysis of the levelized cost of electricity production(LCEOP) in \$/kWh has been adopted in the PDD, which is in compliance with the applied methodology. And the formula to calculate LCEOP is verified to be correct via the Annex 5 of *Projected Costs of Generating Electricity (2005 update)* published by IEA/3.21/.

The detailed validation please refers to Chapter 3.5.3.

1 CAR is raised and successfully closed out; please see details in Appendix A.

The validation team can therefore confirm that all the assumptions and data used by the project participants are listed in the PDD including their references and sources; and all documentation used is relevant for establishing the baseline scenario and correctly quoted and interpreted in the PDD; and relevant national and/or sectoral policies and circumstances are considered and listed in the PDD and the approved baseline methodology has been correctly



applied to identify the most reasonable baseline scenario and the identified baseline scenario reasonably represents what would occur in the absence of the proposed CDM project activity

#### 3.4.4 Algorithms and/or Formula Used to Determine Emission Reductions

The calculations of project emissions, baseline emissions and leakage and emission reductions have been checked by the validation team. The calculations are carried out based on the calculation Excel spreadsheets. The parameters and equations presented in the PDD and further documentation have been compared with the information and requirements presented in applied methodology and respective tools.

#### ● Project Emission

During on-site visit, the validation team found that the technology for start-up or auxiliary functions in the PDD was not in consistence with that mentioned in the FSR, so **CL03** is raised to clarify it. PP clarified that the power plant was designed to adopt Plasmatic Ignition Technology or other oil saving ignition technologies. And the Plasmatic Ignition Technology is still not mature. So the credible micro-oil ignition technology will finally be chosen. The validation team considers that this has been revised in the PDD and it is acceptable. Hence, CL03 is closed.

According to the baseline methodology ACM0013 ver.4.0.0, the coal and diesel are confirmed to be on-site combustion of fossil fuels via the on-site visit and document review. So the CO<sub>2</sub> emissions from electricity generation in the project plant (PE<sub>y</sub>) should be calculated as follows:

$$PE_y = PE_{Coal,y} + PE_{Diesel,y}$$

Where:

$PE_y$ : Project emissions in year y (tCO<sub>2</sub>)

$PE_{coal,y}$ : Project emissions from coal consumption in year y (tCO<sub>2</sub>)

$PE_{diesel,y}$ : Project emissions from diesel consumption in year y (tCO<sub>2</sub>).

#### 1. Project emission from main fossil fuel (coal) consumption

$$PE_{Coal,y} = FF_{Coal,y} \times NCV_{Coal,y} \times EF_{Coal,CO_2}$$

Where:

$FF_{coal,y}$ : Quantity of fuel type i combusted in the project plant in year y (mass or volume unit/yr);

The net electricity generation of 9,470GWh and Net Coal Consumption rate of 283.08tce/GWh is both derived from the approved FSR. Therefore, the quality of coal consumption of 2,680,768tce/y is verified to be correct.

$NCV_{coal,y}$ : Weighted average net calorific value of fuel type i in year y (GJ/mass or volume unit); According to the *General principles for calculation of total production energy consumption GB2589-90/3.22*,  $NCV_{i,y}$  is verified to be 29.307GJ/tce;



$EF_{coal,CO_2}$ : CO<sub>2</sub> emission factor of the fossil fuel type used in the project and the baseline (tCO<sub>2</sub>/GJ). According to the coal type specified in approved FSR the 2006 IPCC default value 0.0873tCO<sub>2</sub>/GJ is used.

## 2. Project emission from auxiliary and start-up fuel (diesel) consumption

$$PE_{Diesel,y} = FC_{Diesel,y} \times NCV_{Diesel,y} \times EF_{Diesel,CO_2} \quad (4)$$

Where:

$PE_{Diesel,y}$ : Project emissions from diesel consumption in year y (tCO<sub>2</sub>);

$FC_{Diesel,y}$ : Quantity of diesel combusted in the project plant in year y (mass or volume unit/yr);  
According to evaluation from design institution, the diesel consumption is 2,106t/yr;

$NCV_{Diesel,y}$ : Weighted average net calorific value of diesel in year y (GJ/mass or volume unit);  
As per China Energy Statistical Yearbook 2010 (p283)/3.23/,  $NCV_{Diesel,y}$  is verified to be 42.652GJ/tce;

$EF_{Diesel,CO_2}$ : CO<sub>2</sub> emission factor of the fossil fuel type used in the project and the baseline (tCO<sub>2</sub>/GJ). The IPCC default value 0.0726tCO<sub>2</sub>/GJ is used./3.27/

## Baseline Emission

As per the applied methodology ACM0013 ver.4.0.0, the validation team has verified that the baseline emissions are calculated by multiplying the electricity generated in the project plant from using fossil fuel types within the main fossil fuel category ( $EG_{PJ,mail,EF,y}$ ) with a baseline CO<sub>2</sub> emission factor as follows:

$$BE_y = EG_{PJ,mail\_FF,y} \times EF_{BL,CO_2}$$

And

$$EG_{PJ,main\_FF,y} = EG_{PJ,y} \times \left[ \frac{\sum_p (FC_{p,y} \cdot NCV_{p,y})}{\sum_p (FC_{p,y} \cdot NCV_{p,y}) + \sum_q (FC_{q,y} \cdot NCV_{q,y})} \right]$$

Where:

$BE_y$ : Baseline emissions in year y (tCO<sub>2</sub>);

$EG_{PJ,mail,FF,y}$ : Net quantity of electricity generated in the project plant from using fossil fuel types within the main fossil fuel category in year y (MWh);

$EG_{PJ,y}$ : Total net quantity of electricity generated in the project plant in year y (MWh);

$EF_{BL,CO_2}$ : Baseline emission factor (tCO<sub>2</sub>/MWh);

$FC_{p,y}$ : Quantity of fossil fuel type p consumed by the project plant in year y (Mass or volume unit);



$NCV_{p,y}$ : Average net calorific value of the fossil fuel type  $p$  consumed by the project plant in year  $y$  (GJ/Mass or volume unit);

$FC_{q,y}$ : Quantity of fossil fuel type  $q$  consumed by the project plant in year  $y$  (Mass or volume unit);

$NCV_{q,y}$ : Average net calorific value of the fossil fuel type  $q$  consumed by the project plant in year  $y$  (GJ/Mass or volume unit);

$p$ : Fossil fuel types that are used in the project plant and that belong to the main fossil fuel category

$q$ : Fossil fuel types that are used in the project plant for auxiliary and start-up purposes

In which:

$EF_{BL,CO_2}$  should be determined using the lowest value among the following two options:

Option 1: The emission factor of the technology and fuel type that has been identified as the most likely baseline scenario under "2x600MW super-critical coal-fired power generation" the section above, and calculated as below:

$$EF_{BL,CO_2} = 3.6 \cdot \frac{MIN(EF_{FF,BL,CO_2}; EF_{FF,CO_2})}{\eta_{BL}}$$

$EF_{BL,CO_2}$ : Baseline emission factor (tCO<sub>2</sub>/MWh);

$EF_{FF,BL,CO_2}$ : CO<sub>2</sub> baseline emission factor of 2x600MW supercritical power generation (tCO<sub>2</sub>/GJ);

$EF_{FF,CO_2}$ : CO<sub>2</sub> emission factor of the fossil fuel type used in the project and the baseline (tCO<sub>2</sub>/GJ);

$\eta_{BL}$ : Energy efficiency of 2x600MW supercritical power generation identified as the most likely baseline scenario;

According to ACM0013 (Version 4.0.0),  $EF_{FF,BL,CO_2}$  is 0.0873tCO<sub>2</sub>/GJ (IPCC default value of coal at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories).  $EF_{FF,CO_2} = EF_{coal,CO_2}$  (Step I) = 0.0873tCO<sub>2</sub>/GJ.

### **Issue 3:**

The DOE is requested to further explain how it has validated the energy efficiency of the power generation technology that has been identified as the most likely baseline scenario (38.95%), in line with the ACM0013 v04 page 10. Please refer to ACM0013 v04 page 10.

### **Response to Issue 3:**

According to the applied methodology ACM0013 ver.04.0.0, page 10,

$\eta_{BL}$  is the energy efficiency of the power generation technology that has been identified as the



*most likely baseline scenario. As a conservative approach, the efficiency should be determined as the efficiency at optimum load, e.g. as provided by the manufacturers.*

(1)  $\eta_{BL}$  is calculated based on the data sourced from Unit Cost Referenced Index of Fossil-fired Power Engineering and Design of 2007. The book is identified as the official reference to conduct investment analysis, preliminary budget and comparative analysis for newly built and expansion of 300MW, 600MW and 1000MW class coal-fired power plants and 300MW, 180MW class gas-fired power plants.

(2) The  $\eta_{BL}$  is calculated based on the Coal Consumption per kWh for Power Supplied to Grid of baseline (2x600MW sup-critical coal-fired power generation technology), the calculation formula is same as the formula (6) of ACM0013, as follows:

$$\eta_{BL} = 3.6 \cdot \frac{EG}{FC \cdot NCV} = 3.6 \text{ MJ/kWh} \times 1 \text{ kWh} / (315.4 \text{ gce/kWh} \times 0.029307 \text{ MJ/gce}) = 38.9\%,$$

Of which:

0.029307 MJ/gce is net calorific value of coal equivalent (also called standard coal in China).

315.4 is Net Coal Consumption Rate, which is calculated via  $299(\text{gce/kWh}) / (1 - 5.20\%) = 315.4(\text{gce/kWh})$ ,

in which:

299gce/kWh: The Gross Coal Consumption Rate is cited from the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007)/3.24/, the data also has been checked by the validation team via the registered CDM project activity "Shanghai Waigaoqiao coal-fired power project using a less GHG intensive technology (Ref.3288)", in which the gross coal consumption rate (299 Sgce/kWh) for a 2\*600MW supercritical power plant is adopted, as same as the proposed project. So the validation team considers that the Gross Coal Consumption Rate (299Sgce/kWh) is suitable for baseline scenario of the project activity.

5.2%: The plant electricity self-consumption rate is cited from page 288 of the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007), so the validation team considers that this is suitable for the baseline scenario of the proposed project.

2) According to the requirement in the methodology ACM0013 ver.04.0.0, the efficiency should be determined as the efficiency at optimum load as a conservative approach. The validation team has checked the efficiency of 38.10%, which is calculated based on the efficiencies of newly built top 30 performing 600 MW coal-fired power plants sourced from the Statistics by the State Electricity Regulatory Commission (SERC) and considered that the baseline efficiency of 38.9% is conservative.

So,  $EF_{BL,CO2(\text{option I})} = 0.8070 \text{ tCO}_2/\text{MWh}$ .

Therefore, the validation team considers that the data sources and assumptions are appropriate and calculations are correct, applicable to the proposed CDM project activity according to the VVM version 01.2 Paragraph 91.



**Option 2:** The average emissions intensity of all the power plants  $j$ , corresponding to the power plants whose performance is among the top 15% of their category, using data from the reference year  $v$  (Year 2008) as follows:

$$EF_{BL,CO_2} = \frac{\sum_j FC_j \cdot NCV_j \cdot EF_{FF,CO_2}}{\sum_j EG_j}$$

Where:

$j$  is the top 15% performer power plants(excluding cogeneration plants),as identified below, among all power plants in a defined geographical area that have a similar size, are operated at similar load and use the same fuel type as the project activity. And the determination of  $j$  is taken with five steps as per the approved methodology ACM0013 ver.4.0.0.

#### **Issue 4:**

The DOE is requested to substantiate how the project complies with the ACM0013 v04 page 9, as the list of the plants identified in Steps 3 and 5 to determine the baseline emission from Option 2, as well as relevant data on the fuel consumption and electricity generation of all identified power plants has not been provided. Please refer to ACM0013 v04 page 9.

#### **Response to Issue 4:**

According to the applied methodology ACM0013 ver.04.0.0, page 9, it requires that:

*All steps should be documented transparently; including a list of the plants identified in Step 3 and 5, as well as relevant data on the fuel consumption and electricity generation of all identified power plants.*

Based on the actual condition, the coal-fired power unit data was not public available in China and only available to the central government, NDRC. China DNA has calculated the emission factor as per the steps above in ACM0013, version 04.0.0, so the list of the plants identified in Steps 3 and 5 (top 15% coal-fired power plants in CEPG) and the relevant data on the fuel consumption and electricity generation of all identified power plants was documented transparently by Chinese NDRC. The calculation and the data sources were allowed to be validated by DOE in the NDRC's office but not allowed to be published. The validation team has performed the emission factor calculation process in accordance with option 2 in China NDRC's office and confirms that the all steps are documented transparently, including a list of the plants identified in step 3 and 5.

The baseline emission factor is based on the latest Baseline Emission Factors for Low-Carbon Technology Fossil Fuel Fired Grid Connected Power Plant published by DNA of China in 25/11/2010, the average emission factor for the top 15% performing power plants of CEPG, namely the baseline emission factor in Option II is calculated as 0.7613tCO<sub>2</sub>/MWh, which is lower than the one of 0.8070tCO<sub>2</sub>/MWh of Option I. Hence, the validation team considers that 0.7613tCO<sub>2</sub>/MWh is used to be correct to calculate the baseline emissions.

Beside that, the assumptions and data used to determine the emission reductions are listed in





the PDD and all the sources have been checked and confirmed.

Based on the information reviewed, it can be confirmed that the sources used are correctly quoted and interpreted in the PDD.

The baseline methodology has been correctly applied following the requirements. The detailed information on the parameters checked used in the equations can be seen in Appendix A.

In summary, the calculation of the baseline emissions can be considered to be correctly done.

### ● Leakage

As per the methodology, the project does not need to consider leakage.

### ● Emission Reductions

According to the approved methodology ACM0013 ver.4.0.0, the emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

The emission reductions are calculated to be 336,640 tCO<sub>2</sub>/y

Based on the assessment of the formulas and parameters in the PDD, the validation team confirms that baseline methodology is applied correctly to calculate the emission reductions, all the assumptions and data used by the PP have been listed in the PDD and all the values used in the PDD are considered to be reasonable.

The validation team can hereby confirm that the emission reductions are appropriately worked out complying with relevant methodology and tools, and parameters and data for the calculations are sourced from proper data sources.

## 3.5 Additionality of a Project Activity

The validation team assesses the additionality of the project activity with the following steps as below. The additionality was demonstrated according to "Tool for the demonstration and assessment of additionality (Version 5.2).

### 3.5.1 Prior Consideration of the Clean Development Mechanism

#### • Project Start Date

The start date of the proposed project activity is defined on 25/05/2009 (the execution date of the main equipment contract) as the earliest date.

During document review and on-site visit, the validation team finds that the start date of the proposed project activity is not in accordance with the CDM glossary, so **CAR05** is raised to clarify how to define the start date of the project activity based on the CDM Glossary of Terms.

The validation team has checked the main equipment purchase contract/4.1/ which states that the contract will come into effect after the project obtains the approval from NDRC (The approval of FSR was on 25/05/2009). And according to the latest CDM Glossary about the start date: *the earliest date at which either the implementation or construction or real action of*





a project activity begin. The validation team considers that the start date shall be the date on which the PP has committed to expenditures related to the real action, so the real action is considered to be the effective date of the main equipment contract to be reasonable. Besides that the validation team has checked the date of main plant construction contract (17/08/2009)/4.2/, so the validation team confirms that the start date of project activity is 25/05/2009 (the execution date of the main equipment contract), is the earliest date at which the implementation or construction or real action of the project activity began which is in line with the CDM glossary. Hence CAR05 is closed.

- **Prior and continuing and real action taken to secure CDM**

According to the timeline of events of the Project listed in the PDD, combined with the Guidelines on the demonstration and assessment or prior consideration of the CDM (EB49 Meeting, Paragraph 47), the validation team has checked the relative evidences and confirms that they are real.

From the table below, the validation team considers that the proposed project is a new project activity with a start date after 02/08/2008 according to the Guideline on the demonstration and assessment or prior consideration of the CDM (EB49 Meeting), and the validation team has also checked the Information Form from DNA of China signed on 22/07/2009/4.3/ and prior consideration of CDM Form on 12/08/2009/4.4/ and confirms that the title of the project activity is in consistence with that mentioned in the PDD and are real, besides that the validation team has cross-checked the Project information on the UNFCCC (<http://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html>)/4.5/ which is received on 24/08/2009, and confirms that the two notification of the intention to seek CDM status have been provided by the PP within six months of the project activity start date (25/05/2009), hence the validation team confirms that the CDM is seriously considered in the decision to implement the project activity.

Besides that, the validation team has checked the evidences as bellows:

Table 5: Timeline of CDM Continuing and real actions taken to secure CDM status

Date	Events	Evidence Verified real
06/2008	EIA was finished	√
07/11/2008	EIA was approved by Ministry of Environmental Protection of P.R.C.	√
11/2008	FSR was finished, in which mentions that the IRR of the project is lower than the benchmark, and it is suggested to apply for CDM support.	√
25/05/2009	FSR was approved by NDRC, and the main equipment purchasing contract became effective	√
	Execution date of Main equipment purchasing contract, which	√



	was signed on 12/09/2008	
27/03/2009	The investment decision on seeking CDM revenue	/4.6/
25/06/2009	Prior Consideration of the CDM at NDRC	√
30/06/2009	Consultant service contract was signed	/4.7/
12/08/2009	Prior Consideration of the CDM at UNFCCC	√
17/08/2009	Construction contract signed	√
27/04/2010	ERPA was signed	/4.8/
01/09/2011	Date of commissioning (anticipated)	√
08/2011	Date of start-up (anticipated)	√
13/06/2011	LoA from China	√
12/07/2011	LoA from Finland	√

1 CAR is raised and successfully closed out; please see details in Appendix A.

The validation team hereby confirms that the PPs considers seriously the incentives from CDM in the context of the project before taking its real actions and verified the start date of the project activity identified in the PDD is appropriate.

### 3.5.2 Identification of Alternatives

See 3.4.3 Baseline Identification in this report.

### 3.5.3 Investment Analysis

According to the requirement of the approved methodology ACM0013 ver.4.0.0, the latest version of the "Tool for demonstration and assessment of additionality" ver.5.2 ( EB39 Meeting, Annex 10) has been applied to assess the additionality of the proposed project activity ,considering the baseline scenario as above identified, the investment comparison analysis is applied in the investment analysis as per the Sub-step 2b of Step 2 of "Tool for the demonstration and assessment of additionality (Version 5.2)".

#### Step 2: Investment analysis

##### (1) Determine appropriate analysis method

The proposed CDM project activity will generate revenues by selling power to the CEPG, hence the investment comparison analysis (Option II) is applied for the current project under consideration.

##### (2) Option II: Apply investment comparison analysis

The levelized cost of electricity production (LCOEP) in \$/kWh is used to be feasible as a financial indicator in the investment analysis.

According to the applied methodology ACM0013 ver.04.0.0, in the case of Option II



(investment comparison analysis) is applied in sub-step 2b, it should be demonstrated that the baseline alternative (A2) is available to the project participants. So the validation team has checked the business license of the project participant (Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd.). It has better experience in coal-fired plants<sup>234</sup>. Besides that, the 600MW Supercritical power generation technology has been widely used since 2005<sup>56789</sup>. Thus the validation team considers that the baseline alternative (A2) is available for the PP.

### (3) Calculation and comparison of financial indicators

Based on the data from the FSR, the LCOEP of the alternative (A1) (The project activity not implemented as a CDM project) is 0.3419RMB/kWh, higher than 0.3249 RMB/kWh of the alternative (A2) (2x600MW super-critical coal-fired power generation).

The data in the LCOEP calculation for the proposed project are confirmed to be derived from the approved FSR, which is complied by an authorized third party of East China Electric Power Design Institute of China Power Engineering Consulting Group and also approved by the NDRC on 25/05/2009, therefore the validation team confirms that input values from the FSR are valid and applicable at the time of investment decision.

During document review, the validation team finds that, the economically most attractive scenario alternative is not demonstrated clearly in the investment analysis, especially the efficiency and technical lifetime of proposed project and baseline scenario, and all the assumptions towards capital expenditure and cost of power generation for the project activity in the different scenarios, and the critical techno-economic parameters such as the load factor of the power plant and the differences are not explained in the PDD, so **CAR06** is raised. The PP revises the PDD and the validation team has verified that the efficiency and technical lifetime, all the assumptions towards the capital expenditure and cost of power generation have been listed in the PDD and checked to be reasonable. And the differences between the project and baseline scenario have been cross-checked via the public information such as China Power Yearbook and the public document, and besides that the validation team has verified the evidences provided by the PP such as the actual employees and salary etc. and considers the differences are reasonable for the project activity and its alternative (2\*600MW supercritical coal-fired power generation). Hence, CAR06 is closed.

Furthermore, the validation team has cross-checked the values against the third-party or publicly available sources as follows:

**Table 6 Validation of input values in the PDD**

Parameter	Alternative A1 and A2	Value Applied	Data Source	Validation Opinions
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<sup>2</sup> <http://www.sdic.com.cn/cn/tzxh/gtwjs/1188178173907162.htm>

<sup>3</sup> <http://biz.zjol.com.cn/05biz/system/2005/10/19/006338076.shtml>

<sup>4</sup> [http://www.cnjxol.com/xwzx/jxxw/wmkjx/content/2011-10/21/content\\_1825480.htm](http://www.cnjxol.com/xwzx/jxxw/wmkjx/content/2011-10/21/content_1825480.htm)

<sup>5</sup> [http://nyj.ndrc.gov.cn/nydx/t20060721\\_77218.htm](http://nyj.ndrc.gov.cn/nydx/t20060721_77218.htm)

<sup>6</sup> [http://nyj.ndrc.gov.cn/xmsphz/t20070615\\_141603.htm](http://nyj.ndrc.gov.cn/xmsphz/t20070615_141603.htm)

<sup>7</sup> [http://nyj.ndrc.gov.cn/xmsphz/t20070618\\_141609.htm](http://nyj.ndrc.gov.cn/xmsphz/t20070618_141609.htm)

<sup>8</sup> [http://nyj.ndrc.gov.cn/xmsphz/t20070618\\_141610.htm](http://nyj.ndrc.gov.cn/xmsphz/t20070618_141610.htm)

<sup>9</sup> [http://nyj.ndrc.gov.cn/xmsphz/t20070618\\_141611.htm](http://nyj.ndrc.gov.cn/xmsphz/t20070618_141611.htm)



		in the PDD	Validated	
Construction Period (Year)	A1	2.7	FSR	<p>(1) The validation team confirms that it is derived from the approved FSR which mentions that the construction period is 32 months.<sup>10</sup></p> <p>(2) According to the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007), the construction period is 36 months, more than the designed value of 32 months; the validation team considers it to be conservative.</p> <p>(3) Based on the on-site visit, the validation team found that the starting date of the project was in May, 2009, and the project plans to operate in September, 2011, which is similarly in compliance with the construction period stated in the FSR.</p>
	A2	2.5	Referenced Index	<p>(1) It is derived from the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007), published by China Electricity Power Press in 2008. The validation team considers that value to be reasonable.</p>
Operation Period (Year)	A1	20	FSR	<p>(1) It has been cross-checked via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design(2007), which states that the operational lifetime of coal-fired power plants should be 20 years;</p> <p>(2) Based on “Guidance on the Assessment of Investment Analysis”ver.4.0.0, it states that” In general a minimum period of 10 years and a maximum of 20 years will be appropriate”;</p> <p>(3) According to the Notice of Some Relative Matters about Normalization</p>
	A2	20	Referenced Index	

<sup>10</sup> Note: The construction period is mentioned to be 30 months for the first set of equipments and another 4 months for the second set of equipments in the approved FSR. The validation team considers that the construction period of the proposed project is 32 months to be reasonable.



				of Power Price Management published by State Planning Commission in 2001 (Doc.No.Jijiage[2001]701)/4.9/, the operational lifetime of coal-fired power plants should be 20 years.
Plant Load factor (%)	A1	57%	FSR	(1) According to the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design, the operation hour of coal-fired power plants should be 5000h, namely the PLF of 57%; (2) Based on the China Power Yearbook in 2009-2010, the average operation hour in the fossil-fired power plant in 2008-2009 is 4,885h and 4,839h, equal to average 4,862h, less than 5,000h In the PDD, besides that, the validation team has cross-checked the average operation hour in CEPG in 2009, the average operation hour in CEPG is 4,968h, which is also lower than 5,000h in the PDD, so it is considered to be conservative;
	A2	95%	Referenced Index	(1) According to the applied methodology ACM0013 ver.04.0.0 Page 3, it mentions that these alternatives should deliver the similar services, so it is assumed that the baseline scenario should also generate the same amount of electricity, namely the PLF of A2 is 95%.
Discount rate (r) (%)	A1	8%	FSR	(1) It has been cross-checked by the validation team via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) and finds to be reasonable.
	A2	8%	Referenced Index	
Capital expenditure per kW (RMB/kW)	A1	3,771	FSR	(1) It is derived from the approved FSR to be correct; (2) The validation team has cross-checked the signed equipment contract of boiler, generator and turbine and confirms that the signed



				equipment fee is a little more than the estimate in the FSR, so the validation team considers to be reasonable.
	A2	3,562	Referenced Index	<p>(1) The validation team has confirmed that it is derived from the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007);</p> <p>(2) Based on the data published by China State Electricity Regulatory Commission, which states that the capital investment per kW is decreased to 3,600RMB/kW/4.10/, so the validation team considers it to be reasonable.</p>
Material cost (RMB/MWh)	A1	4	FSR	<p>(1) It has been cross-checked via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) to be consistent;</p> <p>(2) It has been cross-checked with the project upload on the UNFCCC under validation and finds that the material used in the project is lower than others, so it is conservative.</p>
	A2	5	Referenced Index	<p>(1) It is confirmed from the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007);</p> <p>(2) Besides that, the validation team has cross-checked the value used by the only registered CDM project (ref.3288), the material cost used for baseline alternative is also 5RMB/kWh, so the validation team considers that it is suitable for the alternative A2 of the proposed project.</p>
Desulphurization cost per ton coal (RMB/ton fuel)	A1	4.34	FSR	<p>(1) The desulphurization cost per ton coal is derived from the approved FSR;</p> <p>(2) It is also confirmed by the third qualified party of East China Investigation and Design Institute under CHECC;</p>



				(3) The validation team has cross-checked it with the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) that the price of desulfurizer is 60RMB/ton, so it can be calculated that the desulfurizer consumption per hour of alternative A2 is $43.25\text{ton/h}((4.34\text{RMB/ton coal} \times 0.299\text{ton/MWh} \times 10,000,000\text{MWh}) / (60\text{RMB/ton} \times 5,000\text{h}))$ , which is larger than that mentioned in the Reference Index( 16ton/h),so the validation team considers that it is reasonable;
	A2	4.34	Same as the alternative A1	(1) The validation team has cross-checked the similar registered CDM project activity in the UNFCCC website, and found that the similar registered project (Ref.No.3288) ,in which the desulphurization cost per ton coal used for alternative 2*600 MW supercritical technology by the CDM project is 3.64 RMB/per ton , which is lower than alternative A2 of the proposed project chooses. So the validation team considers that it is suitable and conservative;
Denigration cost per ton coal (RMB/ton fuel)	A1	3.873	FSR	(1) The denigration cost per ton coal is confirmed by the third qualified party of East China Investigation and Design Institute under CHECC;
	A2	3.873	Same as the alternative A1	(1) The validation team has cross-checked the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) that the price of denigration agent is 2,825RMB/ton, so the denigration agent consumption per year is $3.873 \times 299 \times 10000 / 2825 = 4,099\text{ton/per year}$ .(0.82t/h),which is higher than 2,285ton/a adopted by a 2*600 supercritical power plant from



				Dongfang Boiler Group Co.,Ltd, so the validation team considers that it is conservative for the alternative A2.
Overhaul cost rate (%)	A1	2.5	FSR	<p>(1) It has been cross-checked via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) and found to be consistent.</p> <p>(2) The validation team has cross-checked it with the similar CDM project registered in the UNFCCC website(Ref.3288) and confirmed that the overhaul cost rate of baseline alternative of similar projects is also 2.5%.So the validation team considers that it is also suitable for the alternative A2 of the proposed project.</p>
	A2	2.5	Referenced Index	
Employees (person)	A1	300	FSR	<p>(1) It has been cross-checked via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) and found to be consistent.</p> <p>(2) The actual employees/4.11/ have been verified and found that number of employee is nearly the same as that mentioned in the FSR and PDD. So the validation team considers being reasonable.</p>
	A2	247	Referenced Index	





Annual Salary (10 <sup>4</sup> RMB/person)	A1	8	FSR	(1) The actual information on the employees has been verified and found to be consistent.
	A2	8	/	
Welfare rate (%)	A1	54%	FSR	
	A2	54%	/	
Insurance cost rate (%)	A1	25%	FSR	(1) It has been cross-checked via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) and found to be consistent;
	A2	25%	Referenced Index	
Other cost	A1	8	FSR	<p>(1) The other cost is derived from the approved FSR;</p> <p>(2) The other cost mainly includes company fund, labor union fund, staff education fund, labor insurance, unemployment insurance, Board fee, consulting fee, legal fee, entertainment expenses, property tax, vehicles and vessels use tax, land use tax, R&amp;D expenses, which is derived from “<i>Economic Evaluation Guideline for fossil-fired power Plant (DL/T 5435-2009)</i>”/4.16/;</p> <p>(3) The validation team has cross-checked the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007), which is published by China Electric Power Press in May 2008. The book is identified as the official reference to conduct investment analysis, preliminary budget and comparative analysis for newly-built and expansion of 300MW, 600MW and 1000MW class coal-fired power plants and 300MW, 180MW class gas-fired power plants<sup>11</sup>.and it is found to be consistent;</p> <p>(4) Besides that, the validation team has cross-checked the similar registered CDM project activity in the UNFCCC website, and found that the similar</p>

<sup>11</sup> [http://www.cpeinet.com.cn/zcfg/zcdt/201009/t20100927\\_53836.htm](http://www.cpeinet.com.cn/zcfg/zcdt/201009/t20100927_53836.htm)



				registered project (Ref.No.3288) and considers that the value is reasonable;
	A2	10	Referenced Index	(1) The validation team has cross-checked the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007), which is published by China Electric Power Press in May 2008. The book is identified as the official reference to conduct investment analysis, preliminary budget and comparative analysis for newly-built and expansion of 300MW, 600MW and 1000MW class coal-fired power plants and 300MW, 180MW class gas-fired power plants <sup>12</sup> .and it is found to be consistent; (2) Besides that, the validation team has cross-checked the similar registered CDM project activity in the UNFCCC website, and found that the similar registered project (Ref.No.3288) and considers that the value is reasonable;
Pollution cost (10 <sup>4</sup> RMB/y)	A1	1,366	FSR	It has been verified with the project uploaded on the UNFCCC under validation and finds that pollution cost is reasonable.
	A2	1,366	Referenced Index	
Water cost (RMB/MWh)	A1	1	FSR	It has been cross-checked via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007) and found to be consistent;
	A2	1	Referenced Index	
Coal price (excluding tax) (RMB/t)	A1	819.12	FSR	(1) It has been cross-checked via the information issued by National Energy Administration on 28/01/2011/4.12/ that the highest coal price in 2010 is 807RMB/t, and confirms that the coal price is reasonable.
	A2	819.12		
Coal consumption rate	A1	283.08	FSR	(1) It has been cross-checked via the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and

<sup>12</sup> [http://www.cpeinet.com.cn/zcfg/zcdt/201009/t20100927\\_53836.htm](http://www.cpeinet.com.cn/zcfg/zcdt/201009/t20100927_53836.htm)



(gce/kWh)				Design (2007-2009) and found to be consistent; (2) Based on information published on the website about coal consumption in 2009, the validation team considers that the actual coal consumption of the project is consistent with estimated one/4.13/.
	A2	299	Referenced Index	(1) It is confirmed to be derived from the Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007); (2) The validation team has cross-checked it with the similar CDM project registered in the UNFCCC website(Ref.3288) and confirmed that the coal consumption rate of baseline alternative of similar projects is also 299gce/kwh.So the validation team considers that the value of the alternative A2 of the proposed project is suitable.
Energy efficiency (%)	A1	43.4 %	/	The validation team has verified the calculation of energy efficiency to be correct.
	A2	38.95%	/	

### **Issue 2:**

The DOE is requested to further explain how it has validated the input values in the levelized cost analysis, in line with the VVM version 01.2 paragraph 111, as sufficient information has not been provided how the DOE validated:

### **Response to Issue 2:**

(a) The investment cost of the project activity, as the breakdown of the cost has not been provided and the DOE has not substantiated how much the signed fees contribute to the total investment and the likelihood of the rest;

According to the VVM,ver.01.2 Para.111, the validation team has verified the following values in the investment analysis as follows:

- *Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices;*
- (1) The total static investment used in the PDD is 7.54 billion RMB, which is derived from the approved FSR. The Feasibility Study Report was completed by a qualified third party of East China Investigation and Design Institute under CHECC, which has qualification and



abundant expertise in power industry and the FSR is approved by National Development Reform Commission and they are the basis for investment analysis.

- *Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices;*
- (1) Considering that the project has been commissioning since October 2011, the validation team has checked that the evidence provided by the third qualified party-Zhejiang Wanbang Management and Consultation Co.,Ltd. about the actual investment and found that the actual static investment is added up to 7.68 billion RMB, 1.8% higher than the estimation in the FSR; Please see attached Annex 2\_Notification for Actual Investment
- (2) The validation team has checked the main contracts including boilers, steam turbines and generators with the estimation in approved FSR, and found that it is 5.26% higher than the estimation, which covered 50.29% of total static investment of the project anticipated in FSR. The breakdown of the main cost is as follows:

Contracts	Contract price	Estimation in FSR	Discrepancy rate
Boilers	1740	1630.3	6.73%
Steam turbines	815.2	892.8	-8.69%
Generators	301.2	306.4	-1.70%
subtotal	2856.4	2829.5	0.95%
Installation Contract of Boilers, steam turbines and generators	602.3	481.3	25.1%
Desulfuration project	216.9	189.3	14.6%
Denitrification project	117.6	103.6	13.5%
Total	3793.2	3603.7	5.26%

- (3) The validation team has compared the capital expenditure per kW of the proposal project (3,771RMB/kW)with that reference value provided by Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007), which is 3,724 RMB/kW for 2X1000 MW newly-built ultra-supercritical power plants at price level of 2007,with only 1.26% variation by contrast to the reference value. Hence, the validation team considers that the investment cost is reasonable.
- *Review feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants;*

After reviewing the Feasibility Study Report, the validation team confirms that the investment cost is sourced from the Feasibility Study Report of an accredited third party.

- *Assess the correctness of computations carried out and documented by the project participants;*



The computations have been assessed by checking the spreadsheet provided by the PP and they are confirmed to be correct.

- *Assess the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions;*

If the investment is decreased by 46.5%, then the LCOE of the proposed project is the same as that of alternative A1(2\*1,000MW Ultra-supercritical coal-fired power generation). This means that total investment is dropped to 4 billion RMB, the validation team has verified that the current actual investment is add up to 7.68 billion RMB based on the investment statement provided by the third qualified party, which is higher than that estimated in the PDD. Hence, the investment cost is unlikely decreased by 46.5%.

(b) The plant load factor of the supercritical coal power plant (57%), as the electricity generation of this alternative in the spreadsheet considers the same output as the project activity, hence has PLF of 95% (i.e. 10,000 GWh/y or equal to 95%);

According to the applied methodology ACM0013 ver.04.0.0 Page 3, it mentions that these alternatives should deliver the similar services, so it is assumed that the baseline scenario should also generate the same amount of electricity.

(c) The potential revenue from the sale of the ash, if any. Please refer to VVM version 01.2 paragraph 111.

According to the VVM, ver.01.2 Para.111, the validation team has verified the value in the investment analysis as follows:

- *Conduct a thorough assessment of all parameters and assumptions used in calculating the relevant financial indicator, and determine the accuracy and suitability of these parameters using the available evidence and expertise in relevant accounting practices;*

According to the definition from "Projected Costs of Generating Electricity 2010 Edition, published by International Energy Agency, the levelized cost of electricity (LCOE) corresponds to the cost of an investor assuming the certainty of production costs and the stability of electricity prices, so it indicates that the revenues are not involved in the LCOE analysis.

The potential revenue from the sale of the ash is taken into consideration as an offset to O&M cost, it only represents a small part of the O&M costs, so it is excluded in the FSR.

Based on the above, the potential revenue from the sale of the ash is derived from the confirmation letter between the PP and Jiaxing Branch of Zhejiang Tianneng Environmental Protection Co., Ltd. on 17/01/2012; this is verified by the validation team to be credible.

- *Cross-check the parameters against third-party or publicly available sources, such as invoices or price indices;*

According to the evidence provided by the PP on the actual ash production from 26/12/2011 to 15/01/2012, the amount of ash is 93,771 tons, so the ash production annually is estimated to 1,629,725ton/a ( $93,771/21 \times 365$ ), the ash revenue is estimated to 14.67 million (the price of the ash is 9RMB/t), which accounts for 3.68% of the total O&M cost.

Now it is assumed that the baseline scenario 2\*600MW supercritical power plant uses the same type of coal as the project whose ash proportion is 15% .The ash production is estimated



as 746,673 (44.8\*2\*8,333) thousand tons per year in line with Table 4.7 of the book Design Manual for Electric System, issued by China Electric Power Planning Institute. The revenue can be calculated as 6.72 million RMB/a, 1.97% of the total O&M cost summed in LCOE.

- *Review feasibility reports, public announcements and annual financial reports related to the proposed CDM project activity and the project participants;*

After reviewing the confirmation letter between the PP and Jiaying Branch of Zhejiang Tianneng Environmental Protection Co.,Ltd. on 17/01/2012, the validation team confirms that it is sourced from a third party.

- *Assess the correctness of computations carried out and documented by the project participants;*

The computations have been assessed by checking the spreadsheet provided by the PP and they are confirmed to be correct.

- *Assess the sensitivity analysis by the project participants to determine under what conditions variations in the result would occur, and the likelihood of these conditions;*

If taking the ash revenue into account for the proposed project and baseline scenario, the LCOE of both scenarios can be re-calculated as 0.3245 RMB/kWh and 0.3404 RMB/kWh, respectively, so it means that the alternative of supercritical coal-fired power plant is still the baseline.

#### (4) Evaluation of LCOEP Calculation

During document review of LCOEP excel spreadsheet/4.15/, it is found that the formula towards capital expenditure and cost of power generation are not traceable for validation, and the formula used to calculate the LCOEP are not provided in the excel spreadsheet, so **CAR07** is raised for supplement the above contents. The PPs add the formula in the excel spreadsheet and all formula are verified by the validation team to be correct and traceable, hence CAR07 is closed.

The LCOEP calculation in the PDD are calculated basically on the basis of the data from the FSR, which is approved by NDRC on 25/05/2009. With the result of investment comparison analysis, the PDD concludes that the LCOEP of the project activity of 0.3419 RMB/kWh is higher than that in the baseline scenario (2\*600MW Super-critical coal-fired power generation)(0.3249 RMB/kWh).

The validation team also cross-checked the values through public information such as similar projects uploaded on the UNFCCC and China Power Yearbook (2008-2010) and also by the relevant China standard (Unit Cost Referenced Cost Index of Fossil-fired Power Engineering and Design (2007-2009) and confirmed that the values used in the PDD are appropriate and the financial calculations are correct.

### Step 3: Sensitivity Analysis

A sensitivity analysis is presented in the PDD which demonstrates that the project activity is unlikely to be financially viable under reasonable variations in the critical assumption, i.e.



fluctuation range of  $\pm 10\%$ , in four selected financial parameters, incl. (i) fuel cost; (ii) load factor (iii) investment and (iv) O&M cost. The selection of the sensitivity test parameters focuses mainly on those parameters with reference to the "Guidance on the Assessment of Investment Analysis (Version 4.0.0) Annex 13, EB 61/6.7". It states, "The parameters analyzed shall at least include that contribute more than 20% of either total project costs or total project revenue". The selection of the fluctuation range of  $\pm 10\%$  is consistent with the guideline. The validation team has checked the variables and variations  $\pm 10\%$  performed for sensitivity analysis is deemed to be reasonable based on the expert's experience.

Besides that, each parameter that may reach the benchmark (i.e. 10% project IRR) is also presented and analyzed in the PDD for determining what conditions variations in the result would occur and the likelihood of this condition. The validation team has checked each parameter as follows:

- Fuel cost is increased by 67%: The fuel price will be increased to 1,368 RMB/t, the LCOEP of A1 is equal to that of A2, but the validation team has checked that the coal price signed in the actual coal supply contract on 31/03/2010 is 712.3 RMB/t (including tax)/4.14/. Therefore, the validation team confirms that the 67% increase of fuel cost is unlikely to happen.
- Load factor is increased by 100%: This has been verified by the validation team even if the load factor of 100%, the LCOEP of A1 is 0.2025 higher than that of A2 of 0.1942.
- Investment is decreased by 46.5%: This means that total investment is dropped to 4 billion RMB, the validation team verifies that the actual signed equipment contract of boiler, turbine and generator and recycled water and water tank construction contract/3.25/ is nearly 4 billion RMB, so it is unlikely the investment decreased by 46.5%.
- O&M cost is decreased by 100%: under this condition, it has checked that the LCOEP of A1 (0.3017) is higher than that of A2 (0.2907).

2 CARs are raised and successfully closed out; please see details in Appendix A.

The validation team concludes that both of the variation range and relevant assumptions stated in the PDD are robust and the LCOEP of the project is higher than that of baseline scenario.

### 3.5.4 Barrier Analysis

Barrier analysis is not applicable in this project.

### 3.5.5 Common Practice Analysis

The common practice analysis was addressed as per Step 4 of "Tool for the Demonstration and Assessment of Additionality" and latest rules issued by EB.

During document review, the validation team found that the evidences to demonstrate that all similar projects are in the process of CDM development regarding the common practice analysis is not provided, so **CAR08** is raised. PP supplements the relative evidences and all





these have been verified by the validation team and found to be credible. So CAR08 is closed.

China Eastern Power Grid is selected as the geographical scope of the common practice analysis. This is confirmed to be appropriate since the Project will supply the electricity to CEPG.

The project is a new-built ultra-supercritical coal-fired power plant in CEPG, so it is reasonable that the ultra-supercritical coal-fired power plants in CEPG are considered as similar activities to the Project in the PDD.

All the ultra-supercritical coal-fire power plants in CEPG, which are operational, are in the process of CDM development. This has been verified by the website of <http://cdm.ccchina.gov.cn/web/index.asp> and China Power Yearbook 2010 (page 709-714). Therefore, it can be confirmed that the proposed CDM project activity is not a common practice in the defined region.

1 CAR is raised and successfully closed out; please see details in Appendix A.

Based on above demonstration that in accordance with" Tool for the Demonstration and Assessment of Additionality" and supported by reliable data sources, it is the opinion of the validation team that the project is thus additional.

### 3.6 Monitoring Plan

The project used the approved consolidated monitoring methodology ACM0013 ver.4.0.0 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology"

The validation team has checked all the parameters presented in the monitoring plan against the requirement of the methodology ACM0013 ver.4.0.0, no deviations relevant for the project activity have been found in the plan.

But during document review and on-site visit, the validation team finds that the data and parameters monitored are not included completely, such as the quantity of fossil fuel type q consumed by the project activity used for the auxiliary and start-up functions and weighted average net calorific value of fuel type q according to the latest methodology ACM0013.ver.4.0.0, so **CL04** is raised. And the monitoring plan is not complete, such as the QA/QC procedures and the number of electronic belt scale, so **CL05** is raised to supplement it in the PDD. PP supplements the data and parameters monitored of  $FC_{q,y}$  and  $NCV_{q,y}$  in the revised PDD and the descriptions and source of data to be used, value of data applied and description of measurement methods and procedures, monitoring frequency and QA/QC is verified to be correct and in consistence with the requirements in the applied methodology ACM0013 ver.4.0.0, so CL04 is closed. Beside that, the number of electronic belt scale is confirmed to be two (one used, one backup). and QA/QC procedures has been supplemented in the PDD and verified to be reasonable. So CL05 is closed.

The validation team has reviewed the documents and performed the on-site interview with the relevant personnel, and confirmed that the proposed monitoring plan is feasible within the project design. The major parameters monitored have been discussed with the PP's especially





regarding the location of the meters, the location and number of electronic belt scale, the data management and the QA/QC procedures to be implemented in the context of the project. Based on the above, CEC confirmed that the PP has ability to implement the monitoring plan.

The data and parameters monitored are as follows:

- $EG_{PJ,y}$ : The net power supplied to the grid is measured by the meters complied with "Technical Administrative Code of Electric Energy Metering (DL/T 448-2000). The main meter and the backup meter are installed at the outlet of the power transmission line of the step-up substation. The accuracy class of meters is not less than 0.5s. The Cross-check measures include the comparison with the actual power sale invoices as well as additional meter reading provided by the Grid Company.
- $FC_{coal,y}$ : The quantity of coal consumed by the proposed project is measured by the electrical belt scale, which is complied with the verification regulation of continuous totalizing automatic weighing instruments (JJG650-1990). The electrical belt scale is installed before it goes into the burner. The cross-check measures including the comparison with the actual purchase fuel invoices.
- $FC_{diesel,y}$ : The quantity of diesel oil consumed by the proposed project is measured by the mass flow meter, which is complied with the verification regulation of mass flow meters (JJG897-1995). The cross-check measures including the comparison with the actual purchase fuel invoices.
- $NCV_{coal,y}$ : The Weighted average net calorific value of coal consumed by the project plant is measured by sampling. The cross-check measures including the comparison with the values provided by the fuel suppliers or IPCC default values.
- $NCV_{diesel,y}$ : the weighted average net calorific value of diesel oil consumed by the project plant is provided by the fuel supplier. The cross-check measures including the comparison with IPCC default values.

2 CLs are raised and successfully closed out; please see details in Appendix A.

The validation team hereby confirms that the monitoring plan is in compliance with the requirements of the methodology and the monitoring arrangements described in the monitoring plan are feasible within the project design and the project participants have ability to implement the monitoring plan.

### 3.7 Sustainable Development

The LoA of the Host Country clearly presents a statement that the project contributes to the sustainable development of the host party.

See Chapter 3.1 Approval

### 3.8 Local Stakeholder Consultation

The relevant local stakeholders were invited in June 2009 prior to the publication of PDD on the UNFCCC website of 10/09/2010.



The survey was conducted by distributing the questionnaires to collect the stakeholders' comments. But the number of questionnaires is not mentioned in the PDD, so **CL06** is raised. PP supplements that it distributes 30 questionnaires and all these have been returned out. The validation team has verified the evidences provided by the PP and confirmed to be correct. So CL06 is closed. The summary of comments presented in the PDD has been cross-checked with the meeting minute and found it is complete.

The relevant comments presented by the local stakeholders have been taken due account by the PP, the same has been cross-checked with the information obtained during the interviews. 1 CL is raised and successfully closed out; please see details in Appendix A.

Based on the above, the validation team hereby confirmed that the local stakeholder consultation has been adequately performed.

### 3.9 Environmental Impacts

The project participants undertook the Environmental Impact Assessments of Zhejiang Jiaxing Ultra-supercritical Power Generation Project and got the approvals from local Environmental Protection Bureau.

The environmental impact results from the project have been identified and analyzed in the PDD.

The EIA approval from State EPB confirms the correctness of the approach used by the PPs. During the document review and on-site visit and interview with the local personnel affected, the validation team can judge that the environment impacts occurs mainly in the construction period and the operation period due to waste water, air pollution, noise pollution, solid waste and ecological impact. All the above impacts would be within an acceptable limit by carrying out corresponding measures per the statement of EIAs.

The validation team hereby confirms that there is little negative environmental impact caused by the project by means of measures of pollution avoidance and control as well as ecological recovery.

## 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The DOE shall make publicly available the CDM-PDD in accordance with paragraph 40(b) of the modalities and procedures for the CDM and receive, within 30 days, comments from Parties, stakeholders and UNFCCC accredited non-governmental organizations and make them publicly available.

The validation team published the project documents on the UNFCCC CDM website on 10/09/2010 and invited comments within 09/10/2010 by Parties, stakeholders and NGOs. No comments were received during the GSP. Please see the related links:



## 5 VALIDATION OPINION

China Environmental United Center Co., Ltd (CEC) has performed a validation of the “Zhejiang Jiaxing Ultra-supercritical Power Generation Project” in China based on UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The review of the project design documentation, the subsequent on-site interviews and the further cross-check of references have provided CEC with sufficient evidences to determine the fulfillment of stated criteria in the protocol. In our opinion, the project meets all relevant UNFCCC requirements for the CDM. Hence, CEC will recommend the project for registration by the CDM EB.

An analysis as provided by the applied methodology demonstrates that the proposed project activity 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. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of emission reductions as specified within the final PDD version.

The total emission reductions from the project are estimated to be on the average 336,640tCO<sub>2</sub>e per year over the fixed 10-year crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

CEC’s opinion is that the project “Zhejiang Jiaxing Ultra-supercritical Power Generation Project” in China, as described in the PDD ver.03 of 01/03/2012, meets all relevant UNFCCC requirements for the CDM and all relevant host country criteria, and correctly applied the baseline and monitoring methodology ACM0013 ver.4.0.0, CEC thus requests the registration of the project as a CDM project activity.

Beijing, 02/03/2011

A handwritten signature in black ink, appearing to read 'LIU Qingzhi', is positioned above the name.

LIU Qingzhi

Validation Team Leader

China Environmental United Certification Center Co., Ltd (CEC)

Beijing, 05/03/2011

A handwritten signature in black ink, appearing to read 'TANG Dingding', is positioned above the name.

TANG Dingding

Chairman of Board



## 6. REFERENCES

- 1 PDD/LoA
  - 1.1 PDD Version 01 dated 09/09/2010
  - 1.2 PDD Version 03 dated 01/03/2012
  - 1.3 Letter of Approval from China DNA(No.[2011]1219) dated 13/06/2011
  - 1.4 Letter of Approval from the Finland DNA(Annex I Party) dated 12/07/2011
- 2 EIA/FSR/PDR and its Approval
  - 3.1 EIA of Zhejiang Jiaxing Ultra-supercritical Power Generation Project, prepared by East China Investigation and Design Institute under CHECC in June 2008.
  - 3.2 Approvals of EIA issued by State Environmental Protection Bureau on 07/11/2008.
  - 3.3 Feasibility Study Report of Zhejiang Jiaxing Ultra-supercritical Power Generation Project conducted by East China Investigation and Design Institute under CHECC in Nov.2008
  - 3.4 Approval of FSR(No.[2009] 1338)issued by State Development and Reform Commission on 25/05/2009.
- 3 Baseline and Monitoring Methodology
  - 3.1 Definition of supercritical and ultra-supercritical power generation sets:  
<http://wenku.baidu.com/view/ba898d0d6c85ec3a87c2c5bc.html>
  - 3.2 Appendix 4 of China Energy Statistical Yearbook 2009, 1 kg diesel oil equals to 1.4571 kg coal equivalent.
  - 3.3 <http://cdm.ccchina.gov.cn/web/SearchNews.asp>
  - 3.4 China Power Yearbook(2008-2010)
  - 3.5 Chinese Regional Baseline Emission Factor of New Grid Connected Fossil Fuel Fired Power Plants Using a Less GHG Intensive Technology in 2010 published by Chinese National Development and Reform Commission (NDRC) in Nov.2010(<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2537.pdf>) /3.5/
  - 3.6 Baseline Emission Factors for Regional Power Grids in China" issued by NDRC on 20/12/2010 (<http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2552.pdf>),/3.6/
  - 3.7 [http://news.xinhuanet.com/fortune/2010-08/30/c\\_12497266.htm](http://news.xinhuanet.com/fortune/2010-08/30/c_12497266.htm)
  - 3.8 <http://nyj.ndrc.gov.cn/default.htm>
  - 3.9 [http://www.ndrc.gov.cn/zcfb/zcfbl/zcfbl2005/t20051222\\_54304.htm](http://www.ndrc.gov.cn/zcfb/zcfbl/zcfbl2005/t20051222_54304.htm)
  - 3.10 [http://www.ndrc.gov.cn/zcfb/zcfbl/zcfbl2005/t20051222\\_54304.htm](http://www.ndrc.gov.cn/zcfb/zcfbl/zcfbl2005/t20051222_54304.htm)
  - 3.11 [http://www.ndrc.gov.cn/zcfb/zcfbtz/2007tongzhi/t20070904\\_157244.htm](http://www.ndrc.gov.cn/zcfb/zcfbtz/2007tongzhi/t20070904_157244.htm)
  - 3.12 <http://www.shp.com.cn/news/info/2007/8/6/1410022956.html>
  - 3.13 <http://www.zjwater.gov.cn/document.aspx?id=70612>
  - 3.14 [http://114.255.43.243/news\\_view.asp?lm2=10&id=876](http://114.255.43.243/news_view.asp?lm2=10&id=876)
  - 3.15 [http://www.lw23.com/lunwen\\_1017732557/](http://www.lw23.com/lunwen_1017732557/), page 19 of Analysis on the distribution pattern of the crop-straw resource and the status quo of its application in China.
  - 3.16 <http://www.cn-hw.net/html/27/201010/19200.html>
  - 3.17 [http://www.shac.gov.cn/fwzx/nykj/kjdt/lwjx/201008/t20100816\\_1277077.htm](http://www.shac.gov.cn/fwzx/nykj/kjdt/lwjx/201008/t20100816_1277077.htm)
  - 3.18 <http://www.xnyfd.com/sdxf/html/?28249.html>
  - 3.19 Safety Management Rules on Nuclear Power Generation published by Ministry of



## Power Industry

- 3.20 <http://www.cctime.com/html/2010-3-31/20103311441172396.htm>
- 3.21 [http://www.iea.org/publications/free\\_new\\_Desc.asp?PUBS\\_ID=1472](http://www.iea.org/publications/free_new_Desc.asp?PUBS_ID=1472)
- 3.22 [http://114.255.43.243/news\\_view5.asp?lm2=10&id=336](http://114.255.43.243/news_view5.asp?lm2=10&id=336)
- 3.23 China Energy Statistical Yearbook 2010 (p283)
- 3.24 Unit Cost Referenced index of Fossil-fired Power Engineering and Design of 2007, compiled by Electric Power Planning and Design Institute and published by China Electric Power Press in 2008
- 3.25 Recycled Water and Water Tank Construction Contract Signed by Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd and Qingdao Coast Defense Engineering Bureau in Sep.2009
- 3.26 The registered CDM project "Shanghai Waigaoqiao coal-fired power project using a less GHG intensive technology (Ref.3288)".
- 3.27 IPCC default value of coal at the lower limit of the uncertainty at a 95% confidence interval as provided in table 1.4 of Chapter 1 of Vol. 2 (Energy) of the 2006 IPCC Guidelines on National GHG Inventories
4. Additionality
  - 4.1 The Equipment Purchase Contract made effective on 25/05/2009, which was signed on 12/09/2008.
  - 4.2 Main Plant Construction Contract Signed on 17/08/2009;
  - 4.3 Information Form from DNA of China signed on 22/07/2009;
  - 4.4 Prior Consideration of CDM Form on 12/08/2009
  - 4.5 <http://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html>
  - 4.6 The Investment Decision on Seeking CDM Revenue
  - 4.7 Consultant Service Contract signed on 30/06/2009
  - 4.8 ERPA signed on 27/04/2010
  - 4.9 Notice of Some Relative Matters About Normalization of Power Price Management published by State Planning Commission in 2001 (Doc.No.Jijiage[2001]701)
  - 4.10 [http://www.sdpc.gov.cn/cy/z/hxf/t20060725\\_77544.htm](http://www.sdpc.gov.cn/cy/z/hxf/t20060725_77544.htm)
  - 4.11 The Actual Employees provided by the PP
  - 4.12 The Information issued by National Energy Administration on 28/01/2011 : [http://nyj.ndrc.gov.cn/ggtz/t20110128\\_393339.htm](http://nyj.ndrc.gov.cn/ggtz/t20110128_393339.htm)
  - 4.13 <http://www.ccchina.gov.cn/cn/NewsInfo.asp?NewsId=22066>;
  - 4.14 Actual Coal Supply Contract signed on 31/03/2010;
  - 4.15 LCOEP Calculation Spreadsheet;
  - 4.16 "Economic Evaluation Guideline for fossil-fired power Plant (DL/T 5435-2009)"
5. Others
  - 5.1 National Code: Technical Administrative Code of Electricity Energy Metering "DL/T448-2000";
  - 5.2 The Verification Regulation of Continuous Totalizing Automatic Weighing Instruments (JJG650-1990);
  - 5.3 The Verification Regulation of Mass Flow Meters (JJG897-1995);
6. Tools
  - 6.1 Validation and Verification Manual Version 01.2 dated 30/07/2010 EB 55 Annex 1



- 6.2 ACM00013 version 4.0.0 dated 30/09/2010
- 6.3 Tool to calculate the emission factor for an electricity system Version 2.1.0 dated on 15/04/2011;
- 6.4 Tool for demonstration and assessment of additionality Version 5.2 dated 26/08/2008, EB39 Annex 10;
- 6.5 Guidance on the demonstration and assessment of prior consideration of the CDM Version 03 dated 11/09/2009 EB49 Annex 22;
- 6.6 Guidelines for the Reporting and Validation of Plant Load Factors dated 17/07/2009 EB48 Annex 11;
- 6.7 Guidelines on the Assessment of Investment Analysis dated 03/06/2011 EB61 Annex 13

## 7. PERSONS INTERVIEWED

List persons interviewed dated 12/11/2010 during the validation or persons that contributed with other information that are not included in the documents listed above.

Name	Department	Position
HUANG Yan	Development and Reform Commission, Jiaying City	Deputy Director
TANG Lei	Construction Bank in Zhejiang Province,	Deputy Director
YANG Peng	Jiaying Environmental Protection Administration	Deputy Director
TIAN Ke	Zhejiang Electric Design Institute	General Engineer
Hans J.Motzfeut	Nordic Carbon Fund Ky	General Manager
SUN Qi	Nordic Carbon Fund Ky	Market Manger
QIN Chuan	Nordic Carbon Fund Ky	Market Manger
MA Haiyong	Local Resident	/
GUO Chao	Binhai Electricity Supply Bureau	Person in charge
SUN Hualu	Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd	General Manager
JIANG Fangshou	Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd	Person in charge
HUA Jinqiang	Local government	Deputy Director
DING Xuefei	China Carbon Technology Co., Ltd	Manager



## Appendix A Validation Protocol

**Table 1 Requirements Checklist**

CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
<b>A. General Description of Project Activity</b>				
The project Design is assessed				
<b>A.1. Title of the Project Activity</b>				
A.1.1 Does the used project title clearly enable to identify the unique CDM activity?	DR	Yes. The used project title is “Zhejiang Jiaxing Ultra-supercritical Power Generation Project”; it is identifying the unique CDM activity clearly.	OK	OK
A.1.2 Are there any indication concerning the revision number and the date of the revision?	DR	Yes. The proposed project numbered PDD version 01 dated 09/09/2010 made publicly. The revised and final PDD version 03 dated 01/03/2012.	OK	OK
A.1.3 Is the PDD revision history consistent with the time line of the project’s history?	DR	Yes. The first version was aimed to apply to China LoA, The first GSP was started with version 01 as the UNFCCC CDM website: <a href="http://cdm.unfccc.int/Projects/Validation/index.html">http://cdm.unfccc.int/Projects/Validation/index.html</a> The PDD Version 03 was the result of the DOE feedback. It is consistent with the time line of the project’s history.	OK	OK
<b>A.2. Description of the Project Activity</b>				
A.2.1 Is the description delivering a transparent overview of the project activities?	DR	An overview of the project is described transparently in section A.2 of the PDD. The project is located on Liuli Bay, Pinghu City, Zhejiang Province, P.R. China. The project activity is a newly built project, which involves the installation of two sets of 1,000MW ultra-supercritical units with the total installed capacity of 2,000MW, The estimated annual electricity delivered to the grid is 9,470GWh, and The electricity generated by the project will directly connect to the China Eastern Power Grid (“CEPG hereafter). After the project is completed,	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		electricity generated by the project will effectively displace equal amount of the electricity generated by CEPG which is dominated by fossil fuel power plants, and thus greenhouse gas (GHG) emission reductions could be achieved. The estimated annual GHG emission reduction will be 336,640tCO <sub>2</sub>		
A.2.2 What major proofs are available demonstrating that the project description is in compliance with the actual situation or planning?	DR	The project activity will reduce the GHG emissions through using a less GHG intensive technology and supplied the power to the CEPG thus reducing GHG emissions. The following documents deliver evidences for the project activity: <ul style="list-style-type: none"> <li>● EIA and EIA Approval</li> <li>● Feasibility Study Report and FSR Approval</li> <li>● Grid Connection Suggestion</li> </ul> These documents have been provided and verified during the audit.	OK	OK
A.2.3 Is the information provided by the PDD consistent with the information provided by the proofs?	DR	The information provided by these proofs is consistent with the information provided by the PDD.	OK	OK
A.2.4 Is all information presented consistent with details provided by further chapters of the PDD?	DR	During the document review, the validation team finds :  CL01 The net thermal efficiency up to 43.39% in Section A.2 and A.4.3 is not traceable.	CL04	OK
A.2.5 Has the CDM project activity at the start of the validation been constructed or does the CDM project activity use existing facilities or	DR I	The project activity was initiated before the start of validation however it is not fully constructed at the start of the validation.	OK	OK





CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
equipment?				
A.2.6 Is the project a large scale project, a small scale project with average annual emission reductions above 15,000 t or a bundled small scale project? Has on-site visit been carried out?	DR I	The project activity is a large scale project activity (2,000MW of total installed capacity) with annual emission reductions of over 336,640 t CO <sub>2</sub> e. The validation team performed interviews with project stakeholders to confirm the selected information and to resolve the issues identified during the desk review through an on-site visit on 11/11/2010-12/11/2010.	OK	OK
A.2.7 Does the project activity involve alternation of existing installation? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	DR I	The proposed project does not involve alteration of existing installations.	OK	OK
<b>A.3. Project Participation</b> 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.				
A.3.1 Is the form required for the indication of project participants correctly applied?	DR	Yes. The form is correctly applied.	OK	OK
A.3.2 Which Parties and project participants are participating in the project?	DR	The project participant representing the host is: Zhejiang Zhe'neng Jiahua Power Generation Co., Ltd. Of China and Nordic Carbon Fund Ky of the Finland is the project participant representing the Annex I Country.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
A.3.3 Has the project provided written approvals of all parties involved?	DR	Letter of Approval from China's DNA (Document No. [2011]1219) issued on 13/06/2011 has been provided and verified. Letter of Approval from the Finland [Reference: HEL7290-59] issued on 12/07/2011 has been provided and verified.  CAR01 The Letters of Approval from DNA of Annex I Party and Non-Annex I Party have not been provided.	CAR01	OK
A.3.4 Do the written approvals confirm that the corresponding party is a Party to the Kyoto Protocol?	DR	P.R. China has ratified the Kyoto Protocol on 30/08/2002 The Finland has ratified the Kyoto Protocol on 31/05/2002  Please refer to CAR01	CAR01	OK
A.3.5 Do the written approvals confirm that the participation is voluntary?	DR	Please refer to CAR01	CAR01	OK
A.3.6 Does the written approval from the host country confirm that the project contributes to the sustainable development in the country?	DR	Please refer to CAR01	CAR01	OK
A.3.7 Do the written approvals refer to the precise project title in the PDD submitted for registration?	DR	As per the letter of approval from China, Project activity title is: Zhejiang Jiaxing Ultra-supercritical Power Generation Project is consisting with the title in the PDD.  Please refer to CAR01	CAR01	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
A.3.8 Are the written approvals unconditional with regard to A 3.3 to A3.6?	DR	Please refer to CAR01	CAR01	OK
A.3.9 Is the information regarding the project participants listed in section A.3 and in Annex 1 of the PDD internally consistent to each other?	DR	Yes	OK	OK
A.3.10 Are all project participants listed in the PDD approved at least by one Party involved?	DR	Letter of Approval from China DNA's Document No.[2011]1219  Please refer to CAR01	CAR01	OK
A.3.11 Are any other project participant approved but not listed in the PDD?	DR	No. There are no other project participants approved but not listed in the PDD.	OK	OK
A.3.12 Will the project create other environmental or social benefits than GHG emission reductions?	DR	Yes. Besides GHG emission reduction, the proposed project activity also helps mitigating local conflict between supply and demand of electricity and reducing pollutant emissions.  More project specific information about its contribution to sustainable development has been provided, including contribution to the province's economic development, improving of the infrastructure of local villages and providing employment opportunities in operation period.	OK	OK
<b>A.4. Technical Description of the Project activity</b> Validation of project technology focuses on the project engineering, choice of technology and competence/maintenance needs. The auditor				



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
should ensure that environmentally safe and sound technology and know-how is used.				
<b>A.4.1 Location of the project activity</b>				
A.4.1.1 Does the information provided on the location of the project activity allow for a clear identification of the site(s)?	DR I	Yes. The project is located on Liuli Bay, Pinghu City, Zhejiang Province, P.R.China. The project is 6km away from Zhapu Town, 16km away from Pinghu City, 41km away from Jiaxing City, 90km away from Shanghai City and 102km away from Hangzhou City. The central geographical coordinate is 30.36'10"N, 121.08'10"E. This has been verified via on-site visit.	OK	OK
A.4.1.2 How is it ensured and/or demonstrated, that the project participants can implement the project at this site (ownership, licenses, contracts etc.)?	DR I	The project approval issued by National Development and Reform Commission (NDRC) and The EIA approval issued by Ministry of Environmental Protection of P.R.China demonstrate that the project proponent can implement the project at this site.	OK	OK
<b>A.4.2 Category(ies) of the project activity</b>				
A.4.2.1 To which category (ies) does the project activity belonging to? Is the category correctly identified and indicated?	DR	The project falls under Scope 1(Energy industries (non-renewable sources). The category is correctly identified in Section A 4.2 of the PDD.	OK	OK
<b>A.4.3 Technology to be employed by the project activity</b>				
A.4.3.1 Does the technical design of the project activity reflect current good practices?	DR I	Yes. Based on the document review and on-site visit, the project uses ultra-supercritical coal-fired power technology to improve the power generation efficiency of coal-fired power plant, reduce coal consumption per kWh	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		electricity generation, which is the advanced coal-fired generation technology in China. And hence reflects the current good practices to use a more efficient power generation technology.  Please refer to CL01		
A.4.3.2 Does the description of the technology to be applied provide sufficient and transparent input/information to evaluate its impact on the greenhouse gas balance?	DR	The project activity involves the installation of two 1,000MW ultra-supercritical units of coal-fired generation, in which each set includes one boiler with the type of HG-3101/27/46-YM3, one steam turbines with the type of N1000/26.25/600/600, and one generator with the type of THDF125/67, which matches with the total installed capacity of 2,000MW. There is no doubt that this technology will reduce the GHG emissions significantly. But during document review, the validation team finds that:  CL02 The reheat steam inlet/outlet pressure and temperature in the PDD is not in consistence with that mentioned in the purchase contract. Please clarify it. The efficiency of generators in the PDD is not in consistence with the value in the purchase contract of generators. Please clarify it.	CL02	OK
A.4.3.3 Does the implementation of the project activity require any technology transfer from Annex I countries to the host country (ies)?	DR I	No. All elements of the power plant such as boiler, steam turbine and generator are made in China. Therefore no technology transfer is required.	OK	OK
A.4.3.4 Is the information provided in compliance with actual	DR I	Equipment purchase contracts of boiler, generators and turbines have been reviewed by the validation team, and it is in compliance with the PDD.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
situation or planning?		According to the expected construction period of 32 months in the FSR, the start operation of the project in September, 2011 in the PDD is in compliance with the plan. And the power generated by the project will be transmitted to the China Eastern Power Grid through two 500kV transmission lines.		
A.4.3.5 Does the project use state of the art technology and/or does the technology result in a significantly better performance than any commonly used technologies in the host country?	DR	The common practice for electricity generation in Zhejiang Province is still supercritical coal-fired power plant. Hence, the project would result in a better performance than the common practice.	OK	OK
A.4.3.6 Is the project technology likely to be substituted by other or more efficient technologies within the project period?	DR	No. It is not expected that there will be a substitution because the turbines, generators and the other equipment will be newly commissioned and installed. The expected lifetime of the project is under normal circumstances longer than the crediting period.	OK	OK
A.4.3.7 Does the project require extensive initial training and maintenance efforts in order to be carried out as scheduled during the project period?	DR	Yes. The project participant will make arrangements for its staff to become familiar with the operation of a power plant, besides these trainings, the manufacturer of the equipments will also provide on-site training and will provide one of its staffs to operate the boiler, turbine and generator. Additionally, the consultant will train the project owner on CDM monitoring.	OK	OK
A.4.3.8 Is information available on the demand and	DR I	The effort to train the staffs initially and during the operation period was described by the project owner during on-site visit and the demand and	OK	OK



<b>CHECKLIST QUESTION</b> MoV=Means of Verification, DR=Document Review, I=Interview	<b>MoV</b>	<b>comments</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
requirements for training and maintenance?		requirements will be defined in written form before operation.		
A.4.3.9 Is a schedule available for the implementation of the project?	DR I	The planning schedule in the past and for the future was clearly described by the project owner during on-site visit. The construction of the proposed project had been started and estimated to begin operation in September 2011, so the risks for any delay are very low.	OK	OK
<b>A.4.4 Estimated amount of emission reductions over the chosen crediting period</b>				
A.4.4.1 Is the form required for the indication of projected emission reductions correctly applied?	DR	Yes. The form is correctly applied	OK	OK
A.4.4.2 Are the figures provided consistent with other data presented in the PDD?	DR	Yes. The figures provided are consistent with other data presented in the revised PDD.	OK	OK
<b>A.4.5 Public funding of the project activity</b>				
A.4.5.1 Is the information provided on public funding provided in compliance with the actual situation or planning as available by the project activity?	DR	Yes. According to the statement in Section A 4.5 of the PDD there is no public funding for the project activity. By reviewing the FSR the interviewing during on-site visit, the validation team confirms that no public funds are used by the project.	OK	OK
A.4.5.2 Is all information provided consistent with the details given in remaining Sections of the PDD (in	DR	Yes. The information on public funding is consistent with the information provided in Annex 2 that no public funding takes place.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview particular Annex 2)	MoV	comments	Draft Concl.	Final Concl.
<b>B. Application of a Baseline and Monitoring Methodology</b> The validation of the baseline established whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario. And the validation of monitoring plan is appropriate fro the project activity and in line with the applied methodology.				
<b>B.1. Title and reference of the approved baseline and monitoring methodology applied to the project activity(Baseline Methodology)</b> It is assessed whether the project applies an appropriate baseline methodology.				
B.1.1 Does the project apply an approved methodology and the correct version thereof?	DR	The project applies approved baseline and monitoring methodology ACM0013, version 4.0.0 "Consolidated Baseline Methodology for New Grid-Connected Fossil Fuel Fired Power Plants Using a Less GHG Intensive Technology" that is valid from17/09/2010 onwards. At the time of PDD for global stakeholder publication on 09/09/2010, ACM0013 ver.03 is valid, however, it is valid until 17/09/2010.Hence,  CAR02 The latest Methodology ACM0013.ver.4..0.0 shall be adopted, including the application condition, and data and parameters monitored.	CAR02	OK
B.1.2 Is the applied version the most recent one and/or this version still applicable?	DR	Please refer to CAR02	CAR02	OK
B.1.3 Does the methodology refer to the tools with the latest approved versions?	DR	Yes. "Tool to calculate the emission factor for an electricity factor for an electricity system" (ver.2.0) was published on 13/10/2010 in EB50 meeting, so the latest version was used in the revised PDD ver.03 and it is also mentioned clearly. "Tool for demonstration and assessment of additionality (ver.5.2)" has been mentioned clearly and they are the latest approved version.	OK	OK





CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
<b>B.2. Justification of the choice of the methodology and why it is applicable to the project activity</b> It is assessed whether the project applies an appropriate baseline methodology.				
B.2.1 Is justification of the choice of methodology that the project activity meets each of the applicability conditions provided?	DR	The applicable conditions in the methodology is validated as follows: <ul style="list-style-type: none"> <li>Based on the document review of FSR and on-site visit, the validation team confirms that the proposed project involves the construction and operation of a new ultra-supercritical coal-fired grid-connected electricity generation plant. The steam pressure is 26.25MPa, the main steam pressure is 600℃ and the reheat steam temperature is 600℃, which is the critical point of the steam;</li> <li>During on-site visit, the validation team finds that the proposed project is under construction, it can be confirmed that the start-up and auxiliary fossil fuel is diesel oil via verifying the FSR, which states that it can be only used during the start-up and short periods of interruption in the supply of the main fuel due to technical or operational problems. The consumption of diesel oil is about 2,016 ton annually via verifying the annual diesel consumption estimated in the FSR, equal to 2,937.51t coal equivalents annually. So the diesel oil only comprised of 0.11% of the total fuel used annually on an energy basis.</li> <li>The project activity does not include the construction and operation of a co-generation power plant; this has been confirmed via on-site visit and document review of FSR and approval of FSR.</li> <li>Data on fuel consumption and electricity generation of recently constructed power plants are available; This has been verified by Baseline Emission Factor for Fossil Fuel Fired Power Plant Using Low Carbon Technology Connected to the Grid in 2010 published by DNA of China;</li> </ul>	CAR03	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		But during document review, the validation team finds that one of applicable condition is not fully met:  CAR03 The data from latest three years shall be used to meet one of the applicable conditions that the identified baseline fuel category used is more than 50% of total generation by utilities in the geographical area within the host country according to the latest methodology ACM0013 ver.4.0.0		
B.2.2 Does the GHG emission reductions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed CDM project activity contribute more than 1% the overall expected average annual emission reductions, which are not addressed by the applied methodology?		No other project emission or leakage sources contribute more than 1% and not mentioned by the methodology have been found at this stage.	OK	OK
<b>B.3. Description of the sources and gases included in the project boundary</b> Project Boundaries are the limits and borders defining the GHG emission reduction project				
B.3.1 Are the project's spatial boundaries (geographical) clearly defined?	DR	Yes. The project boundary concludes the proposed project and all the power plants connecting to the power system (CEPG).The CSPG is a regional grid, which consists of five sub-grids: Shanghai, Zhejiang, Jiangsu, Anhui and Fujian Grid.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
B.3.2 Are all sources and GHGs included in the project boundary as required in the applied methodology?	DR I	As per methodology, only CO <sub>2</sub> emission reduction from fossil fuel combustion in the power plants that are displaced due to the project activity.	OK	OK
B.3.3 In case the methodology allows choosing whether a source and/or gas are to be included, is the choice sufficiently explained and justified?	DR	N/A	OK	OK
<b>B.4. Description of how the baseline scenario is identified and description of the identified baseline scenario(Baseline Scenario Determination)</b> 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.				
B.4.1 What is the baseline scenario?	DR	The baseline scenario is that power generation using the same fossil fuel category as in the project activity, but technologies other than that used in the project activity (namely:2*600MW Super-critical coal-fired power generation).	OK	OK
B.4.2 What other alternative scenarios have been considered and why is the selected scenario the most likely one?	DR	Nine alternative baseline scenarios to the project have been identified and verified : 1. The project activity not implemented as a CDM project; A1: 2*1000MW Ultra-supercritical coal-fired power generation 2. The construction of one or several other power plants instead of the proposed project activity, including: 2.1 Power generation using the same fossil fuel categories other than that used in the project activity; A2: 2*600MW Super-critical coal-fired power generation	CAR04	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		<p>A3:2*600MW (and 4*300MW) Sub-critical coal-fired power generation</p> <p>2.2 Power generation using fossil fuel categories other than that used in the project activity;</p> <p>A4: 2*300MW Natural gas power generation</p> <p>A5: 2*300MW Fuel oil power generation</p> <p>2.3 Other power generation technologies, such as renewable power generation;</p> <p>A6: Power generation using hydro power</p> <p>A7: Power generation using wind power, biomass power, and solar energy</p> <p>A8: Power generation using nuclear energy</p> <p>3. Import of electricity from connected grids, including the possibility of new interconnections;</p> <p>A9: Import of electricity from connected grids</p> <p>But during document review, the validation team finds that:</p> <p>CAR04</p> <p>The selection of the most plausible and conservative baseline scenario needs to be substantiated in accordance with the Step 1 for identification of baseline scenario as mentioned under ACM0013 ver.4.0.0, on the basis of the following issues:</p> <p>(1) All the alternatives should deliver similar services (e.g. peak vs base load power) determined in the applied methodology ACM0013 ver.4.0.0, so please clarify and substantiate it.</p> <p>(2) Please provide proper justification for choosing different installed capacity</p>		



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		<p>to arrive the levelized cost of unit electricity generation instead of the same capacity.</p> <p>(3) Please clarify if all possible other power generation technologies are included.</p> <p>(4) All the sources needs to be further substantiated, in particular it is mentioned in PDD, Page 10 that the domestic power plants with single unit of 600MW are based prevalently on two types of power generation; however, this statement has not been supported with traceable evidence. Furthermore, description in footnote 8 is not clear as to whether biomass power is unable to provide base load power.</p>		
B.4.3 Has the baseline scenario been determined according to the methodology?	DR	<p>Yes.</p> <p>It is determined according to the methodology.</p>	OK	OK
B.4.4 Has the baseline scenario been determined using conservative assumptions where possible?	DR	<p>Yes.</p> <p>According to the deduction from the available information, the assumptions are conservative.</p>	OK	OK
B.4.5 Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	DR	<p>Yes.</p> <p>The relevant national and/or sectoral policies, macro-economic trends and political aspirations have been taken into account.</p>	OK	OK
B.4.6 Is the baseline scenario determination compatible with the available data and	DR	<p>Yes.</p> <p>The baseline scenario has been determined in compliance with the data provided by China DNA and IPCC 2006.It is compatible with the available data</p>	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
are all literature and sources clearly referenced?		and all literature and sources are clearly referenced.		
<b>B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below that would have occurred in the absence of the registered CDM project activity (Additionality Assessment and Demonstration)</b> The assessment of additionality will be validated with focus on whether the project itself is not a likely baseline scenario.				
<b>B.5.1 Methodology</b>				
B.5.1.1 Does the additionality justification follow the requirements of the applied methodology and/or methodological tools?	DR	According to ACM0013 ver.4.0.0, the additionality of the project activity shall be demonstrated and assessed using the latest version of the "Tool for demonstration and assessment of additionality, ver. 5.2 "approved by the CDM EB, which is available on the UNFCCC CDM website. In PDD the "Tool for the Demonstration and Assessment of Additionality (ver.5.2)" was referred to which is the latest version.  Please refer to CAR03	CAR03	OK
<b>B.5.2 Prior consideration of the CDM</b>				
B.5.2.1 Is the project starting date reported in accordance with the CDM glossary of terms	DR I	The starting date is defined as the execution date of main equipment purchase contract (25/05/2009), which was signed on 12/09/2008. It is the earliest date of real and continual action of the project implementation as per CDM glossary.  CAR05 Please clarify how to define the start date of the project activity based on the CDM Glossary of Terms.	CAR05	OK
B.5.2.2 In case the project start date is prior to the date of publication of the PDD for	DR	N/A.  The start date of project activity is 25/05/2009, is before the date of GSP	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
global stakeholder consultation, was the incentive from the CDM seriously considered and are details given in the PDD?		(10/09/2010). And it is a new project activity with a start time after 02/08/2008. As for a new project activity, the validation team has also checked the Information Form from DNA of China signed on 22/07/2009 and prior consideration of CDM Form on 12/08/2009 and confirms that the title of the project activity is in consistence with that mentioned in the PDD and are real, besides that the validation team has cross-checked the Project information on the UNFCCC ( <a href="http://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html">http://cdm.unfccc.int/Projects/PriorCDM/notifications/index.html</a> ) which is received on 24/08/2009, and confirms that the two notification of the intention to seek CDM status have been provided by the PP within six months of the project activity start date(25/05/2009), so the timeline of key events clearly indicated and confirmed the prior consideration of CDM. Besides that, the investment decision was made on 15/04/2009 for applying the CDM support because of no financial attractive, and CDM consultation contract was signed on 30/06/2009 and ERPA was signed on 27/04/2010, all these evidences have been verified to demonstrate the continuation of CDM action.		
B.5.2.3 How and when was the decision to proceed with the project taken?	DR	Please refer to B 5.2.2	OK	OK
B.5.2.4 Is the project start date consistent with the available evidences?	DR	Yes. The project start date is the execution date of main equipment purchase contract (25/05/2009), which was signed on 12/09/2008. The validation team has checked the relative contracts related to real action such as the main plant house construction contract etc and confirms that they are consistent with the available evidences.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
B.5.2.5 Have real and continual actions been taken during the implementation of the project?	DR	Yes.  Please refer to B.5.2.2	OK	OK
<b>B.5.3 Step 1: Identification of alternatives</b>				
B.5.3.1 Have all realistic alternatives been identified to the project?	DR	A complete list of nine credible alternatives has been identified to the project activity in the PDD.  Please refer to CAR04	CAR04	OK
B.5.3.2 Contains the list of alternatives at least the status-quo situation and the project not undertaken as a CDM project?	DR	Yes. The alternatives contain the status-quo situation and the project not undertaken as a CDM project..	OK	OK
B.5.3.3 Do all identified alternatives comply with applicable regulation?	DR	Alternative A3 is not in compliance with the applicable regulation; all other alternatives are in compliance.	OK	OK
<b>B.5.4 Step 2 Investment analysis</b>				
B.5.4.1 Is an appropriate analysis method chosen for the project?	DR	Yes. Since the proposed CDM project activity will generate revenues by selling power to the CEPG, hence the investment comparison analysis (Option II) is appropriate for the current project under consideration.	OK	OK
B.5.4.2 Does the financial/economic analysis be based on	DR	Yes. The financial analysis is based on the parameters that are standard in the market considering the specific characteristics of the project type.	OK	OK





CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
parameters that are standard in the market, considering the specific characteristics of the project type?				
B.5.4.3 In case of applying investment comparison analysis, has the financial indicator, such as IRR, NPV, cost benefit ratio, or unit cost of service (e.g., levelized cost of electricity production in \$/kWh or levelized cost of delivered heat in \$/GJ) identified?	DR	Yes. The LCOEP is used for investment comparison analysis.	OK	OK
B.5.4.4 Has the suitable financial indicator for the proposed CDM project activity and other alternatives been calculated?	DR	Yes. The LCOEP of the proposed project is 0.3419, higher than that of alternative A2 of 0.3249.	OK	OK
B.5.4.5 Has all relevant costs (including the investment cost, fuel costs and the O&M cost) and revenues, as appropriate,	DR	CAR06 In step 2 to identify the economically most attractive scenario alternative, please further substantiate the following: (1) Please further provide clear description of each baseline scenario alternative, including information on the technology, in particular the	CAR06	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
non-market cost and benefit in the case of public investors ,been included?		<p>efficiency and technical lifetime.</p> <p>(2) All the assumptions towards capital expenditure and cost of power generation for the project activity in the different scenarios need to be further substantiated with traceable sources;</p> <p>(3) The critical techno-economic parameters and assumptions should be clearly presented, in particular the load factor of the power plant;</p> <p>(4) Please substantiate the differences where the assumptions, input data and data sources for the investment analysis differ across the project activity and its alternatives such as the O&amp;M cost, capital expenditure.</p>		
B.5.4.6 Does the investment analysis be presented in a transparent manner and all relevant assumptions be provided preferably in the CDM-PDD or in separate annexes to the CDM-PDD?	DR	<p>During document review, the Excel Spreadsheets of the project are viewable and unprotected. They have been submitted to DOE and reproduced by the auditor, but</p> <p>CAR07</p> <p>In the LCOEP excel spreadsheet, the following issues shall be substantiated:</p> <ul style="list-style-type: none"> <li>All the formula towards capital expenditure and cost of power generation for the project activity need to be further substantiated with traceable sources.</li> <li>The formula used to calculated LCOEP in the excel spreadsheet shall be provided in the LCOEP excel spreadsheet.</li> </ul>	CAR07	OK
B.5.4.7 Does critical techno-economic parameters and assumptions (such as capital costs, fuel price projections, lifetimes, the	DR	Please refer to CAR06	CAR06	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
load factor of the power plant and discount rate or cost of capital) be clearly presented?				
B.5.4.8 In calculating the financial analysis, can the project's risks be included through the cash flow pattern, subject to project-specific expectations and assumptions?	DR	Yes. Relevant costs are included.	OK	OK
B.5.4.9 Where assumptions, input data, and data sources for the investment analysis differ across the project activity and its alternatives, have differences been well substantiated?	DR	Please refer to CAR06	CAR06	OK
B.5.4.10 Does the CDM-PDD submitted for validation present a clear comparison of the financial indicator for all scenario alternatives?	DR	Yes. The CDM-PDD submitted for validation presents a clear comparison of the financial indicator for all scenario alternatives.	OK	OK
B.5.4.11 Was sensitivity analysis	DR	Yes.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
appropriately assessed by the project participants? Please assess and determine under what conditions variations in the result would occur and likelihood of these conditions.		The sensitivity analysis was assessed in the PDD. Two parameters are analyzed in the sensitivity analysis. And the elaboration was verified and found robust.		
<b>B.5.5 Step 3:Barrier analysis</b>				
B.5.5.1 Are there any barriers given which have a clear and definable impact on the profitability of the project?	DR	N/A	OK	OK
B.5.5.2 How is it justified and evidenced that the barriers given in the PDD are real?	DR	N/A	OK	OK
B.5.5.3 How is it justified that one or a set of real barriers prevent(s) the implementation of the project activity?	DR	N/A	OK	OK
<b>B.5.6 Step 4 Common practice analysis</b>				
B.5.6.1 Is the defined region for the common practice	DR	Yes. China Eastern Power Grid is defined as the region for common practice	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
analysis appropriate for the technology/industry type?		analysis, which is appropriate for similar investment conditions and natural conditions etc.		
B.5.6.2 To what extent similar projects have been undertaken in the relevant region?	DR	The PP analyzed four similar projects in the CEPG. , which are broadly similar technology, and of a similar scale, and also take place in a comparable environment. The argument is assessed to be appropriate and evident.  CAR08 Please provide the robust evidences that all similar projects are in the process of CDM development regarding the common practice analysis procedure	CAR08	OK
B.5.6.3 In case similar projects are identified, are there any key differences between the proposed project and existing or ongoing projects and what kind of differences is observed?	DR	Please refer to CAR08	CAR08	OK
<b>B.6. Emission Reductions</b> It is assessed whether the ex-ante calculation of project emissions, baseline emissions, leakage emissions are stated according to the methodology and whether the argumentation for the choice of default factors and values (where applicable) is justified. Further calculation of emission reductions shall be assessed.				
<b>B.6.1 Explanation of methodological choices</b>				
B.6.1.1 Are the equations applied correctly according to the applied approved methodology?	DR	The equations applied for calculations are correctly applied according to the approved methodology ACM0013 ver.4.0.0 as follows: 1. Calculating the Project Emission( $PE_y$ ) 2. Calculating the Baseline Emission( $BE_y$ );	CL03	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		<p>EF<sub>BL,CO2</sub> is determined using the lowest value between (i)Opinion I: the emission factor of the technology and fuel type that has been identified as the most likely baseline scenario ,and Opinion (ii) a benchmark emission factor determined based on the performance of the top 15% power plants that use the same fuel category as the project plant and any technology available in the geographical area.</p> <p>For determination of the top 15% performer power plants j, the following step-wise approach is used:</p> <p>Step 1: Definition of similar plants to the project activity;</p> <p>Step 2: Definition of the geographical area;</p> <p>Step 3: Identification of the sample group;</p> <p>Step 4: Determination of the plant efficiencies;</p> <p>Step 5: Identification of the top 15% performer plants j;</p> <p>CL03</p> <p>The technology for start-up or auxiliary functions in the PDD is not in consistence with that mentioned in the FSR, please clarify it.</p>		
B.6.1.2 In case the methodology allows for different methodology choices, are the equations applied properly justified and have they been used reflecting the other methodological choices (i.e.baseline identification)?	DR	Yes.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
B.6.1.3 Have conservative assumptions been used when calculating the emission reduction?	DR	According to the methodology ACM0013 ver.4.0.0, $EF_{BL,CO_2}$ is determined using the lowest value between Opinion I: the emission factor of the technology and fuel type that has been identified as the most likely baseline scenario, and Opinion II: a benchmark emission factor determined based on the performance of the top 15% power plants that use the same fuel category as the project plant and any technology available in the geographical area, no leakage emissions are to be considered. So it is conservative.	OK–	OK
<b>B.6.2 Data and parameters that are available at validation</b>				
B.6.2.1 Is the list of parameters presented in Chapter B.6.2 considered to be complete and correct with regard to the requirements of the applied methodology?	DR	The list of parameters is complete in the revised PDD with regard to the requirements of the applied methodology ACM0013 ver.4.0.0	OK	OK
B.6.2.2 Is all the data derived from official data sources or replicable records and have these been correctly quoted?	DR	Yes. The Option II is adopted in the $EF_{BL,CO_2}$ calculation as per the approved methodology	OK	OK
<b>B.6.3 Ex-ante calculation of emission reduction</b>				
B.6.3.1 Are the GHG calculations documented in a complete and transparent manner?	DR	Yes. Detailed descriptions are given and conservative IPCC values are adopted.	OK	OK
B.6.3.2 Is the calculation of the baseline emission and the	DR	Yes. The calculation electronically in a spreadsheet is provided to the DOE.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
project emission documented electronically in a spreadsheet? Has this spreadsheet been submitted to the validation team?				
B.6.3.3 Are the data and parameters that are not monitored and remained fixed throughout the crediting period appropriately assessed, correct, and will they result in conservative estimates?	DR	Yes.	OK	OK
B.6.3.4 Is the data provided in this section consistent with data as presented in other chapters of the PDD?	DR	Yes.	OK	OK
<b>B.6.4 Summary of the ex-ante estimation of emission reductions</b>				
B.6.4.1 Will the project result in fewer GHG emissions than the baseline scenario?	DR	As demonstrated in the PDD, the project will result in fewer GHG emissions than the baseline scenario.	OK	OK
B.6.4.2 Is the form/table required for the indication of projected emission	DR	Yes. The table is complete. It includes emissions due to the project activity, baseline emissions, leakage emissions and the overall emission reductions.	OK	OK





CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
reductions correctly applied?				
B.6.4.3 Is the projection in line with the envisioned time schedule for the project's implementation and the indicated crediting period?	DR I	The ex-ante estimate of emission reductions due to the project is calculated for a fixed crediting period of 10 years starting with the expected start of crediting date on 01/09/2011.	OK	OK
B.6.4.4 Is the data provided in this section in consistency with data as presented in other chapters of the PDD?	DR	It is consisting.	OK	OK
<b>B.7. Application of the monitoring methodology and description of the monitoring plan</b>				
It is assessed whether the monitoring plan is appropriate for the project activity and in line with the applied methodology				
<b>B.7.1 Data and parameters monitored</b>				
B.7.1.1 Is the list of parameters presented considered to be complete with regard to the requirement of the applied methodology?	DR	All the following parameters are presented with regard to the requirement of the applied methodology ACM0013.ver.4.0.0 in the revised PDD. EG <sub>PJ,y</sub> : Net quantity of electricity generated in the project plant and fed into the grid in year y FC <sub>coal,y</sub> : Quantity of coal combusted in the project plant in year y; FC <sub>diesel,y</sub> : Quantity of diesel oil consumed by the project plant in year y NCV <sub>coal,y</sub> : Weighted average net calorific value of coal consumed by the project plant in year y NCV <sub>diesel,y</sub> : Weighted average net calorific value of diesel consumed by the project plant in year y The five data are required by the monitoring methodology ACM0002 ,but CL04	CL04	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		The data and parameters monitored shall be included completely, such as the quantity of fossil fuel type q consumed by the project activity used for the auxiliary and start-up functions and weighted average net calorific value of fuel type q according to the latest methodology ACM0013.ver.4.0.0		
B.7.1.2 Are the means of monitoring of all parameters contained in the monitoring plan in accordance with the requirements of the applied methodology?(such as name of the data/parameter, data unit, description, source of data, measurement equipment, monitoring frequency, QA/QC procedures	DR	Please refer to CL04	CL04	OK
<b>B.7.2 Description of the monitoring plan</b>				
B.7.2.1 Is the operational and management structure clearly described and in compliance with envisioned situation?	DR	The data recording methods and the monitoring management structure, and calibration are clearly described in Section B7.2 ,but  CL05 The monitoring plan is not complete, such as the the QA/QC procedures and	CL05	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		the number of electronic belt scale ,please supplement it in the PDD		
B.7.2.2 Are the responsibilities and institutional arrangements for data collection and archiving clearly provided?	DR	Yes. The project owner is responsible for recording the data collection and archiving the data.	OK	OK
B.7.2.3 Does the monitoring plan provide current good monitoring practice?	DR	Yes. The monitoring plan includes monitoring organization, monitoring equipment and program, data collection, calibration, data management and monitoring report.	OK	OK
B.7.2.4 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?	DR	Yes. All monitored data records are kept until 2 years after the end of the crediting period.	OK	OK
B.7.2.5 If applicable: Does annex 4 provide useful information enabling a better understanding envisioned monitoring provisions?	DR	The parameters monitored are clearly described in Annex 4 for a better understanding of the envisioned monitoring plan.	OK	OK
<b>B.8. Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible</b>				



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
<b>person(s)/entity(ies)</b>				
B.8.1 Is there any indication of a date when the baseline was determined?	DR	Yes. It is determined on 01/03/2012 in the revised PDD version 03	OK	OK
B.8.2 Is this consistent with the time line of the PDD history?	DR	Yes. It is consistent.	OK	OK
B.8.3 Is the information on the person(s)/entity (ies) responsible for the application of the baseline and monitoring methodology provided consistent with the actual situation?	DR	Yes. The responsible people Miss ZHOU Ruixia, Miss.Lv Xin and Ms. Huang Jinfeng and Mr.DU Wenjun were interviewed on site.	OK	OK
B.8.4 Is information provided whether this person/entity is also considered a project participant?	DR I	China Carbon Technology Co., Ltd. and the above persons are not project participants.	OK	OK
<b>C. Duration of the Project Activity/Crediting Period</b> It is assessed whether the temporary boundaries of the project are clearly defined.				
<b>C.1. Duration of the project activity</b>				
C.1.1 Are the project's starting date and operational lifetime clearly defined and evidenced?	DR	Yes. The starting date of the proposed project activity is defined as the day on the main equipment purchasing contract becoming effective; The definition of the starting date of the project is in line with the "CDM Glossary of CDM terms" because it is the earliest date on which the project owner committed to expenditures related to the project activity.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
		The expected operational lifetime of the project activity is 20years, which is defined in the approved FSR.		
<b>C.2. Choice of the crediting period and related information</b>				
C.2.1 Is the assumed crediting period clearly defined and reasonable (renewable crediting period of Max 7 years with potential for 2 renewals or fixed crediting period of Max.10 years)?	DR I	The fixed crediting period of Max.10 years is defined clearly in the PDD.	OK	OK
<b>D. Environmental Impacts</b> Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the auditor.				
<b>D.1. Documentation on the analysis of the environmental impacts, including Trans- boundary impacts</b>				
D.1.1 Has an analysis of the environmental impacts of the project activity been sufficiently described?	DR	The environmental impacts of the project activity have been clearly described in Section D.1 of the PDD.	OK	OK
D.1.2 Are there any Host Party requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved?	DR	Yes. The EIA is a must in P.R. China for coal-fired power plants. The EIA of the proposed project was approved by State EPB on 07/11/2008. These documents have been reviewed by the auditor.	OK	OK
D.1.3 Will the project create any adverse environmental effects?	DR I	As described in the PDD, the environmental impacts are not significant via a serious of mitigation measures carried out.	OK	OK



CHECKLIST QUESTION MoV=Means of Verification, DR=Document Review, I=Interview	MoV	comments	Draft Concl.	Final Concl.
D.1.4 Are Trans-boundary environmental impacts considered in the analysis?	DR I	There is no trans-boundary impact described in the EIA reports or approvals of EIA.	OK	OK
<b>D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party.</b>				
D.2.1 Have identified environmental impacts been addressed in the project design?	DR	Yes.	OK	OK
D.2.2 Does the project comply with environmental legislation in the host country?	DR	Yes. The EIA was done and approved by the authorized organization.	OK	OK
<b>E. Stakeholder Comments</b> The auditor should ensure that stakeholder comments have been invited with appropriate media and that due account has been taken of any comments received.				
<b>E.1. Brief description how comments by local stakeholders have been invited and compiled</b>				
E.1.1 Have relevant local stakeholders been invited to consultation prior to the publication of the PDD?	DR I	Yes. The stakeholders were consulted through questionnaires in June 2009, This is prior to the publication of the PDD on 09/09/2010 CL06 The number of questionnaires shall be added in the PDD.	CL06	OK
E.1.2 Have appropriate media been used to invite comments by local stakeholders?	DR I	The local residents were invited by filling in the questionnaires.	OK	OK



<b>CHECKLIST QUESTION</b> MoV=Means of Verification, DR=Document Review, I=Interview	<b>MoV</b>	<b>comments</b>	<b>Draft Concl.</b>	<b>Final Concl.</b>
E.1.3 If a stakeholder consultation process is required by regulation/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	DR I	The stakeholder consultation process is required in the EIA in China. It has been carried out in accordance with the regulation	OK	OK
<b>E.2. Summary of the comments received</b>				
E.2.1 Is a summary of the stakeholder comments received provided?	DR I	This is Confirmed by detailed documents. The process is described in a complete and transparent manner.	OK	OK
<b>E.3. Report on how due account was taken of any comments received</b>				
E.3.1 Has due account been taken of any stakeholder comments received?	DR I	The overall comments with regards to the project were positive and the relevant stakeholders are satisfied with the compensations.	OK	OK



Table 2 Resolution of Corrective Action and Clarification Requests

CL/CAR/FAR Requests by Validation Team		Ref. to Table 1	Summary of PP's Response	Validation Team's Conclusion
CAR01	The Letters of Approval from DNA of Annex I Party and Non-Annex I Party have not been provided.	A.3	The LoAs from DNA of China and Finland have been provided.	Based on the LoAs provided by the PP, the validation team has checked that the written LoAs clearly states the four major requirements as indicated in the VVM ver.01.2, Hence CAR01 is closed.
CAR02	The latest Methodology ACM0013.ver.4.0.0 shall be adopted, including the application condition and data and parameters monitored.	B.1.1 B.1.2	The methodology ACM0013.ver.4.0.0 is applied in revised PDD.	This has been verified to be correct. Hence CAR02 is closed.
CAR03	The data from latest three years shall be used to meet one of the applicable conditions that the identified baseline fuel category used is more than 50% of total generation by utilities in the geographical area within the host country according to the latest methodology ACM0013 ver.4.0.0	B.2.1 B.5.1.1	In order to demonstrate the applicability condition you mentioned, the data from year 2007 to year 2009 is used in B.2 of the revised PDD.  According to Chapter 6-1 of <i>China Statistical Yearbook 2010</i> , the coal-fired electricity generation occupies more than 50% of total generation in the latest three years in China. Maximum value of same fossil fuel generation estimated for three years is greater than 50%. In 2009, coal-fired electricity generation is 77.3% of the total. In 2008, coal-fired electricity generation is 76.8% of the total. In 2007, coal-fired electricity generation is 77.7% of the total.	The validation team has checked China Power Yearbook (2008-2010) and confirmed to be correct. Hence, CAR03 is closed.





CAR04	<p>The selection of the most plausible and conservative baseline scenario needs to be substantiated in accordance with the Step 1 for identification of baseline scenario as mentioned under ACM0013 ver.4.0.0, on the basis of the following issues:</p> <p>(1) All the alternatives should deliver similar services (eg peak vs base load power) determined in the applied methodology ACM0013 ver.4.0.0, so please clarify and substantiate it;</p> <p>(2) Please provide proper justification for choosing different installed capacity to arrive the leveled cost of unit electricity generation instead of the same capacity;</p> <p>(3) Please clarify if all possible other power generation technologies are included;</p> <p>(4) All the sources needs to be further substantiated, in particular it is mentioned in PDD, Page 10 that the domestic power plants with single unit of 600MW are based prevalently on two types of power generation; however, this</p>	B.4.2 B.5.3.1	<p>1. The specific services for each alternative have been illustrated as follows:</p> <p><b>A1:</b> The project will supply electricity of 9,470GWh, and peak and base load power.</p> <p><b>A2:</b> 2*600MW Super-critical coal-fired power generation (A2) can deliver similar services as the project.</p> <p><b>A3:</b> As mentioned in B.4, subcritical coal-fired power generation (A3) with 4*300MW or below within CEPG is forbidden by the government. And 600MW subcritical coal-fired power generation is not common practice in China. Therefore, it is not realistic for 4*300MW (or 2*600MW) coal fired technology with subcritical technology (A3) to supply same services as the project.</p> <p><b>A4:</b> According to the <i>Natural Gas Industry Policy</i>, the construction of power plants consuming natural gas only provide peak load within the grid. So</p>	<p>(1)The validation team has verified the traceable links and cross-checked with China Power Yearbook and others, and considers that all the alternatives has been demonstrated based on the services and the links are traceable for validation. Hence CAR04(1) is closed;</p>
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	<p>statement has not been supported with traceable evidence. Furthermore, description in footnote 9 is not clear as to whether biomass power is unable to provide base load power.</p>		<p>natural gas power generation (A4) is excluded.</p> <p><b>A5:</b> In accordance to <i>Notice from State Council: On Further Strengthening Fuel-Efficient and Power-Saving</i>, the oil fired power generation project only provide peak load. So Fuel oil power generation (A5) is excluded.</p> <p><b>A6:</b> According to the survey from Agriculture Department of Zhejiang Province, there is no sufficient hydro energy resource remaining for new hydro power plants with comparable capacity or electricity generation. So the alternative of power generation using hydro power (A6) is excluded.</p> <p><b>A7:</b> The wind power output is extremely unstable, so power generation using wind energy cannot provide similar services (peak load).</p> <p>Due to no sufficient biomass to generate same electricity quantity as the project, biomass fired power generation cannot supply same electricity quantity.</p> <p>The power plants using solar energy cannot provide the compatible quantity of electricity to the grid as the project due to the small capacity.</p> <p>According to above analysis, A7 cannot provide similar services.</p>	
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			<p><b>A8:</b> Nuclear power plant cannot be operated as peak load, so it (A8) does not provide similar services as the project.</p> <p><b>A9:</b> Central China Grid is dominated by hydropower. As we all know, the output of hydropower varies seasonally. In addition, Central China region is lack of coal for power generation. So power shortages are a natural thing. Particularly in winter, power shortages are serious as a result of Changjiang River dry season coupled with coal shortage in Central China region. Obviously, the import of electricity from CCG can not supply base power load.</p> <p>In sum, only 2*600MW coal fired supercritical power generation technology can provide similar services as the project. The more details can be seen in B.4 of the revised PDD.</p> <p>2. As mentioned in B.4 of revised PDD, LCOEP calculation is implemented on alternative A1 and alternative A2. Although installed capacity of the two alternatives are not equal, but, as indicated in ACM0013, several smaller plants can provide equal capacity of the Project.</p> <p>In addition, the LCOEP is based on the</p>	<p>(2)The validation team has checked China Electric Power Yearbook 2008, 2009 and 2010; the coal-fired power plants with different installed capacity are common practice in China. Further, according to the requirements of the approved consolidated baseline and monitoring methodology ACM0013 ver.04,it</p>
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			<p>unit kWh, which is not impacted by the difference between the installed capacities.</p> <p>Therefore, the LCOEP analysis can be applied between alternatives with different installed capacities.</p> <p>3. As per ACM0013, all plausible baseline scenarios (including power generation using solar energy) have been identified. The details can be seen in B.4 of revised PDD.</p> <p>4. In GSP-PDD it mentions that domestic power plants with single unit of 600MW are based prevalently on two types of power generation i.e. sub-critical and supercritical technologies. However, according to approved power generation project by NDRC from 2004 to 2005, supercritical technology with single unit of 600MW is widely adopted in fossil fired power plants within CEPG. But, 600MW subcritical power plant was not a common practice. This is confirmed by the statistical table of 2009 fossil fired power plant (page 709, China Electric Power Yearbook 2010). Therefore, this description has been revised in the PDD .</p> <p>The footnote 9 in the GSP-PDD will aim</p>	<p>states” These alternatives need not consist solely of power plants of the same capacity, load factor and operational characteristics(i.e. several smaller plants, or the share of a larger plant may be a reasonable alternative to the project activity),the validation team considers that although the different installed capacity of alternatives is not equal to that of the proposed project, but several plants can provide the equal capacity of the proposed project. And the financial indicator is used as the levelized cost of electricity production in \$/kWh, which is not impacted by the difference between the installed capacity. Hence, the validation team considers it is appropriate and reasonable. Hence CAR04 (2) is closed.</p> <p>(3)The validation team has checked in the revised PDD and considers that all other power generation technologies such as renewable power generation have been included. Hence CAR04 (3) is closed.</p> <p>(4)This has been cross-checked via China Electric Power Yearbook and confirmed to be correct. And the</p>
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			<p>to provide traceable evidence that there is no sufficient biomass residue in Zhejiang Province for power generation as the project, but the linkage has been wrong, so the relevant part has been revised. According to calculation in revised PDD, 13.46 million ton biomass is needed for power generation of similar electricity quantities as the project. However, Annual available biomass quantity for power generation is only 11.43 million ton within CEPG. Obviously, the biomass fired power generation cannot provide similar services, including base load power.</p>	<p>footnote 9 has been verified to be traceable to demonstrate the biomass power unable to provide base load power. Hence CAR04 (4) is closed.</p> <p>Based on the above validation, CAR04 is closed.</p>
CAR05	Please clarify how to define the start date of the project activity based on the CDM Glossary of Terms.	B.5.2	<p>As stated in the latest Glossary of Terms, the starting date of a CDM project activity is the earliest date at which either the implementation or construction or real action of a project activity begins.</p> <p>As showed in the table of B.5, the main equipment purchasing contract was signed on Nov. 07, 2008 and come to effective on May 25, 2009. As stated in article 18 of equipment contract, <i>the contract will come into effect after the following terms and conditions are met</i>. One of terms and condition is that <i>the projects obtain the approval from NDRC</i>. The PP confirmed the contract came into effect on 25 May 2009, on</p>	<p>The validation team has verified the equipment purchase contract and mentioned the contract shall come into effect after the following terms and conditions are met, in which one of terms is the project gets the approval from NDRC.</p> <p>Besides that the validation team has checked the date of construction contract (17/08/2009), the validation team confirms that the start date of project activity is 25/05/2009 (the execution date of the main equipment contract), is the earliest date at which the implementation or construction or</p>



			<p>which the project was approved by NDRC.</p> <p>In total, comparing with the signing of the contract, the execution of contract is a “real action”. As we all know, if the project was rejected by NDRC, PP could not continue the project. In addition, Main project construction contract was signed in August 2009. On 17 August 2009, PP started the construction work.</p> <p>Comparatively, it is reasonable the effective date of the main equipment contracts, 25 May 2009, is chosen as the start date of the project.</p>	<p>real action of the project activity began which is in line with the CDM glossary. Hence CAR05 is closed.</p>
CAR06	<p>In step 2 to identify the economically most attractive scenario alternative, please further substantiate the following:</p> <p>(1) Please further provide clear description of each baseline scenario alternative, including information on the technology, in particular the efficiency and technical lifetime.</p> <p>(2) All the assumptions towards capital expenditure and cost of power generation for the project activity in the different scenarios need to be further substantiated with traceable sources;</p>	<p>B.5.4.5 B.5.4.7 B.5.4.9</p>	<p>1. The technical lifetimes for main equipments of the project have been added in table1. Energy efficiencies of the project and baseline are included in Table 1 or/and Table 5. More information related to LCOEP has been added in Table 6.</p> <p>2. The data source has been added in Table 5 of PDD and LCOEP calculation spreadsheet.</p>	<p>(1) The validation team has verified that all information on the technology, in particular the efficiency and technical lifetime has been supplemented to be correct. Hence CAR06 (1) is closed.</p> <p>(2) All the assumptions towards the capital expenditure and cost of power generation have been verified to be traceable and correct, Hence CAR06 (2) is closed.</p>



	<p>(3) The critical techno-economic parameters and assumptions should be clearly presented, in particular the load factor of the power plant;</p> <p>(4) Please substantiate the differences where the assumptions, input data and data sources for the investment analysis differ across the project activity and its alternatives such as the O&amp;M cost, capital expenditure</p>		<p>3. Key parameters have been presented in Table 5 of revised PDD. Plant load factor is also added in table 5.</p> <p>4. 4.1. For different input values:</p> <p>In sum, for the investment analysis, six input values (including capital cost, No. of staff, Material cost per MWh, other cost, coal consumption rate and construction period) differ between the two alternatives. The different input values result in different O&amp;M costs. The relationship can be seen in the process of O&amp;M cost calculation of LCOEP spreadsheet. The existing of these differences is reasonable, as follows:</p> <ul style="list-style-type: none"> <li>• <b>Capital expenditure per kW:</b> According to FSR, static total investment of the project is 7,542 million RMB and the total capacity is 2,000MW. According to this, the unit capital expenditure for Alternative 1 is 3,771RMB/kWh. In addition, unit capital expenditure for Alternative 2 is 3,562RMB/kWh, which is sourced from page 290 of “Unit Cost Referenced Index of Fossil-fired Power Engineering and Design of 2007”(hereafter referred to as UCRI). As showed in page 290 of</li> </ul>	<p>(3) This has been supplemented in the PDD. Hence CAR06 (3) is closed.</p> <p>(4) The differences for the investment analysis between the project activity and its alternatives have been cross-checked via the public information such as China Power Yearbook and the public document, and besides that the validation team has verified the evidences provided by the PP such as the actual employees and salary etc. and considers the differences are reasonable for the project activity and its alternative (2*600MW supercritical coal-fired power generation).Hence, CAR06(4) is closed.</p> <p>Based on the above, CAR06 is closed.</p>
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			<p>UCRI, the capital expenditure differs across projects with different single unit capacity and/or different technology. Therefore, it is reasonable that the capital expenditures for the two alternatives are different from each other.</p> <ul style="list-style-type: none"> <li> <b>No. of staff:</b> According to <i>Personnel Standards for Thermal Power Plant</i>, the number of staff is closely related to installation capacity. In general, the power plant with large single unit capacity has a high number of staff. It can be confirmed by data in page 288 of UCRI, the staff number is 247 persons for 2*600MW coal fired power plant, and it is 300 persons for 2*1000 MW coal fired power plant, which is consistent with the designed value in the project. Therefore, it is reasonable that the No. of staff is different between the project and baseline.         </li> <li> <b>Material cost per MWh and Other cost per MWh:</b> As per UCRI, with the increase of single unit capacity, the material cost per MWh reduces.         </li> </ul>	
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			<p>Same to UCRI, the material cost per MWh is 4RMB/MWh for the project and 5RMB/MWh for baseline scenario. Therefore, it is reasonable for the two alternatives to have different material cost per MWh. Same reason to material cost per MWh, other cost per MWh is different for the two alternatives.</p> <ul style="list-style-type: none"> <li>• <b>Coal consumption rate:</b> With the development of coal fired power generation technology, coal consumption rate tends to decrease. So it is reasonable that coal consumption rates for the two alternatives are different for different technologies: Ultra supercritical and super critical coal technology.</li> <li>• <b>Construction period:</b> According to UCRI, construction period is rising with the increase of single unit capacity. In UCRI, the construction period for 2*600MW coal fired project is 30 months, and that of 2*1000MW coal fired project is 36 months, which is higher than designed construction period for the project (32 months). Comparatively, the construction period of the</li> </ul>	
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			<p>project is a conservative period. Accordingly, it is reasonable for the two alternatives to have different construction periods.</p> <p>In total, the above differences you mentioned are reasonable.</p> <p><b>4.2 For different data sources:</b></p> <p>As mentioned in table 5, the input data of the project activity (A1) are completely sourced from FSR. As for baseline scenario (A2: 2*600MW supercritical coal fired power generation project), the data (including Static investment per MW capacity, Staff number and Gross Coal consumption rate) determined by single unit capacity and supercritical technology are derived from UCRI, and the other input values under baseline are same to that in the project FSR in a conservative manners.</p> <p>The UCRI includes complete data (related to O&amp;M cost and capital expenditure) of various coal fired power generation projects, and it is compiled by Chinese authorized institute, Electric Power Planning and Design Institute, and published by China Electric Power Press in 2008. So the data source of baseline is reliable and credible.</p>	
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			Therefore, it is necessary and reasonable that single unit capacity and technology-specific data are cited from other reliable source.	
CAR07	<p>In the LCOEP excel spreadsheet, the following issues shall be substantiated:</p> <p>(1) All the formula towards capital expenditure and cost of power generation for the project activity need to be further substantiated with traceable sources.</p> <p>(2) The formula used to calculated LCOEP in the excel spreadsheet shall be provided in the LCOEP excel spreadsheet.</p>	B.5.4.6	<p>(1) The data sources of input values have been added in the LCOEP excel spreadsheet.</p> <p>Formulas applied in O&amp;M cost are mainly deduced from general knowledge, descriptions of FSR and <i>Project Financial Assessment Methods and Indicators (3rd edition)</i>. The data sources of input values are added in the LCOEP excel spreadsheet.</p> <p>(2) The formula used to calculated LCOEP in the excel spreadsheet has been added in the LCOEP excel spreadsheet. And all relevant calculations in LCOEP spreadsheet are traceable</p>	<p>The validation team has verified the formula in the LCOEP excel spreadsheet, and the formula towards capital expenditure and cost of power generation have been traceable and cross-checked via the Project Financial Assessment Methods and Indicators(3<sup>rd</sup> edition) issued by China Planning Press and found to be correct. Hence CAR07 (1) is closed.</p> <p>This has been supplemented in the LCOEP spreadsheet. Hence CAR07 (2) is closed.</p> <p>Based on the above, CAR07 is closed.</p>
CAR08	Please provide the robust evidences that all similar projects are in the process of CDM development regarding the common practice analysis procedure.	B.5.6.2 B.5.6.3	As per Tool for the demonstration and assessment of additionality (version 05.2), <i>similar activities are defined as activities that rely on a broadly similar technology or practices, are of a similar scale, take place in a comparable environment with respect to</i>	<p>All these have been cross-checked via China Power Yearbook and the website of <a href="http://cdm.ccchina.gov.cn/web/index.asp">http://cdm.ccchina.gov.cn/web/index.asp</a> confirmed all similar projects are in the process of CDM development, Hence</p>



			<p><i>regulatory framework and are undertaken in the relevant geographical area. Those CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) are not to be included in this analysis.</i></p> <p>According to public available databases with ultra-supercritical projects: China Electric Power Yearbook 2010, four similar projects within the CEPG is identified. As showed in PDD, all similar activities within CEPG need support from CDM. The details can be seen in step 4 of B.5.</p>	CAR08 is closed.
CL01	The net thermal efficiency up to 43.39% in Section A.2 and A.4.3 is not traceable.	A.2.4 A.4.3.1	<p>The efficiency is based on the formula (6) of ACM0013, as follows,</p> $\eta_{BL} = 3.6 \cdot \frac{EG}{FC \cdot NCV}$ <p>Of which,  3.6=Unit conversion factor from GJ to MWh  EG=9,470GWh (Electricity quantity supplied to grid, see Page 52 of volume 2 of FSR)  FC=9,470GWh*283.08t/GWh=2,680,768t  (Quantity of fuel consumed in the project plant, see Page 7 of volume 2 of FSR), of which 283.08t/GWh indicates Net Coal Consumption Rate.</p>	This has been verified to be correct and traceable in the PDD. Hence, CL01 is closed.



			NCV=29.307GWh/tce (Average net calorific value of the standard coal in power plant, data source is <i>General principles for calculation of total production energy consumption GB2589-90</i> ) Therefore, the efficiency is equal to 43.4%.	
CL02	The reheat steam inlet/outlet pressure and temperature in the PDD is not in consistence with that mentioned in the purchase contract. Please clarify it. The efficiency of generators in the PDD is not in consistence with the value in the purchase contract of generators. Please clarify it.	A.4.3.2	Based on technical protocol of steam turbine, the parameters (reheat steam inlet/outlet pressure and temperature) in PDD have been revised.  The efficiency of generators in the PDD is $\geq 99\%$ , which is consistent with that in page 6 of technical protocol of generator .	The validation team has cross-checked the technical protocols of steam turbine and generator and confirmed to be in consist. Hence, CL02 is closed.
CL03	The technology for start-up or auxiliary functions in the PDD is not in consistence with that mentioned in the FSR, please clarify it.	B.6.1.1	The auxiliary oil-fired start-up technology will be applied in the project. So the relevant part of the PDD has been revised based on it.	This has been verified via on-site visit and it is confirmed to be correct. Hence CL03 is closed.
CL04	The data and parameters monitored shall be included completely, such as the quantity of fossil fuel type q consumed by the project activity used for the auxiliary and start-up functions and weighted average net calorific value of fuel type q according to the latest methodology ACM0013.ver.4.0.0	B.7.1	The parameters, $FC_{q,y}$ and $NCV_{q,v}$ , have been added in the revised PDD.	The data and parameters ( $FC_{q,y}$ and $NCV_{q,v}$ ) has been supplemented in the PDD and all relevant description has been verified to be reasonable. Hence CL04 is closed.
CL05	The monitoring plan is not complete,	B.7.2.1	The relevant content has been added in	Based on the document review and



	such as the QA/QC procedures and the number of electronic belt scale ,please supplement it in the PDD		<p>monitoring plan, as follows:</p> <ul style="list-style-type: none"> <li>• All the monitoring instruments applied in the Project shall meet the measurement accuracy and shall be subject to regular maintenance and testing regime to ensure accuracy by a certified third calibration party. The project participants shall keep and provide the certifications of the third calibration party.</li> <li>• Data and records will be checked prior to being recorded and archived, and possible errors would be identified during this step.</li> <li>• In case of emergencies, the project owner will not claim emission reductions due to the project activity for the duration of emergency.</li> <li>• In case the meter operates abnormally, the readings from the back up meters will be used. If the back up meter is not within acceptable limits of accuracy or performed improperly, the proposed project owner and the grid company shall jointly prepare a new agreement of the correct readings.</li> <li>• Training on CDM monitoring will be provided to the relevant staff to guarantee the success of the implementation of the monitoring plan.</li> </ul>	on-site interview, the validation team has considered that
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			The total two electronic belt scales are installed in power plant.	
CL06	The number of questionnaires shall be added in the PDD.	E.1.1	In June 2009, totally 30 questionnaires were distributed to the villagers to better understand stakeholders' comments by the Project owners. The number of questionnaires (30) has been added in revised PDD.	The validation team has verified the relative evidences and confirmed that it is correct. Hence CL06 is closed.



## Appendix 2 Certificate of Competence

LIU Qingzhi

Qualification in accordance with CEC-4001C-B/5 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2, 5.1, 11.1, 12.1

Beijing, 25 Mar 2011

ZHANG Xiaodan

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CDM Supervisor, Technical Director

XU Linghua

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Quality Assurance Management Division





**ZHANG Xiaohong**

Qualification in accordance with CEC-4001C-B/5 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2, 13.1

Beijing, 25 Mar 2011

ZHANG Xiaodan

XU Linghua

A handwritten signature in black ink, appearing to read 'Xiaodan Zhang', is positioned below the name ZHANG Xiaodan.

A handwritten signature in black ink, appearing to read 'Linghua Xu', is positioned below the name XU Linghua.

CDM Supervisor, Technical Director

Quality Assurance Management Division



**SHEN Qiunong**

Qualification in accordance with CEC-4001C-B/5 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2, 1.2

Beijing, 25 Mar 2011

ZHANG Xiaodan

XU Linghua

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A handwritten signature in black ink, appearing to read 'Xu Linghua', is positioned below the name.

CDM Supervisor, Technical Director

Quality Assurance Management Division



**MA Xiao**

Qualification in accordance with CEC-4001C-B/5 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor Trainee: Yes

Industry Sector Expert for Technical Area(s):

Beijing, 25 Mar 2011

ZHANG Xiaodan

XU Linghua

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CDM Supervisor, Technical Director

Quality Assurance Management Division



**YIN Yun**

Qualification in accordance with CEC-4001C-B/5 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.1, 1.2, 2.2, 3.1

Beijing, 25 Mar 2011

ZHANG Xiaodan

XU Linghua

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A handwritten signature in black ink, appearing to read 'Xu Linghua', is positioned below the name.

CDM Supervisor, Technical Director

Quality Assurance Management Division



**WANG Yanping**

Qualification in accordance with CEC-4001C-B/5 *Operation Instruction for Personal Competence Assessment* for CDM

CDM Auditor: Yes

Industry Sector Expert for Technical Area(s): 1.2, 15.1

Beijing, 25 Mar 2011

ZHANG Xiaodan

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CDM Supervisor, Technical Director

XU Linghua

A handwritten signature in black ink, appearing to read 'Xu Linghua', is positioned below the name.

Quality Assurance Management Division